

About IITM

About IIT Madras Indian Institute of Technology Madras is one of the foremost institutes of national importance for higher technical education and research. In 1956, the German Government offered technical assistance in establishing an institute of higher education in engineering in India. The first Indo-German agreement in Bonn, West Germany for the establishment of the Indian Institute of Technology at Madras was signed in 1959. The Institute was formally inaugurated in 1959 by Prof. Humayun Kabir, Union Minister for Scientific Research and Cultural Affairs. The IIT system has twenty three Institutes of Technology. The first of these to be instituted are at Kharagpur (estb. 1951), Mumbai (estb. 1958), Chennai (estb. 1959), Kanpur (estb. 1959), Delhi (estb. 1961), Guwahati (estb. 1994) and Roorkee (estb. 1847, joined IITs in 2001). The Institute has sixteen academic departments and several advanced research centres in various disciplines of engineering and pure sciences. A faculty of international repute, a brilliant student community, excellent technical & supporting staff and an effective administration have all contributed to the pre-eminent status of IIT Madras. The campus is located in the city of Chennai, previously known as Madras. Chennai is the state capital of Tamil Nadu, a southern state in India. Contact Us Indian Institute of Technology Madras IIT P.O., Chennai 600 036 INDIA

Important Dates Academics Term Structure Course Registrations Assessments Exam Cities Fee Structure Diploma in Programming Diploma in Data Science Admissions Eligibility Mandatory Requirements Application Process Qualifier Exam Qualifying Criteria International Students About IITM About IIT Madras Contact Us Merchandise SIGN IN Application for the next batch of the Diploma Program is now open. APPLY NOW Applications open now for next batch of the Diploma Program APPLY NOW Home About IITM About IIT Madras Indian Institute of Technology Madras is one of the foremost

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colleges. With IITM continuing to lead the NPTEL project, it makes them the perfect choice to offer an online diploma program. Relevant Links www.iitm.ac.in
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Please email support-diploma@study.iitm.ac.in - Our normal response time is 3 working days. It might take a little longer during busy periods. We will share Google Meet links during such periods.

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Quizzes and End Term Exams. Course Registrations In each term, learner may register for upto 4 courses. Foundational courses: The learners must register for the following two

Foundational courses in the first term. Additionally, the candidate may choose to register for one or two more

courses in the first term. Diploma in Programming: Computational Thinking and Programming in Python Diploma in Data Science: Mathematics for Data Science II and Statistics for Data Science II Projects: Two of the courses have a project component of 2 credits each.

Learners registering for these courses will automatically be registered for the respective projects. These

projects can be completed alongside their theory courses or in a later term. Diploma in Programming: Modern Application Development I - Project and Modern Application Development II - Project Diploma in Data Science: Business Data Management - Project and Machine Learning Practice - Project Assessments There are 3 types of assessments for each course: online Weekly Assignments monthly in-person Quizzes in-person End Term Exam In addition, assessments may include projects, programming exams and vivas. Exam Cities The Invigilated Quizzes and End Term exams are conducted in a number of cities spread across India. The map shows

our current Exam Cities List. View List Students residing/physically present in India on exam day All students residing in India or physically present in India on the day of an in-centre exam must write exams at one of the exam centres in india. Learners based outside India We also conduct in-person exams in Bahrain, Kuwait, Oman and UAE. Learners based out of other countries will be allowed to take up remote proctored exams. On exam day, students writing such internet based exams will be asked to pin the location exam is being taken

from. If any overseas students are planning to be in India on exam day, it is the student's responsibility to notify us

ahead of time so that we can arrange for you to write the exam(s) in one of the exam centres in india; hall tickets

will also be issued suitably. If any of these norms are violated, it will be considered as malpractice. Exam results

may be withheld pending investigation and findings of the exam committee. Note: Additional Exam Fee applies for all learners opting to write exams outside India. If you reside outside India and cannot find a centre in your city / country, please write to ge@study.iitm.ac.in for assistance. Exam Cities List Bahrain Manama Kuwait Salmiya Oman Muscat Singapore Singapore Sri Lanka Colombo Jaffna UAE Dubai Hamdan (AUH) Sharjah Andaman And Nicobar Islands Port Blair Andhra Pradesh Anantapur Bhimavaram Guntur Kadapa Kurnool Rajahmundry Tirupathi Vijayawada

Vishakhapatnam Arunachal Pradesh Naharlagun Assam Dibrugarh Guwahati Silchar Tezpur Bihar Patna Bhagalpur Gaya Muzaffarpur Darbhanga Chhattisgarh Raipur Delhi Delhi Goa Panaji Gujarat Ahmedabad Anand Rajkot Surat Vadodara Haryana Faridabad Gurgaon Kurukshetra Himachal Pradesh Hamirpur Shimla Jammu and Kashmir Jammu Srinagar Jharkhand Dhanbad Jamshedpur Ranchi Karnataka Belgaum Bengaluru Dharwad Gulbarga Mangalore Mysore Kerala Calicut Ernakulam Kollam Kottayam Palakkad Thrissur Trivandrum Madhya Pradesh Bhopal Gwalior Indore Jabalpur Maharashtra Amravati Aurangabad Jalgaon Kolhapur Mumbai Nagpur Nanded Nashik Pune Solapur Manipur Imphal Meghalaya Shillong Mizoram Aizawl Nagaland Dimapur Odisha Bhubaneswar Rourkela Sambalpur Puducherry Puducherry Punjab Chandigarh Jalandhar Ludhiana Amritsar Rajasthan Jaipur Jodhpur Kota Udaipur Sikkim Bardang Tamil Nadu Chennai-Avadi Chennai-South Coimbatore Erode Kanchipuram Madurai Salem Thanjavur Tiruchirappalli Tirunelveli Vellore Telangana Hyderabad Warangal Tripura Agartala Uttar Pradesh Agra Allahabad Ghaziabad Gorakhpur Greater Noida Kanpur Lucknow Meerut Varanasi Uttarakhand Dehradun Haldwani Roorkee West Bengal Aasansol Adisaptagram Durgapur Kolkata Siliguri

Close Fee Structure For details about application fees, check Application Process section in Admissions page. Each term, pay only for the courses you register for in that specific term. Foundational courses - 4,000 per course Diploma in Programming: Computational Thinking; Programming in Python Diploma in Data Science: Mathematics for Data Science II; Statistics for Data Science II Skill Enhancement courses - 7,500 per course. Diploma in Programming: System Commands Diploma in Data Science: Tools in Data Science All other Diploma courses - 10,000 per course Projects - 2,500 per project Diploma in Programming: Modern Application Development I - Project; Modern Application Development II - Project Diploma in Data Science: Business Data Management - Project; Machine Learning Practice -

Project Additional Exam Fee will apply ONLY for learners

taking our courses from outside India. Fee waivers depend on the socio-economic background of the learner. Family Income > 5 LPA Family Income > 1 LPA and <= 5 LPA Family Income <= 1 LPA Fees Docs Required Fees Docs Required Fees Docs Required General Full Fee NIL 50% waiver EWS + Family Income 75% waiver EWS + Family Income OBC Full Fee NIL 50% waiver OBC-NCL + Family Income 75% waiver OBC-NCL + Family Income SC / ST 50% waiver SC / ST 50% waiver SC / ST 75% waiver SC / ST + Family Income PwD 50% waiver PwD 50% waiver PwD 75% waiver PwD + EWS / OBC-NCL + Family Income SC / ST + PwD 75% waiver SC / ST + PwD 75% waiver SC / ST + PwD 75% waiver SC / ST + PwD *Fee waiver is not be applicable for the International students. The term family income for the purpose of availing fee waivers includes the income of the candidate, the income of his/her parents and spouse, also the income of his/her siblings and children below the age of 18 years. family income certificate is not required while applying for Diploma program, but will be required to avail

fee weiver when joining the program. Download Family income Certificate format OBC-NCL / EWS certificate, if applicable, need to be obtained in following format while applying. Download OBC-NCL Certificate format Download EWS Certificate format Diploma in Programming Computational Thinking Foundational course 4 credits Details Programming in Python Foundational course 4 credits Details Database Management Systems Programming course 4 credits Details Programming, Data Structures and Algorithms using Python Programming course 4 credits Details Modern Application Development I Programming course 4 credits Details Modern Application Development I - Project Project 2 credits Details Programming Concepts using Java Programming course 4 credits Details Modern Application Development II Programming course 4 credits Details Modern Application Development II - Project Project 2 credits Details System Commands Skill Enhancement course 3 credits Details Diploma in Data Science Mathematics for Data Science II Foundational course 4 credits Details Statistics for Data Science II Foundational course 4 credits Details Machine Learning Foundations Data Science course 4 credits Details Business Data Management Data Science course 4 credits Details Business Data Management - Project Project 2 credits Details Machine Learning Techniques Data Science course 4 credits Details Machine Learning Practice Data Science course 4 credits Details Machine Learning Practice - Project Project 2 credits Details Business Analytics Data Science course 4 credits Details Tools in Data Science Skill Enhancement course 3 credits Details

Admissions - Important Dates Academics Term Structure Course Registrations Assessments Exam Cities

Fee Structure Diploma in Programming Diploma in Data Science Admissions Eligibility Mandatory Requirements Application Process Qualifier Exam Qualifying Criteria International Students About IITM About IIT Madras Contact Us Merchandise SIGN IN e Admissions Eligibility completed any UG degree through any mode or completed at least two years of any UG degree through any mode

before September 2024. Mandatory Requirements to Enroll and Learn Access to good internet connection as well as a laptop/desktop

device will be a key requirement to learn effectively from our courses. For a complete list of software and hardware requirements, please refer to this document - Mandatory System Specifications. Learner should be able to travel to assigned exam centres for

quizzes and exams each term. Check the exam cities section in the Academics page to see where our exam centres are

currently located. Application Process Application form for the batch starting September 2024 is currently open. Click here to apply. Anyone who is eligible may apply by filling in the application

form, uploading required documents, and paying the application fee. General Category / OBC Applicant 6000 application fee SC / ST Category / PwD ($\geq 40\%$ disability) Applicant 3000 application fee SC / ST Category Applicant who is ALSO PwD ($\geq 40\%$

disability) 1500 application fee All applicants should attend the in-person Qualifier Exam and obtain the minimum required cutoff marks to join the program. Within India: Exams are conducted in designated centres in 110+ cities

in an invigilated manner that candidates have to attend in person. Outside India: Applicants opting to write the Qualifier Exam outside India must pay an additional exam fee. In countries where we have exam centres, candidates will write exams in person at these centres, else they will appear for remote proctored online exams. Qualifier Exam Qualifier Exam for Diploma in Programming

Subjects: English, Aptitude,

and Basic Mathematics Duration: 3 hours Click here to view detailed syllabus, reference videos and mock question

papers. Qualifier Exam for Diploma in Data Science Subjects: English, Programming in Python, Mathematics, and Statistics Duration: 4 hours Click here to view detailed syllabus, reference videos and mock question

papers. Qualifying Criteria To pass the Diploma Qualifier Exam, the learner has to get a minimum Total Qualifier Exam Score and a minimum Qualifier Exam Score in each subject individually. Min. Req. Total Qualifier Exam

Score Min. Req. Qualifier Exam Score in each subject General Learner 50% 40% SC /ST /PwD* 40% 30% SC / ST + PwD* 40% 30% OBC-NCL / EWS* 45% 35% *Note: Relaxations in pass criteria indicated for various

categories of learners, is applicable ONLY for the qualifier exam.

There will be no relaxations in terms of grades / pass criteria

once registered into the program. Only those who pass the Qualifier Exam will be eligible to register for the respective Diploma Program. Learners who pass the Diploma Qualifier Exam on

01 September, 2024 will

be eligible to register and join the program in the September 2024

term only. International Students Are you a learner outside India interested to join this program?

Are you worried about the in-person assessments? This program is open to learners from all around the globe. You

can study from IIT Madras and earn a Diploma in programming or

data science irrespective of the country you are from. IIT Madras is setting up modalities to conduct in-person exams in

as many countries as possible. Currently, we conduct in-person

exams in the following cities outside India: UAE - Dubai, Sharjah, Abu Dhabi Sri Lanka -

Colombo, Jaffna Bahrain - Manama Students residing in these countries must write exams in the designated exam centres. Students have to appear for in-person

exams roughly once a month. Learners residing in any other country, apart from those shown

above, can also enroll for this program and appear for remote proctored exams. Please write to the following email id with any queries you might have - ge@onlinedegree.iitm.ac.in. Our team will get in touch with you and guide you on the next steps. Outside India learners who have taken exams with us till date:

159 View detailed location of learners outside India Outside India learners who have taken exam with us till date Country Number of learners Mode of Exam BAHRAIN 2 Remote proctored CANADA 3 Remote proctored KENYA 1 Remote proctored KUWAIT 3 Remote proctored OMAN 4 Remote proctored QUATAR 8 Remote proctored SAUDI ARABIA 2 Remote proctored SINGAPORE 5 Remote proctored UNITED ARAB EMIRATES 127 "In centre: Dubai, Sharjah, Hamdan Others are remote

proctored" UNITED KINGDOM 1 Remote protected UNITED STATES 3 Remote protected Okay Diploma in Data Science English - Syllabus Doc - mock Question Paper Programming in Python - Syllabus Doc - Video Playlist - mock Question Paper Mathematics - Syllabus Doc - Video Playlist - mock Question Paper Statistics - Syllabus Doc - Video Playlist - mock Question Paper Computational Thinking (will not be included in exam syllabus. Given just for your

reference) - Syllabus Doc - Video Playlist - mock Question Paper Diploma in Programming English - Syllabus Doc - mock Question Paper Aptitude - mock Question Paper Basic Mathematics - Syllabus Doc - Video Playlist - mock Question Paper Required Documents to apply 1. Passport size photograph (JPEG / JPG format) 50KB-150KB 2. Signature (JPEG / JPEG format) 4KB-150KB 3. Photo ID Card Scan - Aadhar Card / PAN Card / Passport /

Voter ID / Driving License / 12th Admit card with photo /

other Government ID with photo (JPEG / JPG / PDF format) - 50KB to 2MB file size. 4.

Category Certificate - only for applicants who select SC /

ST / OBC-NCL* / EWS (JPEG / JPG / PDF format) - 50KB to 2MB file size. 5. PwD Certificate - only for applicants with 40% or more

disability (JPEG / JPG / PDF format) - 50KB to 2MB file size. 6. Proof of applicant having been permanently disabled OR

parent having been permanently disabled / killed during war or peacetime operations while serving as a defence / paramilitary personnel. - if applicable (JPEG / JPG / PDF format) - 50KB to 2MB file size. *Note that BC /

OBC certificate is not the same as OBC-NCL

(Other Backward Caste - Non Creamy Layer) certificate. Only applicants belonging to OBC caste as listed in Central

Government's www.ncbc.nic.in website and also belonging to Non Creamy Layer may apply in the "OBC-NCL" category. Other BC /

OBC applicants must apply in the "General" category. Download OBC-NCL Certificate format

Download EWS Certificate format Okay Contact Us IITM BS Degree Office, 3rd Floor, ICSR

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and

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For this purpose, we will maintain the highest standards of integrity,

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be bound by the following rules: Be respectful of others • We will respect others, including IIT

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employees, and will act in a professional manner while participating in

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personal information and data. Treat people fairly • We will not engage in harassment of any kind,

including sexual

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or otherwise. • We will not discriminate against any person because of characteristics

protected by law (e.g., age, ancestry, color, disability or handicap,

national origin, race, religion, gender, sexual or affectional

orientation, gender identity, gender expression, appearance,

matriculation, political affiliation, marital status, social or

professional status). Refrain from retaliation • We will not retaliate against any IIT Madras DIPLOMA

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employee or other person who reports an act of misconduct, or who

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Code of conduct

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and any additional terms specific to a course or program. This Honor Code, and any additional terms, will be posted on our website - diploma.iitm.ac.in. Honour Code Pledge By registering in an IIT Madras Diploma programme, I agree that I will:

- Complete all tests and assignments on my own, unless collaboration on an assignment is explicitly permitted.
- Maintain only one user account, unless IIT Madras has approved the use of a separate user account in connection with an employer-sponsored or university-sponsored program.
- Not let anyone else use my username and/or password.
- Not engage in any activity that would dishonestly improve my results, or improve or hurt the results of others.
- Not engage in any activity that will cause grief or harm to the diploma programmes websites/portals or study materials, including activities like hacking or accessing restricted materials.
- Not post answers to problems that are being used to assess learner performance either inside the course forums or in any other website.
- Not resubmit or submit work (in identical or similar form) for multiple assignments without prior explicit approval.
- Not submit false or altered or fabricated admission documents including signatures or certificates of enrollment or standing, registration forms, and medical certifications.

Violations If you are found in violation of the Terms of Service or Honor Code, you may be subject to one or more of the following actions:

- Receiving a zero or no credit for an assignment;
- Having any certificate/degree earned in the course or programme withheld or revoked;
- Being unenrolled from a course or programme; or
- Termination of your use of the IIT Madras DIPLOMA PROGRAMMES Site.

• Additional actions may be taken at the sole discretion of IIT Madras.

- No refunds will be issued in the case of any corrective action for such violations.

Honor Code violations will be determined at the sole discretion of IIT Madras. You will be notified if a determination has been made that you have violated this Honor Code and you will be informed of the corresponding action that will be taken as a result of the violation.

Changing the Honour Code Please note that we review and may make changes to this Honor Code from time to time. Any changes to this Honor Code will be effective immediately upon posting on diploma.iitm.ac.in page, with an updated effective date. By accessing the IIT Madras DIPLOMA PROGRAMMES Site after any changes have been made, you signify your agreement

on a prospective basis to the modified Honor Code and any changes contained therein. Be sure to return to

this page periodically to ensure familiarity with the most current version of this Honor Code.

Eligibility Anyone interested with at least two years of any UG

education. Coursework 8 theory courses, plus hands-on training through 2 projects.

Flexibility Learn at your own pace, from anywhere, within or outside

India. Skills Exit the program as a certified programmer or data scientist. Learn

from the best IIT Madras is an Institute of Eminence. Ranked No.1 in the 'Overall' Category for three consecutive years and ranked No.1 in

the 'Engineering Institutions' Category for six consecutive years by NIRF. Open to

anyone who has

completed any UG degree or at least two years of any UG degree through any

mode. Need NOT have an

engineering or computer

science background. Students, working

professionals, job seekers and anyone else

interested can apply. Improve your

employability and advance your career. Carefully designed

courses by experienced

faculty. About the Program IIT Madras is offering Diplomas in Programming and

Data Science for college

students, working professionals and job seekers who aim to build a career in these domains.

The

convenience of online learning combined with in-person assessments makes the program

flexible and

affordable while retaining the exceptional quality of learning that IIT Madras stands for.

Currently, the following diplomas are being offered: Diploma in Programming Diploma in Data Science Diploma in Programming Apply now Full Stack Development Programming in Java Programming

in Python Advanced SQL Database Design Develop Web Applications Develop APIs Fee: 70,500 Upto

75% fee waivers available Duration: 8 months* Coursework: 8 courses + 2 projects View list of

courses Diploma in Data Science Apply now Predictive Analytics Machine Learning

Techniques Data Visualization Tools Statistical Modeling Business Analytics Python Programming

Libraries like Scikit-learn and TensorFlow Fee: 70,500 Upto 75% fee waivers available Duration: 8

months* Coursework: 8 courses + 2 projects View list of

courses *shortest

possible duration Diploma Qualifier Exam Exam Date: 01 September, 2024 Applicants

must attend the in-person Diploma Qualifier Exam at an exam centre. Those who

clear this exam will be allowed to register and join the program. Classes start on 20

Sep, 2024. Syllabus for the Exam : Refer section in Admissions page Wish to learn the basics and pursue

a BS Degree in Programming and Data Science from IIT

Madras? Go to our study.iitm.ac.in website Important Dates Contact Us IITM BS Degree

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You might also reach us over phone at 7850999966.

Course Page - BSCS1001 Computational Thinking The students will be introduced to a number of programming concepts using illustrative examples which will be solved almost entirely manually. The

manual execution of each solution allows for close inspection of the concepts being discussed. by

Madhavan Mukund , G Venkatesh Course ID: BSCS1001 Course Credits: 4 Course Type: Foundational

Recommended Pre-requisites:

None What you'll learn VIEW COURSE VIDEOS Applying a procedural approach to real life problems: sequencing basic steps, identifying common patterns. Communicating procedural descriptions: flowcharts, pseudo-code. Understanding underlying abstractions used in programming, through examples: variables, iteration, accumulation, filtering, parametrised procedures, polymorphism and state. Selecting appropriate data structures to store relationships between data: lists, trees, matrices, graphs. Identifying algorithmic techniques to solve a given problem: searching, sorting, indexing, matching. Decomposing problems into smaller units to find a solution: recursion, divide and conquer. Understanding and checking algorithms: predict their behaviour, design tests to verify their output, perform simple debugging. Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Variables, Initialization, Iterators, Filtering, Datatypes, Flowcharts, Sanity of data WEEK 2 Iteration, Filtering, Selection, Pseudocode, Finding max and min, AND operator WEEK 3 Multiple iterations (non-nested), Three prizes problem, Procedures, Parameters, Side effects, OR operator WEEK 4 Nested iterations, Birthday paradox, Binning WEEK 5 List, Insertion sort WEEK 6 Table, Dictionary WEEK 7 Graph, Matrix WEEK 8 Adjacency matrix, Edge labelled graph WEEK 9 Backtracking, Tree, Depth First Search (DFS), Recursion WEEK 10 Object oriented programming, Class, Object, Encapsulation, Abstraction, Information hiding, Access specifiers WEEK 11 Message passing, Remote Procedure Call (RPC), Cache memory, Parallelism, Concurrency, Polling, Preemption, Multithreading, Producer Consumer, Atomicity, Consistency, Race condition, Deadlock, Broadcasting WEEK 12 Top-down approach, Bottom-up approach, Decision tree, Numerical prediction, Behaviour analysis, Classification + Show all weeks About the Instructors Madhavan Mukund Director,

Chennai Mathematical Institute Madhavan Mukund studied at IIT Bombay (BTech) and Aarhus University (PhD). He has been a faculty member at Chennai Mathematical Institute since 1992. His main research area is formal verification. He has active research collaborations within and outside India and serves on international conference programme committees and editorial boards of journals. ... more He has served as President of both the Indian Association for Research in Computing Science (IARCS) (2011-2017) and the ACM India Council (2016-2018). He has been the National Coordinator of the Indian Computing Olympiad since 2002. He served as the Executive Director of the International Olympiad in Informatics from 2011-2014. In addition to the NPTEL MOOC programme, he has been involved in organizing IARCS Instructional Courses for college teachers. He is a member of ACM India's Education Committee. He has contributed lectures on algorithms to the Massively Empowered Classroom (MEC) project of Microsoft Research and the QEEE programme of MHRD. less Visit website Other courses by the same instructor: BSCS2002 -

Programming, Data Structures and Algorithms using Python and BSCS2005 -
Programming Concepts using Java G Venkatesh Professor of Practice,

Department of Humanities and Social Sciences,

IIT Madras Dr. Venkatesh is a Professor of Practice at IIT Madras, where he is involved with several projects in the field of education. He is also a Fellow and Director of Sasken Communication Technologies Ltd, a leading Indian R&D services provider, and a founder of Mylspot, an education technology startup that aims to bridge knowledge gaps of students through a mentored learning platform. ... more Dr Venkatesh is a graduate in electronics from IIT Madras, PhD in Computer Science from TIFR, Mumbai and was a faculty member of the Computer Science & Engineering Dept of IIT Bombay for 8 years where his research interests revolved around declarative languages and their application to the design of embedded systems. He moved to the industry when Sasken was being formed, where he led their technology activities for over two decades. He was a visiting/adjunct faculty at IIM Bangalore for 10 years and a Chair Professor in the department of EE at IIT Madras for 3 years. Dr. Venkatesh was

elected as a fellow of the Indian National Academy of Engineers in 2006 and the IETE in 2012. He won the Technomenter award of the Indian Electronics and Semiconductor Association in 2013 and the Vasvik award for industrial research in 2015. Dr. Venkatesh serves on a number of government, industry and investor committees and boards in the areas of microelectronics, telecommunications and education. less
Other courses by the same instructor: BSMS2001 -

Business Data Management and BSMS2002 -
Business Analytics

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Structure Course Registrations Assessments Exam Cities Fee Structure Diploma in Programming
Diploma in Data Science Admissions Eligibility Mandatory Requirements Application Process Qualifier
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SIGN IN Application for the next batch of the Diploma Program is now open. APPLY NOW Applications
open now for next batch of the Diploma Program APPLY NOW Home Academics BSCS1002
Programming in Python This will be the first formal programming course that students will see in this
programme. The goal of this course is to introduce Python programming, which is used throughout the
programme, with a basic problem solving and algorithmic flavour. by Sudarshan Iyengar Course ID:
BSCS1002 Course Credits: 4 Course Type: Foundational Recommended Pre-requisites:

None What you'll learn VIEW COURSE VIDEOS Using basic programming concepts
such as variables, expressions, loops, conditionals and functions in Python Creating, manipulating, and
using more Python specific features such as lists, tuples, and dictionaries Familiarising with and using
common Python libraries such as random, math, datetime, scipy, matplotlib, Pandas etc Analysing real
life activities and casting them as programming problems Applying programming concepts to analyse and
solve diverse problems Writing Readable code and debugging it Building small applications using python
Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person
invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1
Introduction to algorithms WEEK 2 Conditionals WEEK 3 Conditionals (Continued) WEEK 4 Iterations and
Ranges WEEK 5 Iterations and Ranges (Continued) WEEK 6 Basic Collections in Python WEEK 7 Basic
Collections in Python (Continued) WEEK 8 Basic Collections in Python (Continued) WEEK 9 File
Operations WEEK 10 File Operations (Continued) WEEK 11 Module system in python WEEK 12 Basic
Pandas and Numpy processing of data + Show all weeks Prescribed Books The following are the
suggested books for the course: Title: Python for Everybody. Author: Charles R. Severance. Publisher:
Shroff Publishers. ISBN: 9789352136278 (The PDF of this book is currently available freely at
http://do1.dr-chuck.com/pythonlearn/EN_us/pythonlearn.pdf) About the Instructors Sudarshan Iyengar
Associate Professor and Head ,

Department of Computer Science and Engineering,

IIT Ropar Sudarshan Iyengar has a PhD from the Indian Institute of Science and is
currently working as an Associate Professor and Head of CSE at IIT Ropar. less Visit website View all
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BSCS2001 Database Management Systems A comprehensive introduction to databases, database
management, and relevant topics like database security, integrity, concurrency, and data warehousing. by
Partha Pratim Das Course ID: BSCS2001 Course Credits: 4 Course Type: Programming Recommended
Pre-requisites:

None Course structure & Assessments 12 weeks of coursework, weekly online
assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Course Overview WEEK 2 Relational Model and Basic SQL WEEK 3 Intermediate and Advanced SQL WEEK 4 Relational Query Languages and Database Design WEEK 5 Functional Dependency and Normal Forms WEEK 6 Functional Dependency and Normal Forms (cont.) WEEK 7 Application Development WEEK 8 Storage Management WEEK 9 Indexing and Hashing WEEK 10 Transactions WEEK 11 Backup and Recovery WEEK 12 Query Optimization and Conclusion + Show all weeks Prescribed Books The following are the suggested books for the course: Database Management Systems - Abraham Silberschatz , Henry F. Korth, S. Sudarshan About the Instructors Partha Pratim Das Professor,

Computer Science and Engineering,

IIT Kharagpur Dr. Das obtained his B Tech, M Tech and Ph D degrees in 1984, 1985 and 1988 respectively from IIT Kharagpur. He served as a faculty member in the Department of Computer Science and Engineering, IIT Kharagpur from 1988 to 1998. In 1998, he moved to the Industry and served in Senior Director positions. In 2011, Dr. Das joined back the Department as a Professor. He is the Joint PI of National Digital Library of India project of MoE and leads the national initiative to integrate the digital learning contents. ... more Dr. Das is a regular contributor to the SWAYAM Program and his courses on Programming in C++, Object Oriented Analysis and Design, and Data Base Management Systems have been attended by thousands of students since 2017. Over the last decade he has been teaching Compilers, Software Engineering, Image Processing, Foundations of Algorithms & Machine Learning, and Principles of Programming Languages for which he received top students' feedback 6 times during 2014 to 2018. Dr. Das has published over 50 papers in international journals in his interest areas spanning Computer Vision, Digital Learning, Digital Geometry, Human-Computer Interaction, Medical Image Analysis, Computer Analysis of Indian Classical Dance, and Productivity in Software Engineering. less View all courses Contact Us Office of IITM Online Programs, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Privacy

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Course Page BSCS2002 Programming, Data Structures and Algorithms using Python A good foundation course to introduce basic concepts in the design and analysis of algorithms as well as standard data structures, using Python as a base language for implementing these. by Madhavan Mukund Course ID: BSCS2002 Course Credits: 4 Course Type: Programming Recommended Pre-requisites:

None What you'll learn VIEW COURSE VIDEOS Python Refresher Complexity, Notations, Sorting and Searching Algorithms Arrays, Lists, Stacks, Queues, Hashing Graph Algorithms Graph Algorithms (Continued) Union-Find Data Structure, Priority Queue, Heap, Binary Search Tree Balanced Search Tree, Greedy Algorithms Divide and Conquer Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Dynamic Programming WEEK 2 String or Pattern Matching Algorithms WEEK 3 Network Flows, Linear Programming, Class of Algorithms WEEK 4 Summary WEEK 5 Graph Algorithms WEEK 6 Graph Algorithms (Continued) WEEK 7 Divide and Conquer WEEK 8 Abstract datatypes WEEK 9 Abstract datatypes (Continued) WEEK 10 Dynamic programming WEEK 11 Dynamic programming (Continued) WEEK 12 Network flows and linear programming + Show all weeks About the Instructors Madhavan Mukund Director,

Chennai Mathematical Institute Madhavan Mukund studied at IIT Bombay (BTech) and Aarhus University (PhD). He has been a faculty member at Chennai Mathematical Institute since 1992. His main research area is formal verification. He has active research collaborations within and outside India and serves on international conference programme committees and editorial boards of journals. ... more He has served as President of both the Indian Association for Research in Computing Science (IARCS) (2011-2017) and the ACM India Council (2016-2018). He has been the National Coordinator of the Indian Computing Olympiad since 2002. He served as the Executive Director of the International Olympiad in Informatics from 2011-2014. In addition to the NPTEL MOOC programme, he has been involved in organizing IARCS Instructional Courses for college teachers. He is a member of ACM India's Education Committee. He has contributed lectures on algorithms to the Massively Empowered Classroom (MEC) project of Microsoft Research and the QEEE programme of MHRD. less Visit website Other courses by the same instructor: BSCS1001 -

Computational Thinking and BSCS2005 -

Programming Concepts using Java View all courses

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BSCS2003 Modern Application Development I Building a modern application involves many different aspects: front end, recording transactions, storage, connecting to a remote server, using APIs etc. The courses Modern Application Development I and II go through all these aspects through a detailed and evolving case study, teaching the relevant programming skills as the course progresses. by Thejesh G N , Nitin Chandrachoodan Course ID: BSCS2003 Course Credits: 4 Course Type: Programming Recommended Pre-requisites:

None Recommended Co-requisites: BSCS2001 - Database Management Systems

What you'll learn VIEW COURSE VIDEOS To be able to design a web application To be able to distinguish between the frontend, the backend, and the database activities To create such an application with Python and MySQL Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Basic terminologies of Web WEEK 2 Webpages written in HTML and CSS WEEK 3 Presentation layer - View WEEK 4 Models - Introduction to databases WEEK 5 Controllers - Business logic WEEK 6 APIs and REST APIs WEEK 7 Backend Systems WEEK 8 Application Frontend WEEK 9 Application Security WEEK 10 Testing of Web Applications WEEK 11 HTML Evolution and Beyond HTML WEEK 12 Application Deployment + Show all weeks About the Instructors Thejesh G N Software Consultant,

IITM BSc Degree,

IIT Madras Thejesh GN is an Electronics and Communication graduate from Bangalore, India. He started his career as a software engineer at Infosys technologies limited. He was awarded Infosys Community Empathy Fellowship in 2010, which allowed him to work for a not-for-profit organization for a year. He was also a senior software engineer for NPTEL / CourseBuilder team, which is now offered as Seek, an Open Source Online Education delivery platform. ... more He loves free and open-source software. He has been an active contributor to various open-source projects. He was awarded IBM Champion in the years 2018 and 2019. Currently, he runs DataMeet – India's biggest Open Data Community and works as an Engineering Head. less Visit website Other courses by the same instructor: BSCS2006 -

Modern Application Development II Nitin Chandrachoodan Professor,

Department of Electrical Engineering,

IIT Madras Nitin Chandrachoodan received his BTech (electronics and communication

engineering) from IIT Madras in 1996, and PhD from the University of Maryland at College Park in 2002, in the area of high-level synthesis techniques for mapping DSP algorithms to architectures. He has been with the department of electrical engineering at IIT Madras since 2004, where he is currently an professor. ... more His research interests include digital systems design and design automation tools and techniques, as well as design of embedded systems with a special focus on assistive technologies. He has taught graduate courses on digital integrated circuit design and on mapping algorithms to architectures, and a UG course on data structures and algorithms, as well as a laboratory course on digital design using FPGAs. He is an associate editor of the Springer Journal of Signal Processing Systems. less Visit website Other courses by the same instructor: BSCS2006 -

Modern Application Development II View all courses

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BSCS2003P Modern Application Development I - Project "Modern Application Development - I project" is a comprehensive course designed to introduce learners to the fundamentals of web application development. The course covers essential technologies such as HTML, CSS, JavaScript, Flask, API implementation, and SQLite for data storage. Learners will gain practical knowledge in building secure, efficient, and deployable web applications while understanding key concepts in web development. by Thejesh G N , Nitin Chandrachoodan Course ID: BSCS2003P Course Credits: 2 Course Type: Programming Recommended Pre-requisites:

None Recommended Co-requisites: BSCS2003 - Modern Application Development I

Project Course Overview The objective of this course project is to provide hands-on experience in developing a web application from scratch, integrating various technologies taught throughout the course. Students will apply their knowledge to create a functional web application that incorporates secure authentication, efficient data management, and API integration. The project aims to reinforce understanding of key concepts, foster problem-solving skills, and enhance proficiency in web application development. What you'll learn Upon completing this course project, learners will acquire proficiency in HTML, CSS, JavaScript, Flask, and SQLite, enabling them to develop robust web applications. Students will gain practical experience in implementing secure authentication mechanisms, optimizing application performance, and integrating APIs to enhance functionality. The project will equip learners with skills in deploying web applications, considering security measures, and ensuring efficient data storage and retrieval. Best Projects Puneet Bhagat (21f1004363@ds.study.iitm.ac.in) View Project Aniket Kalra (21f3002102@ds.study.iitm.ac.in) View Project ANABIL KANUNGOE (21f1003580@ds.study.iitm.ac.in) View Project Rahul Kurian Jacob (21f1000481@ds.study.iitm.ac.in) View Project Rajashree Das (21f1003047@ds.study.iitm.ac.in) View Project About the Instructors Thejesh G N Software Consultant,

IITM BSc Degree,

IIT Madras Thejesh GN is an Electronics and Communication graduate from Bangalore, India. He started his career as a software engineer at Infosys technologies limited. He was awarded Infosys Community Empathy Fellowship in 2010, which allowed him to work for a not-for-profit organization for a year. He was also a senior software engineer for NPTEL / CourseBuilder team, which is now offered as Seek, an Open Source Online Education delivery platform. ... more He loves free and open-source software. He has been an active contributor to various open-source projects. He was awarded IBM Champion in the years 2018 and 2019. Currently, he runs DataMeet – India's biggest Open Data Community and works as an Engineering Head. less Visit website Other courses by the same instructor: BSCS2003 -

Modern Application Development I and BSCS2006 -

Modern Application Development II Nitin Chandrachoodan Professor,

Department of Electrical Engineering,

IIT Madras Nitin Chandrathoodan received his BTech (electronics and communication engineering) from IIT Madras in 1996, and PhD from the University of Maryland at College Park in 2002, in the area of high-level synthesis techniques for mapping DSP algorithms to architectures. He has been with the department of electrical engineering at IIT Madras since 2004, where he is currently an professor. ... more His research interests include digital systems design and design automation tools and techniques, as well as design of embedded systems with a special focus on assistive technologies. He has taught graduate courses on digital integrated circuit design and on mapping algorithms to architectures, and a UG course on data structures and algorithms, as well as a laboratory course on digital design using FPGAs. He is an associate editor of the Springer Journal of Signal Processing Systems. less Visit website Other courses by the same instructor: BSCS2003 - Modern Application Development I and BSCS2006 - Modern Application Development II View all courses

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BSCS2004 Machine Learning Foundations This course lays the groundwork for the upcoming ML courses by covering various fundamentals that do not necessarily fall under Machine Learning but are quite necessary for a comprehensive understanding of Machine Learning. by Harish Guruprasad Ramaswamy , Arun Rajkumar , Prashanth LA Course ID: BSCS2004 Course Credits: 4 Course Type: Data Science Recommended Pre-requisites:

None What you'll learn VIEW COURSE VIDEOS Recognising if a particular problem can be viewed as a Machine Learning problem. Breaking down standard Machine Learning problems into more fundamental problems using tools from Calculus, Linear Algebra, Probability and Optimisation. Recognising relationships between equation solving, projection onto a subspace, and the supervised learning problem of linear least squares regression. Visualising eigenvalue/eigenvectors as a property of a matrix, and recognising its potential in practical unsupervised learning problems like dimensionality reduction and image compression. Using, identifying failure modes, programming and debugging simple gradient descent methods for solving unconstrained optimisation problems. Recognising the value of simple models like Gaussian mixture models for data, constructing algorithms for learning the parameters of such models, and interpreting these parameters. Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Introduction to machine learning WEEK 2 Calculus WEEK 3 Linear Algebra - Least Squares Regression WEEK 4 Linear Algebra - Eigenvalues and eigenvectors WEEK 5 Linear Algebra - Symmetric matrices WEEK 6 Linear Algebra - Singular value decomposition, Principal Component Analysis in Image Processing WEEK 7 Unconstrained Optimisation WEEK 8 Convex sets, functions, and optimisation problems WEEK 9 Constrained Optimisation and Lagrange Multipliers. Logistic regression as an optimization problem WEEK 10 Examples of probabilistic models in machine learning problems WEEK 11 Exponential Family of distributions WEEK 12 Parameter estimation. Expectation Maximization. + Show all weeks About the Instructors Harish Guruprasad Ramaswamy Assistant Professor,

Department of Computer Sciences & Engineering,

IIT Madras I am currently an assistant professor at the computer science and engineering (CSE) department of IIT Madras. My primary areas of interest are in machine learning, statistical learning theory and optimisation. I was previously a research scientist at IBM research labs and a post-doc at University of Michigan. I completed my PhD at the Computer Science and Automation (CSA) department of the Indian Institute of Science (IISc), Bangalore advised by Prof. Shivani Agarwal. I

have been fortunate to work with Profs. Ambuj Tewari and Clayton Scott during my PhD and postdoc. Earlier, I finished my M.E. under the supervision of Prof. Chiranjib Bhattacharyya. less Visit website Arun Rajkumar Assistant Professor,

Department of Computer Sciences & Engineering,

IIT Madras I am currently an Assistant Professor at the Computer Science and Engineering department of IIT Madras. Prior to joining IIT Madras, I was a research scientist at the Xerox Research Center (now Conduent Labs), Bangalore for three years. I earned my Ph.D from the Indian Institute of Science where I worked on 'Ranking from Pairwise Comparisons'. My research interests are in the areas of Machine learning, statistical learning theory with applications to education and healthcare. less Visit website Prashanth LA Assistant Professor,

Department of Computer Sciences & Engineering,

IIT Madras Prashanth L.A. is an Assistant Professor in the Department of Computer Science and Engineering at Indian Institute of Technology Madras. Prior to this, he was a postdoctoral researcher at the Institute for Systems Research, University of Maryland - College Park from 2015 to 2017 and at INRIA Lille - Team SequeL from 2012 to 2014. From 2002 to 2009, he was with Texas Instruments (India) Pvt Ltd, Bangalore, India. ... more He received his Masters and Ph.D degrees in Computer Science and Automation from Indian Institute of Science, in 2008 and 2013, respectively. He was awarded the third prize for his Ph.D. dissertation, by the IEEE Intelligent Transportation Systems Society (ITSS). He is the coauthor of a book entitled 'Stochastic Recursive Algorithms for Optimization: Simultaneous Perturbation Methods', published by Springer in 2013. His research interests are in reinforcement learning, simulation optimization and multi-armed bandits, with applications in transportation systems, wireless networks and recommendation systems. less Visit website View all courses

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BSCS2005 Programming Concepts using Java This course uses Java to provide an understanding of core ideas in object oriented programming, exception handling, event driven programming, concurrent programming and functional programming. by Madhavan Mukund Course ID: BSCS2005 Course Credits: 4 Course Type: Programming Recommended Pre-requisites:

None What you'll learn VIEW COURSE VIDEOS Creating simple object-oriented programs in Java Understanding encapsulation, separating interface from implementation Implementing abstraction through a hierarchy of classes and objects Dealing gracefully with errors and exceptions Controlling concurrent access to data through locks, semaphores and monitors Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Basic Object Oriented Programming: Class Hierarchy WEEK 2 Basic Object Oriented Programming: Inheritance, Overriding WEEK 3 Basic Object Oriented Programming: Polymorphism WEEK 4 Basic Object Oriented Programming: Abstract Classes WEEK 5 Collections. Iterators. WEEK 6 Generics. Callbacks. WEEK 7 Cloning. I/O serializations. Packages WEEK 8 Cloning. I/O serializations. Packages (Continued) WEEK 9 Exception handling WEEK 10 Concurrent programming WEEK 11 Concurrent programming (Continued) WEEK 12 Concurrent programming (Continued) + Show all weeks About the Instructors Madhavan Mukund Director,

Chennai Mathematical Institute Madhavan Mukund studied at IIT Bombay (BTech) and Aarhus University (PhD). He has been a faculty member at Chennai Mathematical Institute since 1992. His main research area is formal verification. He has active research collaborations within and outside India and serves on international conference programme committees and editorial boards of journals. ... more He has served as President of both the Indian Association for Research in Computing Science (IARCS) (2011-2017) and the ACM India Council (2016-2018). He has been the National Coordinator of the Indian Computing Olympiad since 2002. He served as the Executive Director of the International Olympiad in Informatics from 2011-2014. In addition to the NPTEL MOOC programme, he has been involved in organizing IARCS Instructional Courses for college teachers. He is a member of ACM India's Education Committee. He has contributed lectures on algorithms to the Massively Empowered Classroom (MEC) project of Microsoft Research and the QEEE programme of MHRD. less Visit website Other courses by the same instructor: BSCS1001 -

Computational Thinking and BSCS2002 -

Programming, Data Structures and Algorithms using Python View all courses

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BSCS2006 Modern Application Development II Building a modern application involves many different aspects: front end, recording transactions, storage, connecting to a remote server, using APIs etc. The courses Modern Application Development I and II go through all these aspects through a detailed and evolving case study, teaching the relevant programming skills as the course progresses. by Thejesh G N , Nitin Chandrachoodan Course ID: BSCS2006 Course Credits: 4 Course Type: Programming Recommended Pre-requisites: BSCS2003 - Modern Application Development I What you'll learn VIEW COURSE VIDEOS To be able to build highly interactive frontends using Vue To be able to integrate the Vue frontend with the backend via APIs To learn best practices involved in designing web APIs, and authentication mechanisms To be able to handle asynchronous backend jobs execution To be able to implement caching, and performance measurement for a web application To be able to distinguish between the frontend, the backend, and the database activities Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Basics of JavaScript WEEK 2 Advanced JavaScript WEEK 3 Introduction to Web Frontend WEEK 4 Introduction to VueJS WEEK 5 Vue with APIs WEEK 6 Advanced Vuejs WEEK 7 Advanced State Management WEEK 8 Authentication and Designing APIs WEEK 9 Asynchronous Jobs WEEK 10 Inter-Service Messaging and Webhooks WEEK 11 Performance WEEK 12 Project + Show all weeks About the Instructors Thejesh G N Software Consultant,

IITM BSc Degree,

IIT Madras Thejesh GN is an Electronics and Communication graduate from Bangalore, India. He started his career as a software engineer at Infosys technologies limited. He was awarded Infosys Community Empathy Fellowship in 2010, which allowed him to work for a not-for-profit organization for a year. He was also a senior software engineer for NPTEL / CourseBuilder team, which is now offered as Seek, an Open Source Online Education delivery platform. ... more He loves free and open-source software. He has been an active contributor to various open-source projects. He was awarded IBM Champion in the years 2018 and 2019. Currently, he runs DataMeet – India's biggest Open Data Community and works as an Engineering Head. less Visit website Other courses by the same

instructor: BSCS2003 -

Modern Application Development I Nitin Chandrachoodan Professor,

Department of Electrical Engineering,

IIT Madras Nitin Chandrachoodan received his BTech (electronics and communication engineering) from IIT Madras in 1996, and PhD from the University of Maryland at College Park in 2002, in the area of high-level synthesis techniques for mapping DSP algorithms to architectures. He has been with the department of electrical engineering at IIT Madras since 2004, where he is currently an professor. ... more His research interests include digital systems design and design automation tools and techniques, as well as design of embedded systems with a special focus on assistive technologies. He has taught graduate courses on digital integrated circuit design and on mapping algorithms to architectures, and a UG course on data structures and algorithms, as well as a laboratory course on digital design using FPGAs. He is an associate editor of the Springer Journal of Signal Processing Systems. less Visit website Other courses by the same instructor: BSCS2003 -

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BSCS2006P Modern Application Development II - Project "Modern Application Development - II project" is an advanced course designed to build upon the foundations of web application development introduced in "Modern Application Development - I." The course focuses on advanced frontend technologies, such as Vue.js, to create interactive and sophisticated user interfaces. It also covers additional concepts like token-based authentication, asynchronous task execution using Celery and Redis, caching, and security considerations.

The course covers some important concepts of web like Token-based Authentication, Asynchronous Task Execution with Celery and Redis, Caching Techniques. The course also talks about Security and Privacy Considerations and Cross-Origin Resource Sharing (CORS). by Thejesh G N , Nitin Chandrachoodan
Course ID: BSCS2006P Course Credits: 2 Course Type: Programming Recommended Pre-requisites: BSCS2003P - Modern Application Development I - Project Recommended Co-requisites: BSCS2006 - Modern Application Development II Project Course Overview The objective of this course project is to provide learners with hands-on experience in developing advanced web applications using Vue.js and related technologies. Students will work on building a functional web application that incorporates interactive frontend components, efficient state management using Vuex, token-based authentication for enhanced security, and asynchronous task execution using Celery and Redis. The project aims to reinforce knowledge gained in "Modern Application Development - I" and introduce advanced concepts in web development. What you'll learn Proficiency in advanced frontend technologies such as Vue.js, Vue Router, and Vuex, enabling them to build interactive and dynamic user interfaces. Understanding and implementation of token-based authentication for secure user authentication and authorization. Knowledge and practical experience in using Celery and Redis for asynchronous task execution, improving application performance and scalability. Familiarity with caching techniques to optimize data retrieval and enhance application efficiency. Understanding of security and privacy considerations in web development, including handling CORS (Cross-Origin Resource Sharing) and ensuring secure user interactions. Best Projects JAIDEV VIVEK DESHPANDE (21f1003751@ds.study.iitm.ac.in) View Project LOLLA AJAY KUMAR (21f1000200@ds.study.iitm.ac.in) View Project Afnan Ahmad (21f1003730@ds.study.iitm.ac.in) View Project VIGNESHWARAN S (21f1004210@ds.study.iitm.ac.in) View Project HIMANSHU SANJAY SINGH SEEMA (21f1003237@ds.study.iitm.ac.in) View Project About the Instructors Thejesh G N Software Consultant,

IITM BSc Degree,

IIT Madras Thejesh GN is an Electronics and Communication graduate from Bangalore, India. He started his career as a software engineer at Infosys technologies limited. He was awarded Infosys Community Empathy Fellowship in 2010, which allowed him to work for a not-for-profit organization for a year. He was also a senior software engineer for NPTEL / CourseBuilder team, which is now offered as Seek, an Open Source Online Education delivery platform. ... more He loves free and open-source software. He has been an active contributor to various open-source projects. He was awarded IBM Champion in the years 2018 and 2019. Currently, he runs DataMeet – India's biggest Open Data Community and works as an Engineering Head. less Visit website Other courses by the same instructor: BSCS2003 -

Modern Application Development I and BSCS2006 -

Modern Application Development II Nitin Chandrachoodan Professor,

Department of Electrical Engineering,

IIT Madras Nitin Chandrachoodan received his BTech (electronics and communication engineering) from IIT Madras in 1996, and PhD from the University of Maryland at College Park in 2002, in the area of high-level synthesis techniques for mapping DSP algorithms to architectures. He has been with the department of electrical engineering at IIT Madras since 2004, where he is currently an professor. ... more His research interests include digital systems design and design automation tools and techniques, as well as design of embedded systems with a special focus on assistive technologies. He has taught graduate courses on digital integrated circuit design and on mapping algorithms to architectures, and a UG course on data structures and algorithms, as well as a laboratory course on digital design using FPGAs. He is an associate editor of the Springer Journal of Signal Processing Systems. less Visit website Other courses by the same instructor: BSCS2003 -

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open now for next batch of the Diploma Program APPLY NOW Home Academics BSCS2007 Machine Learning Techniques To introduce the main methods and models used in machine learning problems of regression, classification and clustering. To study the properties of these models and methods and learn about their suitability for different problems. by Ashish Tendulkar Course ID: BSCS2007 Course Credits: 4 Course Type: Data Science Recommended Pre-requisites:

None Recommended Co-requisites: BSCS2004 - Machine Learning Foundations

What you'll learn VIEW COURSE VIDEOS Demonstrating In depth understanding of machine learning algorithms - model, objective or loss function, optimization algorithm and evaluation criteria. Tweaking machine learning algorithms based on the outcome of experiments - what steps to take in case of underfitting and overfitting. Being able to choose among multiple algorithms for a given task. Developing an understanding of unsupervised learning techniques. Course structure & Assessments 12 weeks of

coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1

Introduction to machine learning;

Supervised vs unsupervised, batch vs online, instance-based vs model-based; Problems - regression, classification, clustering; Challenges WEEK 2 Models of regression;

Linear regression - least squares;

Polynomial regression - learning curves;

Regularized linear models - Ridge, LASSO WEEK 3 Models of regression;

Linear regression - least squares;

Polynomial regression - learning curves;

Regularized linear models - Ridge, LASSO WEEK 4 Models of classification;

Discriminant functions and decision boundaries - two classes, multiple classes, least squares, perceptron;

Probabilistic generative and discriminative models - ML, Naive Bayes, exponential family, logistic

regression WEEK 5 Models of classification;

Discriminant functions and decision boundaries - two classes, multiple classes, least squares, perceptron;

Probabilistic generative and discriminative models - ML, Naive Bayes, exponential family, logistic

regression WEEK 6 Models of classification;

Discriminant functions and decision boundaries - two classes, multiple classes, least squares, perceptron;

Probabilistic generative and discriminative models - ML, Naive Bayes, exponential family, logistic

regression WEEK 7 Models of classification; Nearest Neighbours - regression and classification problems

WEEK 8 Support Vector Machines;

Linear SVM - soft margin classification;

Nonlinear SVM - kernels WEEK 9 Decision Trees, Ensemble Methods and Random Forests;

Training decision trees, making predictions;

Bagging, Boosting WEEK 10 Decision Trees, Ensemble Methods and Random Forests;

Training decision trees, making predictions;

Bagging, Boosting WEEK 11 Clustering;

k-Means - algorithm, demo and how to select k

HAC WEEK 12 Neural networks;

Multi-layer perceptron, activation functions;

Training - SGD and back propagation;

Hyperparameters - number of layers, neurons, activation functions; Note: We will give additional material for NN and Clustering. + Show all weeks Prescribed Books The following are the suggested books for the

course: Pattern Classification by David G. Stork, Peter E. Hart, and Richard O. Duda Pattern Recognition

and Machine Learning by Christopher M. Bishop The Elements of Statistical Learning: Data Mining,

Inference, and Prediction by Trevor Hastie, Robert Tibshirani, and Jerome Friedman About the Instructors

Ashish Tendulkar Research Software Engineer,

Google AI,

Google Dr. Ashish Tendulkar is a researcher with Google Research Bangalore. He holds Masters and PhD from IIT Bombay. Before his current position, he was an Assistant Professor at IIT Madras and Head of data sciences at Persistent Systems Pune. Ashish is passionate about teaching ML and writing AI related contents in Indian languages. less Other courses by the same instructor: BSCS2008 -

Machine Learning Practice View all courses Contact Us Office of IITM Online Programs, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Privacy Policy | Terms of Service

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Singh\Downloads\study-iitm-website\www\diploma\course_pages\BSCS2008.html

BSCS2008 Machine Learning Practice This companion course to the ML Theory course introduces the student to scikit-learn, a popular Python machine learning module, to provide hands-on problem solving experience for all the methods and models learnt in the Theory course. by Ashish Tendulkar Course ID: BSCS2008 Course Credits: 4 Course Type: Data Science Recommended Pre-requisites: BSCS2004 - Machine Learning Foundations BSCS2007 - Machine Learning Techniques What you'll learn VIEW COURSE VIDEOS Understand the life cycle of a machine learning project - typical steps involved and tools that can be used in each step. Using machine learning algorithms to solve practical problems using libraries like scikit-learn and tensorflow. Fine tuning the algorithms through regularization, feature selection, and better models. Develop an understanding of evaluation of machine learning algorithms and decide the next steps based on the analysis. Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 End-to-end machine learning project on scikit-learn WEEK 2 End-to-end machine learning project on scikit-learn (Continued) WEEK 3 Regression on scikit-learn - Linear regression Gradient descent - batch and stochastic. WEEK 4 Polynomial regression, Regularized models WEEK 5 Logistic regression WEEK 6 Classification on scikit-learn - Binary classifier WEEK 7 Classification on scikit-learn - Multiclass classifier WEEK 8 Support Vector Machines using scikit-learn WEEK 9 Decision Trees, Ensemble Learning and Random Forests WEEK 10 Decision Trees, Ensemble Learning and Random Forests (Continued) WEEK 11 Neural networks models in scikit-learn WEEK 12 Unsupervised learning + Show all weeks About the Instructors Ashish Tendulkar Research Software Engineer,

Google AI,

Google Dr. Ashish Tendulkar is a researcher with Google Research Bangalore. He holds Masters and PhD from IIT Bombay. Before his current position, he was an Assistant Professor at IIT Madras and Head of data sciences at Persistent Systems Pune. Ashish is passionate about teaching ML and writing AI related contents in Indian languages. less Other courses by the same instructor: BSCS2007 -

Machine Learning Techniques View all courses

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BSCS2008P Machine Learning Practice - Project The purpose of a machine learning project is to apply ML models learnt in ML courses, on real world data and to create an effective predictive model. Discover patterns in your data and then make predictions based on often complex findings to answer business questions, detect and analyze trends and help solve problems. by Ashish Tendulkar Course ID: BSCS2008P Course Credits: 2 Course Type: Data Science Recommended Pre-requisites:

None Recommended Co-requisites: BSCS2008 - Machine Learning Practice Project Course Overview The MLP Project is conducted on Kaggle platform. Kaggle is a well recognized platform among data science professionals that will familiarize you with many latest problems being currently solved by organizations across the world. Good place to practice your ML skills and knowledge. Looks good on your resume, especially if you have won medals and badges. The project runs for 12 to 15 weeks. The project is divided into several milestones. These milestones divide the ML cycle into smaller and manageable steps. These milestones guide you to make steady progress. What you'll learn After completing the project you will gain experience of applying different ML techniques on real world data. You will gain proficiency in numpy, panda and sklearn libraries. You will become familiar with the 5 components of any ML project i.e. data, model, cost function, optimization and evaluation, i.e. in short, with complete end to end process of a machine learning project. In order to successfully complete the project, a viva will be conducted by an industry expert. This viva prepares you for ML interviews. About the Instructors Ashish Tendulkar Research Software Engineer,

Google AI,

Google Dr. Ashish Tendulkar is a researcher with Google Research Bangalore. He holds Masters and PhD from IIT Bombay. Before his current position, he was an Assistant Professor at IIT Madras and Head of data sciences at Persistent Systems Pune. Ashish is passionate about teaching ML and writing AI related contents in Indian languages. less Other courses by the same instructor: BSCS2007 -

Machine Learning Techniques and BSCS2008 -

Machine Learning Practice View all courses Contact Us Office of IITM Online Programs, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Privacy Policy | Terms of Service

BSMA1003 Mathematics for Data Science II This course aims to introduce the basic concepts of linear algebra, calculus and optimization with a focus towards the application area of machine learning and data science. by Sarang S Sane Course ID: BSMA1003 Course Credits: 4 Course Type: Foundational Recommended Pre-requisites:

None What you'll learn VIEW COURSE VIDEOS Manipulating matrices using matrix algebra. Performing elementary row operations. Using Gaussian Elimination: Solving systems of linear equations. Find out whether a set of vectors are linearly independent. Writing down a set of dependencies in case vectors are not linearly independent. Finding subspaces along with their bases and ranks. Finding distances and angles using norms and inner products. Obtaining orthonormal basis using the Gram-Schmidt process. Finding maxima and minima of single variable functions using derivatives. Finding maxima and minima of multivariate functions using vector calculus. Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1

Vector and matrices -

Vectors;

Matrices;

Systems of Linear Equations;

Determinants (part 1);

Determinants (part 2) WEEK 2 Solving linear equations -

Determinants (part 3);

Cramer's Rule;

"Solutions to a system of linear equations with an invertible coefficient matrix";

The echelon form;

Row reduction;

The Gaussian elimination method WEEK 3 Introduction to vector spaces -

Introduction to vector spaces;

Some properties of vector spaces;

Linear dependence;

Linear independence - Part ;

Linear independence - Part 2 WEEK 4 Basis and dimension -

What is a basis for a vector space?;

Finding bases for vector spaces;

What is the rank/dimension for a vector space;

Rank and dimension using Gaussian elimination WEEK 5 Rank and Nullity of a matrix;

Introduction to Linear transformation -

The null space of a matrix : finding nullity and a basis - Part 1;

The null space of a matrix : finding nullity and a basis - Part 2;

What is a linear mapping - Part 1;

What is a linear mapping - Part 2;
 What is a linear transformation WEEK 6 Linear transformation, Kernel and Images -
 Linear transformations, ordered bases and matrices;
 Image and kernel of linear transformations;
 Examples of finding bases for the kernel and image of a linear transformation WEEK 7 Equivalent and
 Similar matrices;
 Introduction to inner products -
 Equivalence and similarity of matrices;
 Affine subspaces and affine mappings;
 Lengths and angles;
 Inner products and norms on a vector space WEEK 8 Orthogonality, Orthonormality;
 Gram-schmidt method -
 Orthogonality and linear independence;
 What is an orthonormal basis?
 Projections using inner products;
 The Gram-Schmidt process;
 Orthogonal transformations and rotations WEEK 9 Multivariable functions, Partial derivatives,
 Limit, continuity and directional derivatives -
 Multivariable functions : visualization;
 Partial derivatives;
 Directional derivatives;
 Limits for scalar-valued multivariable functions;
 Continuity for multivariable functions;
 Directional derivatives in terms of the gradient WEEK 10 Directional ascent and descent,
 Tangent (hyper) plane,
 Critical points -
 The directional of steepest ascent/descent;
 Tangents for scalar-valued multivariable functions;
 Finding the tangent hyper(plane);
 Critical points for multivariable functions WEEK 11 Higher order partial derivatives,
 Hessian Matrix and local extrema,
 Differentiability -
 Higher order partial derivatives and the Hessian matrix;
 The Hessian matrix and local extrema for $f(x,y)$;
 The Hessian matrix and local extrema for $f(x,y,z)$;
 Differentiability for Multivariable Functions;
 Review of Maths - 2 + Show all weeks Reference Documents / Books Linear Algebra DOWNLOAD About
 the Instructors Sarang S Sane Assistant Professor,

Department of Mathematics,

IIT Madras I completed my B.Stat. (Hons.) and M.Stat. from the Indian Statistical
 Institute, Kolkata in 2004 and my Ph.D. from TIFR, Mumbai in 2010. I was a postdoctoral fellow in TIFR, a
 visiting assistant professor in the University of Kansas and very briefly an INSPIRE faculty fellow in IISc,
 Bengaluru before I joined the mathematics department in IITM in 2015. less Visit website View all courses
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 Singh\Downloads\study-iitm-website\www\diploma\course_pages\BSMA1004.html
 BSMA1004 Statistics for Data Science II This second course will develop on the first course on statistics

and further delve into the main statistical problems and solution approaches by Andrew Thangaraj Course ID: BSMA1004 Course Credits: 4 Course Type: Foundational Recommended Pre-requisites:

None What you'll learn VIEW COURSE VIDEOS Recalling statistical modeling, description of data. Applying Probability distributions and related concepts to the data sets Explaining the concept of estimation of parameters. Solving the problems related to point and interval estimation. Explaining the concept of Testing of hypothesis related to mean and variance Analysing the data using simple regression models and setting up relevant hypothesis tests Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Multiple random variables - Two random variables, Multiple random variables and distributions WEEK 2 Multiple random variables - Independence, Functions of random variables - Visualization, functions of multiple random variables WEEK 3 Expectations Casino math, Expected value of a random variable, Scatter plots and spread, Variance and standard deviation, Covariance and correlation, Inequalities WEEK 4 Continuous random variables Discrete vs continuous, Weight data, Density functions, Expectations WEEK 5 Multiple continuous random variables - Height and weight data, Two continuous random variables, Averages of random variables - Colab illustration, Limit theorems, IPL data - histograms and approximate distributions, Jointly Gaussian random variables Probability models for data - Simple models, Models based on other distributions, Models with multiple random variables, dependency, Models for IPL powerplay, Models from data WEEK 6 Refresher week WEEK 7 Estimation and Inference I WEEK 8 Estimation and Inference II WEEK 9 Bayesian estimation WEEK 10 Hypothesis testing I WEEK 11 Hypothesis Testing II WEEK 12 Revision week + Show all weeks Reference Documents / Books Joint Discrete Distributions (VOL 1) DOWNLOAD Joint Continuous Distributions (VOL 2) DOWNLOAD Prescribed Books The following are the suggested books for the course: Probability and Statistics with Examples using R. Author: Siva Athreya, Deepayan Sarkar and Steve Tanner About the Instructors Andrew Thangaraj Professor

Electrical Engineering Department

IIT Madras Andrew Thangaraj received his B. Tech in Electrical Engineering from the Indian Institute of Technology (IIT) Madras in 1998 and Ph.D. in Electrical Engineering from the Georgia Institute of Technology, Atlanta, USA in 2003. ... more He was a post-doctoral researcher at the GTL-CNRS Telecom lab at Georgia Tech Lorraine, Metz, France from Aug 2003 till May 2004. Since 2004, he has been a faculty at the Department of Electrical Engineering, IIT Madras, where he is currently a professor. His research interests are in the broad areas of information theory, error-control coding and information-theoretic aspects of cryptography. From Jan 2012 till Jan 2018, he served as Editor for the IEEE Transactions on Communications. From July 2018, he is an Associate Editor for the IEEE Transactions on Information Theory. From Nov 2011, he has been one of the NPTEL coordinators for IIT Madras. At NPTEL, he has played a key role in the starting of online courses and certification. He is currently a National MOOCs coordinator for NPTEL under the SWAYAM project of the MHRD. Prof. Andrew is also one of the coordinators for the IIT Madras Online BSc Degree Program, which was launched in June, 2020. less Visit website View all courses Contact Us Office of IITM Online Programs, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Privacy

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BSMS2001 Business Data Management A significant source of data sets and problems for data scientists will come from the business domain. This course provides a basic understanding of how businesses are

organised and run from a data perspective. by G Venkatesh , Suresh Babu , Dr. Milind Gandhe Course ID: BSMS2001 Course Credits: 4 Course Type: Data Science Recommended Pre-requisites:

None What you'll learn VIEW COURSE VIDEOS Understand the business context: consumption patterns, micro-economic concepts underlying demand and supply Analyse firm-level and industry-level data Discover how businesses operate, and how they are actively managed using data dashboards Get a handle on the data that originates from business processes Identify the techniques used to represent and structure this data Gain skills on the use of worksheets to organise, interpret and present data Working with large data sets Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Consumption and demand: Micro & Macro economics: the role of data, production, consumption and exchange, consumption baskets, sources of consumer survey data WEEK 2 Micro-economic concepts: Utility: cardinal vs ordinal, indifference curves. Demand and supply curves, changes in demand and elasticity. production cost, cost curves. Make vs buy decisions, production quantity decisions WEEK 3 Firm level strategies and performance data: Objectives and types of pricing strategies, analysis of firm performance - key ratios. Analysis examples: Ultratech, Page Industries, Nestle, TCS WEEK 4 Analysing industry level data: Industry definition and classification codes, IIP and PMI, industry market structure and concentration indices, competitive positioning in an industry - Porter's five forces. Analysis examples: Cement industry, Textile industry, FMCG industry, IT industry WEEK 5 Case study 1 - Fabmart (E-Commerce): Introduction to E-Commerce, Fabmart case introduction, explanation of data set & questions to be answered, revenue pareto, volume pareto, scatter plot of sales and revenue, revenue trend WEEK 6 Fabmart case continued: Sales analysis, organisation of distribution centre, analysis of sales trends, average days of inventory, ledger, avoiding stockouts WEEK 7 Case study 2 - Ace Gears (Manufacturing): Introduction to the manufacturing sector, context of the automotive industry during the years 2019-2021, explanation of data set containing monthly information on sales, production, inventory and costing. Revenue trend analysis, portfolio management WEEK 8 Ace Gears case study continued: Regional sales analysis, sales agent planning, production scheduling, scrap analysis, unit level profitability analysis, raw material re-ordering and safety stock WEEK 9 Case study 3 - Tech Enterprises (IT): Introduction to HR as a function, Introduction to the Tech Enterprises, internal sourcing, ranking of internal candidates, job description, sourcing channels and their analysis, recruitment process and onboarding WEEK 10 Case study 4 - PayBuddy (Fin Tech): Introduction to Finance Industry and Fintech, payment processing and money flow, new credit product introduction, nudge economics, payment transaction and customer data set, identifying rules to target the appropriate customers WEEK 11 Paybuddy case continued: Introduction to A/B testing, analysis of the A/B testing data, credit risk evaluation, risk-return tradeoffs WEEK 12 Discussion on student acquired data sets. Wrap up/Wrap up (summary) of the case studies, course project work + Show all weeks About the Instructors G Venkatesh Professor of Practice,

Department of Humanities and Social Sciences,

IIT Madras Dr. Venkatesh is a Professor of Practice at IIT Madras, where he is involved with several projects in the field of education. He is also a Fellow and Director of Sasken Communication Technologies Ltd, a leading Indian R&D services provider, and a founder of Mylspot, an education technology startup that aims to bridge knowledge gaps of students through a mentored learning platform. ... more Dr Venkatesh is a graduate in electronics from IIT Madras, PhD in Computer Science from TIFR, Mumbai and was a faculty member of the Computer Science & Engineering Dept of IIT Bombay for 8 years where his research interests revolved around declarative languages and their application to the design of embedded systems. He moved to the industry when Sasken was being formed, where he led their technology activities for over two decades. He was a visiting/adjunct faculty at IIM Bangalore for 10 years and a Chair Professor in the department of EE at IIT Madras for 3 years. Dr. Venkatesh was elected as a fellow of the Indian National Academy of Engineers in 2006 and the IETE in 2012. He won the Technomenter award of the Indian Electronics and Semiconductor Association in 2013 and the Vasvik

award for industrial research in 2015. Dr. Venkatesh serves on a number of government, industry and investor committees and boards in the areas of microelectronics, telecommunications and education. less
Other courses by the same instructor: BSCS1001 -

Computational Thinking and BSMS2002 -
Business Analytics Suresh Babu Professor,

Department of Humanities and Social Sciences,

IIT Madras Suresh Babu has completed his M.S. in Development Economics and M.Phil. in Applied Economics before completing his Ph.D. from Jawaharlal Nehru University, New Delhi. He currently is a professor at the Department of Humanities and Social Sciences, and his key areas of research are in applied macroeconomics, trade & development and industrial economics. less Visit website Dr. Milind Gandhe Chief Programme Officer,

Machine Intelligence and Robotics (MINRO) COE,

IIT Bangalore Milind is the Chief Program Officer at the Center of Excellence for Machine Intelligence and Robotics, IIT Bangalore. Prior to joining IITB, Milind has 26 years of experience in the corporate sector, first with Sasken Communication Technologies and most recently with Tata Elxsi as the head of the Systems Business Unit. Milind has lead projects in Semiconductor, Automotive, Communications and Smart Home verticals. ... more Milind has a PhD in Computer Science and Engineering from IIT Bombay. Before his PhD, Milind obtained a B.Tech and an M. Tech also from IIT Bombay. His thesis was on Abstract Interpretation of Functional Programming Languages. Milind also has a Diploma in Practicing Management from INSEAD, France. Milind's primary research interests are AI (Natural Language Processing, Mathematical Logic, Hardware acceleration for AI at the Edge) and Interaction between Society and Technology. less View all courses Contact Us Office of IITM Online Programs, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Privacy

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BSMS2001P Business Data Management - Project BDM Capstone Project is an independent research project where the student is expected to reach out to a business firm (either from organized sectors viz., well established businesses in manufacturing, IT, automobile sectors etc. which has excellent systems in place to handle and manage data or from an unorganized sectors like Kirana stores, vegetable vendors etc. which do not maintain proper records), identify the issues or the problem(s) they face, collect primary data pertaining to it, clean the data, analyze it, and provide novel/ valuable insights to the decision maker(s). by G Venkatesh , Suresh Babu , Dr. Milind Gandhe Course ID: BSMS2001P Course Credits: 2 Course Type: Data Science Recommended Pre-requisites:

None Recommended Co-requisites: BSMS2001 - Business Data Management

Project Course Overview In the proposal stage, the student is expected to provide information about the organization and its background, problem definition/ statement, the background of the problem, the problem-solving approach they wish to use with justification, the expected timelines for project completion and the probable outcomes of the project. In the midterm submission, students must provide a short video interaction clip with the business owner/ manager, tangible evidence like pictures, field notes etc., provide information on the meta data and descriptive statistics, conduct preliminary analysis, provide an interpretation of the results and findings. The final report submission is a complete report and involves in-depth explanation of the entire process from start to finish. The viva voce is conducted following acceptance of the final submission and for this, the student needs to make a presentation not exceeding 10 slides. What you'll learn How to reach out and collect primary data, identify the issues or the problem(s), clean the data. Explain and justify the reasoning behind using a particular approach, report

them in a professional manner, by knitting one section to the next and how the novel insights benefits decision maker(s). Hands-on experience in dealing with real world problems and providing solutions. Reference Documents / Books Details of the BDM Project Course, Timelines & Submission Requirements [DOWNLOAD](#) About the Instructors G Venkatesh Professor of Practice,

Department of Humanities and Social Sciences,

IIT Madras Dr. Venkatesh is a Professor of Practice at IIT Madras, where he is involved with several projects in the field of education. He is also a Fellow and Director of Sasken Communication Technologies Ltd, a leading Indian R&D services provider, and a founder of Mylspot, an education technology startup that aims to bridge knowledge gaps of students through a mentored learning platform. ... more Dr Venkatesh is a graduate in electronics from IIT Madras, PhD in Computer Science from TIFR, Mumbai and was a faculty member of the Computer Science & Engineering Dept of IIT Bombay for 8 years where his research interests revolved around declarative languages and their application to the design of embedded systems. He moved to the industry when Sasken was being formed, where he led their technology activities for over two decades. He was a visiting/adjunct faculty at IIM Bangalore for 10 years and a Chair Professor in the department of EE at IIT Madras for 3 years. Dr. Venkatesh was elected as a fellow of the Indian National Academy of Engineers in 2006 and the IETE in 2012. He won the Technomenter award of the Indian Electronics and Semiconductor Association in 2013 and the Vasvik award for industrial research in 2015. Dr. Venkatesh serves on a number of government, industry and investor committees and boards in the areas of microelectronics, telecommunications and education. less Other courses by the same instructor: [BSCS1001](#) -

[Computational Thinking](#) , [BSMS2001](#) -

[Business Data Management](#) and [BSMS2002](#) -

[Business Analytics](#) Suresh Babu Professor,

Department of Humanities and Social Sciences,

IIT Madras Suresh Babu has completed his M.S. in Development Economics and M.Phil. in Applied Economics before completing his Ph.D. from Jawaharlal Nehru University, New Delhi. He currently is a professor at the Department of Humanities and Social Sciences, and his key areas of research are in applied macroeconomics, trade & development and industrial economics. less Visit website Other courses by the same instructor: [BSMS2001](#) -

[Business Data Management](#) Dr. Milind Gandhe Chief Programme Officer,

Machine Intelligence and Robotics (MINRO) COE,

IIIT Bangalore Milind is the Chief Program Officer at the Center of Excellence for Machine Intelligence and Robotics, IIIT Bangalore. Prior to joining IIITB, Milind has 26 years of experience in the corporate sector, first with Sasken Communication Technologies and most recently with Tata Elxsi as the head of the Systems Business Unit. Milind has lead projects in Semiconductor, Automotive, Communications and Smart Home verticals. ... more Milind has a PhD in Computer Science and Engineering from IIT Bombay. Before his PhD, Milind obtained a B.Tech and an M. Tech also from IIT Bombay. His thesis was on Abstract Interpretation of Functional Programming Languages. Milind also has a Diploma in Practicing Management from INSEAD, France. Milind's primary research interests are AI (Natural Language Processing, Mathematical Logic, Hardware acceleration for AI at the Edge) and Interaction between Society and Technology. less Other courses by the same instructor: [BSMS2001](#) - [Business Data Management](#) [View all courses](#)

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SIGN IN Application for the next batch of the Diploma Program is now open. APPLY NOW Applications
open now for next batch of the Diploma Program APPLY NOW Home Academics BSMS2002 Business
Analytics The problems faced by decision makers in today's business environments are extremely
complex. Hence, the task of making good decisions is not easy. The answer is in building quantitative
models, and this course is designed to help you understand the fundamentals of this critical, foundational,
business skill. The business application of statistical methods is the core focus of this course. In that
sense, the course builds on the core course in the first year of the program. That basic course focused on
the preliminaries of the area. This course highlights a business application and then demonstrates an
application of a statistical technique to solve that scenario and arrive at the best decisions and insights. by
Rahul R Marathe Course ID: BSMS2002 Course Credits: 4 Course Type: Data Science Recommended
Pre-requisites: BSMS2001 - Business Data Management What you'll learn VIEW COURSE VIDEOS At
the end of this course, the students will be able to apply various statistical techniques to solve various
business problems. Extrapolate using various techniques and with statistical robustness. Build
data-centric business models. Course structure & Assessments 8 weeks of coursework, weekly online
assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1
Data dashboarding Insights from data summary WEEK 2 Can summarizing the data provide insights?
WEEK 3 Do people in different cities prefer different
brand? WEEK 4 Predicting the stock returns – Regression basics WEEK 5 How do you pay a professor?
– Regression diagnostics - Path variables WEEK 6 Can I cure cancer? – Logistic Regression -
Connection with classification problem WEEK 7 What is the impact of repeatedly watching the same ad?
Repeated measures ANOVA WEEK 8 When the data has a time axis: Time series modeling + Show all
weeks Prescribed Books The following are the suggested books for the course: SF Robert E Stine and
Dean Foster, Statistics for Business: Decision Making and Analysis, Pearson. NCT Paul Newbold, William
L. Carlson and Betty Thorne, Statistics for Business and Economics, Sixth Edition, Pearson. ASW David
R. Anderson, Dennis J. Sweeney and Thomas A. Williams, Statistics for Business and Economics, Ninth
Edition, Cengage Learning. Keller Gerald Keller, Managerial Statistics, 9 Edition, Cengage Learning. LR
Richard Levin and David Rubin, Statistics for Management, Seventh Edition, Pearson. About the
Instructors Rahul R Marathe Professor,

Department of Management Studies,

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Structure Course Registrations Assessments Exam Cities Fee Structure Diploma in Programming
Diploma in Data Science Admissions Eligibility Mandatory Requirements Application Process Qualifier
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open now for next batch of the Diploma Program APPLY NOW Home Academics BSSE2001 System
Commands by Prof. Gandham Phanikumar Course ID: BSSE2001 Course Credits: 2 Course Type:

Programming Recommended Pre-requisites:

None Course structure & Assessments 8 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1

Introduction to GNU/Linux OS.

Setting up and running Linux environment.

The command line environment.

Knowing hardware of your machine

Information - commands such as hwdm, lshw, df, free etc.

Diagnostics - commands to fetch hardware information such as battery state, memory modules etc.,

Knowing the OS and software of your machine

Commands to get details about operating system, versions etc.

Packages - installed / available

Input / output redirection. WEEK 2 Introduction to packages and repositories.

Using 'apt' commands to manage packages.

File types and related commands.

Understanding file permissions and access modes.

Managing file permissions through symbolic and numeric mode.

Concept of environment variables. Important environment variables such as \$HOME, \$USER and \$PATH

WEEK 3 Managing shell variables.

Prompt strings.

Symbolic links and hard links, brief introduction to inode numbers.

Exploring the root file system and related commands.

Using shell shortcuts with commands.

Slicing output.

Managing programs currently running on the machine.

Shell access to a local / remote machine. WEEK 4 Redirection to script, variable and for logging purpose.

Using pipes.

Introduction to regex; using regex patterns and egrep.

Using egrep to extract useful information from files.

find command and its uses - patterns to pick specific files in a folder, using exec

Command line editors (nano, vi, emacs - syntax highlighting & prompting, configuring options)

Writing and running simple Bash scripts. WEEK 5 How are shell scripts interpreted?

Using variables in scripts.

Passing command line arguments to scripts, to create your own commands.

More shell programming.

Writing conditional statements using if /else / fi.

Introduction to loops.

Using functions

Configuring startup / periodic / recurring tasks WEEK 6 Text processing using AWK language.

Using awk to run statistics on a data file.

Using regex within awk.

Awk as a programming language

Introduction to 'sed' – another text processing utility.

Line by line processing to replace a regex pattern with a string.

Use of place holders for matching regex patterns for use in replacing strings. WEEK 7 Introduction to

make utility; concept of target and dependency; actions performed by make; conditional compilation;

passing shell variables to make;

File packaging utilities such as compress, tar, zip, gzip, bzip2, xz.

Networking concepts

Introduction to IP addresses.

Concept of localhost. Intranet and public addresses.

Concept of ports and services that run on these ports.

Concept of DNS and Domain names.

Network diagnostics using tools and commands.

Scripting a tool for analysis of logs. WEEK 8 Introduction to RAID for handling hardware failure.

Introduction to version control

Git as a version control system:

Overview of Git workflow

Branches, repositories, forks, etc.

Creating and merging pull requests.

Personal access tokens.

Managing changes as local and remote.

Working demo of a public repository using Git

Approval workflow

How a team collaborates on the private repository in an organization.

Managing pull requests for the owner, raising issues and resolving them. + Show all weeks About the Instructors Prof. Gandham Phanikumar Professor,

Metallurgical and Materials Engineering,

IIT Madras Prof. Gandham Phanikumar's doctoral work is on heat transfer, fluid flow and solute transfer during laser processing of dissimilar metals. After joining IIT Madras in 2005, he has been teaching a UG core course on transport phenomena for several years. His research continues to involve concepts of transport phenomena in materials processing. less Visit website View all courses Contact Us Office of IITM Online Programs, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Privacy

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Singh\Downloads\study-iitm-website\www\diploma\course_pages\BSSE2002.html

Course Page - IIT Madras Diploma Program English | | | | | | | | Important Dates

Structure Course Registrations Assessments Exam Cities Fee Structure Diploma in Programming

Diploma in Data Science Admissions Eligibility Mandatory Requirements Application Process Qualifier

Exam Qualifying Criteria International Students About IITM About IIT Madras Contact Us Merchandise

SIGN IN Application for the next batch of the Diploma Program is now open. APPLY NOW Applications

open now for next batch of the Diploma Program APPLY NOW Home Academics BSSE2002 Tools in

Data Science This course will teach students to use popular tools for sourcing data, transforming it,

building and optimizing models, communicating these as visual stories, and deploying them in production.

by S Anand Course ID: BSSE2002 Course Credits: 2 Course Type: Data Science Recommended

Pre-requisites:

None Recommended Co-requisites: BSCS2004 - Machine Learning Foundations

Course structure & Assessments 8 modules over 12 weeks of coursework, online assignments for each module, 1 remote online exam, 2 take home projects, 1 in-person end term exam.

For details of standard course structure and assessments, visit Academics page. MODULE 1

Discover the data MODULE 2 Get the data MODULE 3 Prepare the data MODULE 4 Model the data

MODULE 5 Modern tools to simplify deep learning models MODULE 6 Design your output MODULE 7

Narrate a story MODULE 8 Deploy the results + Show all weeks About the Instructors S Anand Anand is

a co-founder of Gramener, a data science company. He leads a team that tells visual stories from data.

He is recognized as one of India's top 10 scientists, and is a regular TEDx speaker. ... more Anand is a

gold medallist from IIM Bangalore and an alumnus of IIT Madras, London Business School, IBM, Infosys

Consulting, Lehman Brothers, and BCG. More importantly, he has hand-transcribed every Calvin &

Hobbes strip ever, is addicted to Minecraft (thanks to his daughter), and dreams of watching every film on

the IMDb Top 250 (except The Shining). less Visit website View all courses Contact Us Office of IITM

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About IIT Madras English | | | | | | | | | | Academics Overall Structure Term Structure

Registrations Assessments Exam Cities Fee Structure Foundation Level Diploma Level BSc Degree
Level BS Degree Level Sample Certificates Academic Calendar Admissions Important Dates Mandatory
Requirements Eligibility to Apply Application Process Admission to the Foundation Level 1. Regular Entry
2. JEE-based Entry International Students Resources Help Videos In the Media Archive Student Life
Student Houses & Societies PARADOX / Student Festivals School Connect Achievements Recognition 1.
Toppers Page 2. Student's Best Projects 3. Teaching Assistance Testimonials Research and Publication
Events FAQ About IITM About IIT Madras Faculty Co-ordinators Contact Us Merchandise Partnerships
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2024 | Exam: Oct 27, 2024 APPLY NOW Applications Open now for September 2024 Batch | Applications
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Institute of Technology Madras is one of the foremost institutes of national importance for higher
technical education and research. In 1956, the German Government offered technical assistance in
establishing an institute of higher education in
engineering in India. The first Indo-German agreement in Bonn, West Germany for the establishment
of the Indian

Institute of Technology at Madras was signed in 1959. The Institute was formally inaugurated in
1959 by Prof. Humayun Kabir, Union Minister for Scientific Research
and Cultural Affairs. The IIT system has twenty three Institutes of Technology. The first of these to
be

instituted are at Kharagpur (estb. 1951), Mumbai (estb. 1958), Chennai (estb. 1959), Kanpur (estb.
1959), Delhi

(estb. 1961), Guwahati (estb. 1994) and Roorkee (estb. 1847, joined IITs in 2001). The Institute has
sixteen academic departments and several advanced research centres in various disciplines of
engineering and pure sciences. A faculty of international repute, a brilliant student community,
excellent

technical & supporting staff and an effective administration have all contributed to the pre-eminent
status of

IIT Madras. The campus is located in the city of Chennai, previously known as Madras. Chennai is
the state

capital of Tamil Nadu, a southern state in India. IITM's Experience in Online Education IITM is
well-equipped to provide an online degree course. We have been ranked number 1 Engineering Institute
for

the past 5 years and we have been ranked number 1 Overall for the past 2 years by NIRF.
Furthermore, IITM began the NPTEL program, the country's first online content portal as an inter-IIT
consortium

project in 2001 and npTEL.ac.in is one of the largest online course portals in
the world. In 2014, IITM also created NPTEL online courses - the country's first Massive Open
Online Course

(MOOC). Today, NPTEL is considered the largest MOOC provider in India. MHRD launched the
SWAYAM MOOC platform in 2017 and NPTEL has been the largest contributor to it. NPTEL also
manages the national MOOCs portal - swayam.gov.in as well as the network of more than 3800
SWAYAM local chapter colleges. With IITM continuing to lead the NPTEL

project, it makes them the perfect choice to offer an online degree program. Why an Online Degree
Initiative? IIT Madras wishes to reach out to the many aspiring and motivated learners across India. An
online degree is the

perfect way to accomplish this, as it is not limited by on-campus physical infrastructure. Being an
online program, we can accommodate between 50,000 to a lakh learners per batch. It is a game changer
as working professionals, and learners of any age group can enroll in it. Students currently enrolled in a
physical college in any program can join here and earn their second degree . (University Grants
Commission had

announced in 2020 that students will now be permitted to pursue two degree programs simultaneously if one is

in online mode) Since there are no restrictions on the base subjects, students from other streams such as commerce / arts / law and of course, science students can enroll in this program. Data Science and Machine Learning is proving to be

useful in all disciplines and fields. All courses will be offered 3 times a year. Thus, learners have considerable flexibility in the pace they can select to move ahead in the program. The program gives flexibility to learners to set their goals . Learners who

successfully complete all 8 courses in Foundational Level can get a certificate and exit.

Alternatively, they

can proceed to do the more specialised courses in the Diploma Level and exit with a Diploma in Programming

AND/OR Diploma in Data Science from IIT Madras. However, those interested in acquiring the BS degree can

proceed to take up the Degree Level courses. Check the Academics page for details. Based on their requirements, they can acquire certifications that will help them with better

employment opportunities. The program will be rigorous in its delivery , just as any other program from IIT Madras. Learners have to spend time with the coursework every week and achieve minimum

criteria to pass every course. Being an online program, the course content can be accessed by learners from anywhere . They

need to have a laptop / desktop, a good internet connection, and more importantly, the will to learn and work

hard. Learners will be required to travel to designated exam centres only for the quizzes and exams each term.

View section about exam cities . Each course will have a discussion forum with an active academic team to help in clearing doubts. We plan to bring in more personalised mentors to help students with Diploma Level and

Degree Level courses. In future, we are considering tie-ups with industries to enable internships and project opportunities . This will also facilitate hiring of our learners who perform well in the program. Relevant Links www.iitm.ac.in/ReachIITM/ReachIITM/iitmadras Faculty Co-ordinators BS Data Science and Applications Dr. Andrew Thangaraj Andrew Thangaraj, Professor in the Department of Electrical Engineering, Indian Institute of Technology

Madras, has been with the institute since June 2004. His bachelors was from IIT Madras and PhD from Georgia

Institute of Technology, Atlanta, USA. His research interests are in the areas of information theory and

error-control coding. He has served on the editorial boards of the IEEE Transactions on Communications and

IEEE Transactions on Information Theory. From Nov 2011, he has been one of the Coordinators of the National Programme on Technology Enhanced Learning (NPTEL), a multi-institutional

project funded by the Ministry of Education and managed by IIT Madras. At NPTEL, he played a key role in the

starting of online courses and certification on a massive scale through the SWAYAM portal . He is currently

the Principal Investigator for SWAYAM. At IIT Madras, he led a team of faculty that started the Bachelor of Science Degree in Data Science &

Applications (IIT Madras Degree Program in Data Science and Applications), launched in June 2020, with online course content delivery and in-person exams. He is currently a

coordinator for the program. Dr. Vignesh Muthuvijayan Dr. Vignesh Muthuvijayan is a Professor in the Department of Biotechnology, Bhupat and Jyoti Mehta School of

Biosciences, IIT Madras. He received his BTech in Chemical Engineering from A. C. Tech, Anna University,

India. He went on to pursue his master's degree in Chemical and Biochemical Engineering at the

University of

Maryland, Baltimore County, and his PhD in Chemical Engineering at Oklahoma State University. He also worked

as a post-doc at Johns Hopkins University. He joined the Department of Biotechnology at IIT Madras in 2010.

His research interests are in the area of biomaterials and their applications. Prof. Vignesh Muthuvijayan is

also serving as a Coordinator for the IIT Madras BS in Data Science and Applications program and National

Programme on Technology Enhanced Learning (NPTEL). Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

Our normal response time is 3 working days. It might take a little longer during busy periods.

We will share Google Meet links during such periods.

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In some cases, you might have to call multiple times to successfully connect to us. View Site Map © IIT Madras. All rights reserved. View Site Map © IIT Madras. All rights reserved. Privacy Policy | Terms of Service

Teaching Assistance Testimonials Research and Publication Events FAQ About IITM About IIT Madras Faculty Co-ordinators Contact Us Merchandise Partnerships Placements SIGN IN Applications Open now for September 2024 Batch | Applications Close: Sep 15, 2024 | Exam: Oct 27, 2024 APPLY NOW Applications Open now for September 2024 Batch | Applications Close: Sep 15, 2024 | Exam: Oct 27, 2024 APPLY NOW Home Academics Overall Structure There are four levels in the IIT Madras Degree program and to get the BS Degree in Data Science and Applications from IIT

Madras, a learner has to successfully complete all four levels. There is also the flexibility to exit at any level . Depending on the courses completed and credits earned, the

learner can receive a Foundation Certificate from IITM CODE (Centre for Outreach and Digital Education) or Diploma(s) from IIT Madras or BSc Degree in Programming and Data Science from IIT Madras or BS Degree in Data Science and Applications from IIT Madras. Those who are interested in pursuing an exclusive Diploma Program in Programming or Data Science can also check out

our Diploma Program website . Courses and Credits in Each Level: Foundation Level: 32 credits | 8 courses Diploma Level: - Programming: 27 credits | 6 courses + 2 projects - Data Science: 27 credits | 6 courses + 2 projects BSc Degree Level: 28 credits BS Degree Level: 28 credits Total credits to be earned to get: BSc Degree: 114 credits BS Degree: 142 credits Completion time: 4 - 8 years The time period for this is based on learner's preferred pace and performance in assessments . Expected learner engagement will be approximately 10hrs/course/week. Fees: Each term, pay only for courses you register for! Refer Fee Structure . Online Courses & Assignments Duration of each course: 12 weeks - Each week comprising 2-3 hrs of videos, practice questions, text

transcripts and online graded assignment(s). Quizzes and Exams In-person invigilated quizzes and exams as per the grading pattern defined for each course. Term Structure Every year is divided into three terms of four months each - January Term, May Term and September Term. Each term of four months has 12 weeks of coursework (video lectures and assignments), 2 in-person invigilated

Quizzes and End Term Exams. Depending on the course, assessments may include programming exams, mini projects,

vivas, take home assignments, etc. Course Registrations In each term, a learner may register for upto 4 courses depending on their CCC (Credit Clearing Capability). A learner's CCC in the Foundation Level is calculated based on their performance in the Qualifier Exam or the

previous term's End Term Exams. The CCC in the Diploma Level and thereafter is 4. All 8 courses in Foundation Level need to be successfully completed before registering for any Diploma Level course.

Similarly, all Diploma Level courses & projects need to be successfully completed before registering for any Degree

Level course. Assessments There are 3 types of assessments for each course: Weekly

Assignments which are online monthly

in-person Quizzes in-person End Term Exam View More Details In addition, assessments may include programming exams, mini projects, vivas, take home assignments, etc. Assessment There are 3 types of assessments for each course - online weekly assignments, monthly in-person invigilated quizzes and an in-person invigilated end term exam. 1. Online Assignments A 12 week course will have one or more weekly assignments to be submitted online within the

due date specified. The average score of the best 6 out of the first 9 weekly assignments given during the course run should be $\geq 40/100$ to be eligible to write the final exam and get the hall

ticket for the same. (Score in any unattempted assignment will be counted as 0). While the scores obtained in these will not be counted towards the Total Course Score T, it will determine the eligibility to write the End Term Exam. 2. Two Invigilated Quizzes Two quizzes will be conducted at the end of Weeks 4 and 8 based on the content of Weeks 1-4 and 1-8

respectively. Each quiz will be a single session exam with 4 hrs to attempt 4 subjects, 3 hrs to attempt 3

subjects and 2 hrs to attempt 2 or 1 subject. The score of a quiz not attempted will be taken as 0. No make-up quiz will be provided. It is mandatory to attend at least one of the 2 quizzes. Else, the learner will not be

eligible to write the final exam. The Qualifier Exam Score will be counted as Quiz 1 score for the courses registered in the

Foundation level only in the subsequent term of the Qualifier Exam. 3. End Term Exam At the end of a term, there will be an End Term Exam of 1.5 hours duration for each course.

(This will ensure exams can be conducted only on Sundays and exams for 4 courses completed

in 2 sessions of 3 hrs each throughout the program.) Eligibility to write the End Term Exam: Average weekly graded online assignment score \geq

40/100 AND learner has appeared for at least one out of the three invigilated quizzes. If the above eligibility is not satisfied, the learner will not be allowed to write the End Term Exam and will have to repeat the full course. The score obtained in the End Term Exam accounts for 50% of the Total Course Score T -

called End Term Score (E). Pass criteria for each course Total Course Score (T) = Average Quiz Score Q (out of 50) + End Term Score E (out of 50) A candidate is deemed to have passed a course IF Total Course Score (T) $\geq 50/100$. This

criteria is the same for all learners in the course. Close Exam Cities The Invigilated Quizzes and End Term exams are conducted in a number of cities spread across India. The map shows our

current Exam Cities List. View List Students residing/physically present in India on exam day All students residing in India or physically present in India on the day of an in-centre exam must write exams at one of the exam centres in india. Learners based outside India We also conduct in-person exams in Bahrain, Kuwait, Oman and UAE. Learners based out of other countries will be allowed to take up remote proctored exams. On exam day, students writing such internet based exams will be asked to pin the location exam is being taken from. If any overseas students are planning to be in India on exam day, it is the student's responsibility to notify us ahead

of time so that we can arrange for you to write the exam(s) in one of the exam centres in india; hall tickets will also

be issued suitably. If any of these norms are violated, it will be considered as malpractice. Exam results may be

withheld pending investigation and findings of the exam committee. Note: Additional Exam Fee applies for all learners opting to write exams outside India. If you reside outside India and cannot find a centre in your city / country, please write to ge@study.iitm.ac.in for assistance. Exam Cities List Bahrain Manama Kuwait Salmiya Oman Muscat Singapore Singapore Sri Lanka Colombo Jaffna UAE Dubai Hamdan (AUH) Sharjah Andaman And Nicobar Islands Port Blair Andhra Pradesh Anantapur

Bhimavaram Guntur Kadapa Kurnool Rajahmundry Tirupathi Vijayawada Vishakhapatnam Arunachal Pradesh Naharlagun Assam Dibrugarh Guwahati Silchar Tezpur Bihar Patna Bhagalpur Gaya Muzaffarpur Darbhanga Chhattisgarh Raipur Delhi Delhi Goa Panaji Gujarat Ahmedabad Anand Rajkot Surat Vadodara Haryana Faridabad Gurgaon Kurukshetra Himachal Pradesh Hamirpur Shimla Jammu and Kashmir Jammu Srinagar Jharkhand Dhanbad Jamshedpur Ranchi Karnataka Belgaum Bengaluru Dharwad Gulbarga Mangalore Mysore Kerala Calicut Ernakulam Kollam Kottayam Palakkad Thrissur Trivandrum Madhya Pradesh Bhopal Gwalior Indore Jabalpur Maharashtra Amravati Aurangabad Jalgaon Kolhapur Mumbai Nagpur Nanded Nashik Pune Solapur Manipur Imphal Meghalaya Shillong Mizoram Aizawl Nagaland Dimapur Odisha Bhubaneswar Rourkela Sambalpur Puducherry Puducherry Punjab Chandigarh Jalandhar Ludhiana Amritsar Rajasthan Jaipur Jodhpur Kota Udaipur Sikkim Bardang Tamil Nadu Chennai-Avadi Chennai-South Coimbatore Erode Kanchipuram Madurai Salem Thanjavur Tiruchirappalli Tirunelveli Vellore Telangana Hyderabad Warangal Tripura Agartala Uttar Pradesh Agra Allahabad Ghaziabad Gorakhpur Greater Noida Kanpur Lucknow Meerut Varanasi Uttarakhand Dehradun Haldwani Roorkee West Bengal Aasansol Adisaptagram Durgapur Kolkata Siliguri

Close Fee Structure For details about application fees, check Application Process in Admissions page. Each term, pay only for the courses you register for in that specific term. Goal Total Credits Total Fees INR

Foundation Only	32	32,000	Foundation + One Diploma	59	94,500	Foundation + Two Diplomas	86
1,57,000	BSc Degree	114	2,21,000 - 2,27,000	BS Degree	142	3,15,000 - 3,51,000	Fee waivers depend on category of learner and family income. Family Income > 5 LPA Family Income > 1 LPA and <= 5 LPA Family Income <= 1 LPA Fees Docs Required Fees Docs Required Fees Docs Required General Full Fee NIL 50% waiver EWS + Family Income 75% waiver EWS + Family Income OBC Full Fee NIL 50% waiver OBC-NCL + Family Income 75% waiver OBC-NCL + Family Income SC / ST 50% waiver SC / ST 50% waiver SC / ST 75% waiver SC / ST + Family Income PwD 50% waiver PwD 50% waiver PwD 75% waiver PwD + EWS / OBC-NCL + Family Income SC / ST + PwD 75% waiver SC / ST + PwD 75% waiver SC / ST + PwD *Fee waiver is not applicable for the International students. The term family income for the purpose of availing fee waivers includes the income of the candidate, the income of

his/her parents and spouse, also the income of his/her siblings and children below the age of 18 years. Family income certificate is not required while applying for the Degree program, but will be required to avail fee

weaver when joining the program. Download Family Income Certificate format OBC-NCL / EWS certificate, if applicable, need to be obtained in following format while applying: Download OBC-NCL Certificate format Download EWS Certificate format Note: If a learner does not pass a course in the term they registered for, they will need to repeat the entire

course in a later term with re-payment of full course fee. If a learner completed all course requirements, but couldn't

attend the end term exam alone, they can choose to repeat just the end term exam in the next term with the payment

of an end term exam fee (1000 for foundation level courses; 2000 for diploma / degree level courses). Foundation Level The Foundation Level comprises courses in Mathematics, Statistics, Basics of Programming and Python, and English. These courses have

been chosen to ensure that the learner who passes these successfully is well prepared to proceed to the Diploma Level courses. Requirements for registration The learner should apply for and clear the Qualifier Process . Options on successful completion Learners have the following two options when they successfully complete all 8 Foundational Level courses: Exit: The learner may exit with a Foundational Certificate from Centre for Outreach

and Digital Education (CODE), IIT Madras. Proceed to next level : The learner can join the Diploma Level . 8 courses 32 credits 1 - 3 years 10 hrs/course/week 32,000* *Refer Fee Structure

Course Name	Credits	Code	Prerequisites	Corequisites
Mathematics for Data Science I	4	BSMA1001	None	None
Statistics for Data Science I	4	BSMA1002	None	None
Computational Thinking	4	BSCS1001	None	None
English I	4	BSHS1001	None	None
Mathematics for Data Science II	4	BSMA1003	BSMA1001	None
Statistics for Data Science II	4	BSMA1004	BSMA1002, BSMA1001	BSMA1003
Programming in Python	4	BSCS1002	BSCS1001	None
English II	4	BSHS1002	BSHS1001	None

Diploma Level There are two sections in the Diploma Level with courses for Diploma in Programming and courses for Diploma in Data Science.

Each of these diplomas comprises 5 core courses, 2 projects and 1 skill enhancement course. Requirements for registration The learner should have cleared all 8 Foundation Level courses. Options on successful completion Learners have the following options based on the courses completed in this level: If a learner has completed all the courses and projects in Foundation Level and both Diplomas, they can proceed to the BSc Degree Level . OR they may exit with a Diploma in Programming from IIT Madras. OR they may exit with a Diploma in Data Science from IIT Madras. OR they may exit with both Diplomas from IIT Madras. 12 courses + 4 projects 54 credits 1 - 3 years 15 hrs/course/week 1,25,000* *Refer Fee Structure Courses for Diploma in Programming The Diploma in Programming lays a sturdy foundation in databases and programming concepts with data structures and algorithms.

The learner goes on to apply these in the building of a web application by the end of the diploma. 6 courses + 2 projects 27 credits 1 - 2 years 15 hrs/course/week 62,500* *Refer Fee Structure Course Name Credits Code Prerequisites Corequisites Database Management Systems 4 BSCS2001 None None Programming, Data Structures and Algorithms using Python 4 BSCS2002 None None Modern Application Development I 4 BSCS2003 None BSCS2001 PROJECT Modern Application Development I - Project 2 BSCS2003P None BSCS2003 Programming Concepts using Java 4 BSCS2005 None None Modern Application Development II 4 BSCS2006 BSCS2003 None PROJECT Modern Application Development II -

Project 2 BSCS2006P BSCS2003P BSCS2006 System Commands 3 BSSE2001 None None Courses for Diploma in Data Science The Diploma in Data Science exposes the learner to the holistic approach of gathering, analysing, and interpreting data for a

variety of problems. The courses on Business Data lays down the context and the need for the data, while the Machine Learning

courses equip the learner to use and analyse this data towards impactful conclusions. 6 courses + 2 projects 27 credits 1 - 2 years 15 hrs/course/week 62,500* *Refer Fee Structure Course Name Credits Code Prerequisites Corequisites Machine Learning Foundations 4 BSCS2004 None None Business Data Management 4 BSMS2001 None None PROJECT Business Data Management - Project 2 BSMS2001P None BSMS2001 Machine Learning Techniques 4 BSCS2007 None BSCS2004 Machine Learning Practice 4 BSCS2008 BSCS2004, BSCS2007 None PROJECT Machine Learning Practice - Project 2 BSCS2008P None BSCS2008 Business Analytics 4 BSMS2002 BSMS2001 None Tools in Data Science 3 BSSE2002 None BSCS2004 BSc Degree Level for BSc in Programming and Data Science Requirements for registration The learner should have cleared all 8 courses in Foundation Level and all 12 courses + 4

projects in Diploma Level . Options on successful completion Once the learner successfully completes overall 114 credits including credits earned in all previous levels: they can proceed to the BS Degree Level . OR they may exit with a BSc Degree in Programming & Data Science from IIT Madras. BSc Degree Level 28 credits (Total 114 credits) 1 - 3 years 15 hrs/course/week 64,000 - 70,000* *Refer Fee Structure BS Degree Level for BS in Data Science and Applications Requirements for registration The learner should have earned 114 credits and completed the BSc Degree Level to enter the BS Degree Level. Exit Once the learner successfully completes 142 credits and the course requirements, they can exit with a BS Degree in Data

Science and Applications from IIT Madras. BS Degree Level 28 credits (Total 142 credits) 1 - 3 years 15 hrs/course/week 94,000 - 1,24,000* *Refer Fee Structure Degree Level Courses Core Courses There are two pairs of core courses in the degree level. It is mandatory for the learner to complete all four core courses. Core Courses Pair I Core Courses Pair II Software Testing AI: Search Methods for Problem Solving Software Engineering Deep Learning Elective Courses Here is the list of elective courses offered in the program. In the BSc and BS level, a maximum of 8 credits can be transferred from

NPTEL and there is the option to do an apprenticeship and transfer up to a maximum of 12 credits in the BS level. (Note: List of elective courses may change each term depending on availability.) 1. Software Testing CORE COURSE 2. Software Engineering CORE COURSE 3. AI: Search Methods for Problem Solving CORE COURSE 4. Deep Learning CORE COURSE 5. Strategies for Professional Growth MANDATORY COURSE 6. Algorithmic Thinking in Bioinformatics 7. Big Data and Biological Networks 8. Data Visualization Design 9. Special topics in Machine Learning (Reinforcement Learning) 10. Speech Technology 11. Design Thinking for Data-Driven App Development 12. Industry 4.0 13. Sequential Decision Making 14. Market Research 15. Privacy & Security in Online Social Media 16. Introduction to

Big Data 17. Financial Forensics 18. Linear Statistical Models 19. Advanced Algorithms 20. Statistical Computing 21. Computer Systems Design 22. Programming in C 23. Mathematical Thinking 24. Large Language Models 25. Introduction to Natural Language Processing (i-NLP) 26. Deep Learning for Computer Vision 27. Managerial Economics 28. Game Theory and Strategy 29. Foundations of Finance Sample Certificates BS in Data Science and Applications from IIT Madras BSc in Programming and Data Science from IIT Madras Diploma in Programming from IIT Madras Diploma in Data Science from IIT Madras Foundational Certificate from CODE, IIT Madras Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

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Academic Calendar English | | | | | | | | | | Academics Overall Structure Term Structure Registrations Assessments Exam Cities Fee Structure Foundation Level Diploma Level BSc Degree Level BS Degree Level Sample Certificates Academic Calendar Admissions Important Dates Mandatory Requirements Eligibility to Apply Application Process Admission to the Foundation Level 1. Regular Entry 2. JEE-based Entry International Students Resources Help Videos In the Media Archive Student Life Student Houses & Societies PARADOX / Student Festivals School Connect Achievements Recognition 1. Toppers Page 2. Student's Best Projects 3. Teaching Assistance Testimonials Research and Publication Events FAQ About IITM About IIT Madras Faculty Co-ordinators Contact Us Merchandise Partnerships Placements SIGN IN Applications Open now for September 2024 Batch | Applications Close: Sep 15, 2024 | Exam: Oct 27, 2024 APPLY NOW Applications Open now for September 2024 Batch | Applications Close: Sep 15, 2024 | Exam: Oct 27, 2024 APPLY NOW Home Academics Academic calendar Academic calendar Current academic calendar of the BS Degree Program. Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

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device will be a key requirement to learn effectively from our

courses. For a complete list of software and hardware

requirements, please refer to this document - Mandatory System Specifications . Learner should be able to travel to assigned exam centres for

quizzes and exams, each term. Check the list of exam cities where our exam centres are currently located. Note: The details below are for the BS degree in Data Science and Applications from IIT Madras. We also offer a Diploma Only Program

for those who are interested exclusively in pursuing a Diploma in

Programming or Diploma in Data Science. Please visit the Diploma Program website for further details on this. Who can apply for admission? 1. Anyone who has passed Class 12 or equivalent can apply irrespective of age or academic background. Those who qualify can join the program immediately. View list of accepted class 12 equivalents. 2. School students who have appeared for their Class 11 final exams can apply irrespective of their group/stream/board. Those who qualify can join the program after passing Class 12. It is expected that the applicants have studied Mathematics and English in Class 10. No additional eligibility other than the ones mentioned above is required to apply for the qualifier process

or join the foundational level courses after clearing the qualifying exam. Accepted Class 12 equivalents 1. A Diploma recognised by AICTE or a state board of technical education of at least 3 year duration. 2. Any Public School / Board / University examination in India or in any foreign country recognised as equivalent to the 10+2 system by the Association of Indian Universities (AIU). 3. Final examination of the two-year course of the Joint Services Wing of the National Defence Academy. 4. General Certificate Education (GCE) examination (London / Cambridge / Sri Lanka) at the Advanced (A) level. 5. High School Certificate Examination of the Cambridge University or International Baccalaureate Diploma of the International Baccalaureate Office, Geneva. 6. Higher Secondary Certificate vocational examination. 7. Intermediate or two-year Pre-University examination conducted by a recognised Board / University. 8. Senior Secondary School Examination conducted by the National Institute of Open Schooling with a minimum of five subjects. Close Application Process Applications for the batch starting September 2024 is now open. Apply Now . Anyone who is eligible may start applying by filling in a simple application form

and paying the application fee. General Category / OBC Applicant 3000 application fee SC / ST Category / PwD ($\geq 40\%$ disability) Applicant 1500 application fee SC / ST Category Applicant who is ALSO PwD ($\geq 40\%$ disability

) 750 application fee An additional exam facilitation fee will apply for learners opting to write the Qualifier Exam in an Exam Centre outside India. Application will be considered only when, after payment, applicant also fills in further details and submits required documents for verification. Applications without details & documents, even if paid, will not be considered valid. Admission to the Foundation Level Regular entry: All candidates, irrespective of their backgrounds, can earn admission to the Foundation Level by successfully completing the qualifier process. See details below JEE-based entry: Candidates eligible to appear for the most recent JEE Advanced are directly admitted to the Foundation Level. See details below Regular Entry All regular entry applicants must go through the Qualifier Process to earn admission to the Foundation Level. Qualifier Preparation: The qualifier process includes 4 weeks of coursework based on lecture videos, assignments, and live sessions of the four foundational level courses - English I, Mathematics for Data Science I, Statistics for Data Science I, and Computational Thinking - that will be provided through our online portal. Every week an assignment must be submitted for grading in each course. Qualifier Exam: At the end of the 4 weeks, a qualifier exam will be conducted for eligible candidates based on the content covered in the 4 weeks of study. Eligibility to appear for the qualifier exam (regular entry): In each course, the average of the best 2 out of the first 3 assignment

scores will be calculated. Only those who get the minimum required average assignment scores in all four courses (as given below)

will be allowed to appear for the Qualifier Exam. Minimum Average Assignment Score required in each course General Learner 40% SC / ST / PwD with 40% disability 30% PwD with 40% disability & SC / ST 30% OBC-NCL / EWS 35% Note: Relaxations in pass criteria indicated for various categories of learners is applicable ONLY for the qualifier process. There will be no relaxations in terms of grades / pass criteria once registered into the program. Qualifier Exam and Passing Criteria (regular entry):

Only learners who are eligible to appear for the qualifier exam will receive the hall ticket for it. The in-person Qualifier Exam at the end of 4 weeks of coursework is of 4 hours duration and covers all 4 courses. To pass the Qualifier Exam , the learner has to get a minimum Average Qualifier Exam Score and a minimum Qualifier Exam Score in each course individually .

Refer table: Min. Req. Qualifier Exam Score in each course Min. Req. Average Qualifier Exam Score General Learner 40% 50% SC / ST / PwD with 40% disability 30% 40% PwD with 40% disability & SC / ST 30% 40% OBC-NCL / EWS 35% 45% Note: Relaxations in pass criteria indicated for various

categories of learners is applicable ONLY for the qualifier process. There will be no relaxations in terms of grades / pass criteria once registered into the program. Only those who pass the Qualifier Exam will be eligible to register for the Foundation Level courses. Validity of the Qualifier Exam result: For candidates who have already appeared for or cleared class 12 board exams, the Qualifier Exam result is valid for a period of 3 terms (or 1 year). So, a learner may choose to not join the program immediately after clearing the Qualifier Exam and join in the second or third term following the Qualifier Exam. For candidates who are yet to appear for class 12 board exams, the Qualifier Exam result is valid for a period of 6 terms (or 2 years). The extended validity is given to these candidates to facilitate joining the program after passing class 12. Though everyone who passes the Qualifier Exam will be allowed to register for Foundation Level, there will be limitations on the number of courses a learner will be allowed to register for in their first term based on the Average Qualifier Exam Score (M). Average Qualifier Exam Score (M)

Number of courses allowed to register for Minimum required $\leq M < 50\%$ up to 2 courses $50\% \leq M < 70\%$ up to 3 courses $M \geq 70\%$ up to 4 courses

Re-attempt Qualifier Exam (regular entry) Learners who were eligible to appear for the qualifier exam, but did not clear the qualifier exam or were absent for it, will be eligible to re-attempt the qualifier exam in the same term (refer important dates) without having to repeat the assignments. Anyone who is eligible may apply by filling in the re-attempt application form that opens up immediately after the qualifier results are announced and paying the re-attempt fee. General Category / OBC Applicant 1500 re-attempt fee SC / ST Category / PwD ($\geq 40\%$ disability) Applicant 750 re-attempt fee SC / ST Category Applicant who is ALSO PwD ($\geq 40\%$ disability)

) 375 re-attempt fee Learners who are not eligible to re-attempt OR do not clear the re-attempt exam may try again by applying again for the next term. Such learners will be required to pay the full application fee (3000 for general category applicants) and go through the entire qualifier process including the weekly assignments and qualifier exam. JEE-based Entry Candidates qualified to appear for current year's JEE Advanced can directly join our program by following the steps below: Complete the application form found here. Pay the admission fee of Rs 3000/- Once we verify your proof for JEE advanced, you are eligible to directly start the foundation level courses. Next, you have to register for courses (English 1, Maths 1, Statistics 1, Computational Thinking) by paying the course fees. You can register to 1/2/3/4 courses depending on the time you would have to study. We will inform you of when you can register for courses. Only after you register for courses, will you get access to content. Thereafter you continue the program as a regular student. You can pursue this even as you join another college or degree. International Students Are you a learner outside India interested to join this program? Are you worried about the in-person assessments? This program is open to learners from all around the globe. You

can study from IIT Madras and earn the BS in Data Science and Applications irrespective of the country you are from. IIT Madras is setting up modalities to conduct in-person exams in as many countries as possible. Currently, we conduct in-person exams in the following cities outside India: UAE - Dubai, Sharjah, Abu Dhabi Sri Lanka -

Colombo, Jaffna Bahrain - Manama Kuwait - Salmiya Oman - Muscat Students residing in these countries must write exams in the

designated exam centres. Students have to appear for in-person exams roughly once a month. Learners residing in any other country, apart from those shown above, can also enroll for this program and appear for remote proctored exams. Please write to the following email id with any queries you might have - ge@study.iitm.ac.in. Our team will get in touch with you and guide you on the next steps. Outside India learners who have taken exams with us till date:

159 View detailed location of learners outside India Outside India learners who have taken exam with us till date

Country	Number of learners	Mode of Exam
BAHRAIN	2	Remote proctored
CANADA	3	Remote proctored
KENYA	1	Remote proctored
KUWAIT	3	Remote proctored
OMAN	4	Remote proctored
QUATAR	8	Remote proctored
SAUDI ARABIA	2	Remote proctored
SINGAPORE	5	Remote proctored
UNITED ARAB EMIRATES	127	"In centre: Dubai, Sharjah, Hamdan Others are remote proctored"
UNITED KINGDOM	1	Remote protected
UNITED STATES	3	Remote protected

Okay Required Documents to apply 1. Passport size photograph (JPEG / JPG format) 50KB-150KB 2.

Signature (JPEG / JPEG format) 4KB-150KB 3. Photo ID Card Scan - Aadhar Card / PAN Card / Passport /

Voter ID / Driving License /

other Government ID with photo (JPEG / JPG / PDF format) - 50KB to 2MB file size. 4.

Category Certificate - only for applicants who select SC /

ST / OBC-NCL* / EWS (JPEG / JPG / PDF format) - 50KB to 2MB file size. 5. PwD Certificate - only for applicants with 40% or more disability (JPEG / JPG / PDF format) - 50KB to 2MB file size. 6. Proof of applicant having been permanently disabled OR

parent having been permanently disabled / killed during war or peacetime operations while serving as a defence / paramilitary personnel. - if applicable (JPEG / JPG / PDF format) - 50KB to 2MB file size. 7. Only for those

applying to join via JEE-based entry: Scoresheet / admit card / registration receipt as proof of eligibility to write JEE Advanced (PDF format) - 50KB to 2MB file size. *Note that BC / OBC certificate is not the same as OBC-NCL

(Other Backward Caste - Non Creamy Layer) certificate. Only applicants belonging to OBC caste as listed in Central

Government's www.ncbc.nic.in website and also belonging to Non Creamy Layer may apply in the "OBC-NCL" category. Other BC /

OBC applicants must apply in the "General" category. Download OBC-NCL Certificate format

Download EWS Certificate format Okay Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

Foundational Level Does IIT Madras offer B.Sc in Programming & Data Science on-campus? Does IIT Madras offer B.Sc in Programming & Data Science on-campus? No, there is no equivalent on-campus version. IIT Madras has carefully curated this exclusively as an online program. Will those enrolled to this program have access to IIT Madras campus facilities? Will those enrolled to this program have access to IIT Madras campus facilities? Due to limitations of campus facilities and students being spread out geographically, learners enrolled in the program will not have access to IITM campus facilities. What is the language of instruction for these courses? Are they available in other regional languages? What is the language of instruction for these courses? Are they available in other regional languages? All our program courses are taught in English. Hence, we expect a minimum proficiency in English language to participate in the program. I am a CA / B.Com Graduate / Lawyer / B.Sc Graduate / Mechanical engineer / MBBS student and do not have any knowledge of coding. Does this course cover the basics of coding before progressing to advanced levels? I am a CA / B.Com Graduate / Lawyer / B.Sc Graduate / Mechanical engineer / MBBS student and do not have any knowledge of coding. Does this course cover the basics of coding before progressing to advanced levels? It is not necessary to have a prior knowledge of coding to learn from our program. Our program is structured in such a way that once a learner starts from the Foundational level and progresses towards the Degree level, in sequence, he / she will obtain sufficient proficiency in Programming and Data Science. How long will it take to complete the online degree program if I am working? How long will it take to complete the online degree program if I am working? The full program can take anywhere between 3 and 6 years to complete. On an average, we anticipate that a learner studying part time will finish the degree in 4 to 5 years. While this is the estimated time for the full degree, a diploma can potentially be obtained faster (around 8 months - 2 years). Check Academics page to better understand the program structure. What are the technological requirements for this program? What are the technological requirements for this program? Access to good internet connection as well as a laptop / desktop device will be a key requirement to learn effectively from our courses. Familiarity with Google tools would be an advantage. Will the classes be taught live? Will there be any interaction? Will the classes be taught live? Will there be any interaction? No. Pre-recorded lessons and assignments will be made available on our portal on a weekly basis. Learners can learn from the content released each week at their own pace, but will be required to submit the weekly assignments online within stipulated deadlines. One or two LIVE sessions per course may be conducted to clear doubts and interact with the course instructor and course support team. What is the overall structure of the program? What are

Levels? What is the overall structure of the program? What are Levels? The program is split into three levels that have to be done strictly in sequence: 1: Foundational Level (8 courses) 2: Diploma Level (6 Programming courses + 6 Data Science courses) 3: Degree Level (11 courses) Check Overall Structure in Academics page. How much time do I need to spend on a course per day? How much time do I need to spend on a course per day? The expected effort to do well in one course is about 10 hours per week. How many courses can I complete in a year? How many courses can I complete in a year? There are 3 terms in a year. Learner may be allowed to register for a maximum of 2 - 4 courses in a term depending on their performance in previous exams and their preferred pace of learning. Note that all courses of one level need to be completed before registering for courses in the next level, and all prerequisites of a course need to be completed before registering for that course. How / where do I ask questions or doubts related to the course content of the program? How / where do I ask questions or doubts related to the course content of the program? Each course page will have a discussion forum where learners can raise their course-related questions and interact with the course instructor or course support team. For all questions not related to the course, you may write to support@onlinedegree.iitm.ac.in Are there any communication groups on WhatsApp, Telegram etc for the IITM Online Degree Program? Are there any communication groups on WhatsApp, Telegram etc for the IITM Online Degree Program? We have NOT created any official groups anywhere yet. We currently answer all questions / doubts via support email / calls. We have plans to create official groups for our learners when the qualifier month starts. We will reach out to you through whatsapp, email and SMS. Kindly look out for communication from our side on this. Are there any sample video content or assignments? Are there any sample video content or assignments? As a sample, Week 1 content videos have been made available for the first four Foundational Level courses for you to try and learn from. We recommend you to check out these lectures and try the sample assignment we have put out for each course. The links to Week 1 Content & Assignment pages can be accessed from the Foundational Level courses section in Academics page. I ran into an error or issue in the application form. What do I do? I ran into an error or issue in the application form. What do I do? Please send us your registered email ID and a screenshot of the error / issue with relevant description to support@onlinedegree.iitm.ac.in If the error is after payment has been made, please forward the confirmation email from Razorpay along with email ID, application number and screenshot with description. Is there an attendance policy for this program? Is there an attendance policy for this program? There is no daily attendance, but once you register for the courses, submission of weekly assignment is taken as an attendance indicator. Minimum required scores in weekly assignments of a course will determine if a learner will be allowed to write the end term exam for that course or not. Can I take my exams from home? Can I take my exams from home? No. Every term will have 3 quizzes and an end term exam for each course. All quizzes and end term exams will be in-person, invigilated exams at designated centres across the country. You need to travel to the exam centre and take these exams. Check Exam Cities in Academics Page. What is a quiz? What is a quiz? A quiz is similar or equivalent to a monthly test in schools and colleges. Marks obtained in quizzes count towards the total score obtained in the course. All quizzes will be in-person, invigilated exams at designated centres across the country. Are the exam dates flexible? Are the exam dates flexible? No, the exam dates are not flexible. The quiz and end term exam dates are fixed for all learners taking the same course in a term. We try our best to schedule all exams during the weekends though it may not be possible for every exam. What if I want to request for a city not listed in the current list of exam cities? What if I want to request for a city not listed in the current list of exam cities? If the city of your choice is not in our current exam cities list, please send an email to support@onlinedegree.iitm.ac.in. We will consider your request, but there is no guarantee that we will add it. Will there be multiple exam centres within an exam city? How many? Will there be multiple exam centres within an exam city? How many? There may be more than one exam centre in any exam city. The count depends on the number of learners in each city and availability of centres on given date with our exam partner. When will the term start? What is the timeline? When will the term start? What is the timeline? Learners who clear the Qualifier Exam will be expected to register for the program right after their results are announced. In the first term alone, classes start (with week 5) immediately after the completion of week 4 in the qualifier phase with no gap. Please check Important Dates in Admissions page to get to know the timeline. Can I pursue only a Diploma instead of Degree? Can I pursue only a Diploma instead of Degree? Learners who join the IIT Madras Online Degree Program have the option of exiting the program earlier with a Diploma in Programming AND / OR Diploma in Data Science. Learners who wish to exclusively pursue a Diploma in Programming OR Data Science

alone and already have a basic understanding of the foundations can check out IIT Madras Diploma Program website . What is the eligibility criteria to apply for the Degree Program? What is the eligibility criteria to apply for the Degree Program? Check Eligibility section in Admissions page for the latest update of the eligibility criteria. Is the program available to students currently in class 12 or equivalent? Is the program available to students currently in class 12 or equivalent? Students currently in class 12 (or equivalent) will be allowed to apply for the program, go through the qualifier phase and write the qualifier exam, but will not be allowed to register for the foundational level of the program until they clear class 12 (or equivalent). Note that a Qualifier Exam result is valid only for 3 terms (about 1 year) right after the exam. So, plan accordingly. I took a break year after class 12 to prepare for JEE / NEET. Can I Apply for the Program? I took a break year after class 12 to prepare for JEE / NEET. Can I Apply for the Program? Yes, you may apply for the Program if you have studied Mathematics & English in class 10 and have cleared class 12 or equivalent. I had dropped out of degree over two decades ago. Would I be eligible to apply? I had dropped out of degree over two decades ago. Would I be eligible to apply? Yes. If you cleared class 12 or equivalent in 2019 or earlier, you may apply for our program - there is no requirement to have completed a degree program. Check our latest eligibility criteria . How and where can I apply for the program? How and where can I apply for the program? Anyone who is eligible may apply by filling in the application form, uploading required documents and paying the application fee. We recommend that you go through the Academics Page to better understand the program and the Admissions Page to understand the admission process before applying. What is the qualifier process? What is the qualifier process? All applicants will have to go through a Qualifier Process, like a trial month, wherein they will get access to 4 weeks of content for the four foundational level courses - English I, Mathematics for Data Science I, Statistics for Data Science I and Computational Thinking. Check Qualifier Process in Admissions page Will everyone who goes through the qualifier process be allowed to write the qualifier exam? What is the passing criteria? Will everyone who goes through the qualifier process be allowed to write the qualifier exam? What is the passing criteria? No. Only the learners who get the minimum required marks in the online assignments during the qualifier process of 4 weeks will allowed to attend the qualifier exam. Only those learners allowed to write the qualifier exam shall be provided with hall tickets. Refer to Qualifier Process and the section below it to learn about the minimum required marks in the qualifier assignments and minimum required marks to pass / clear the qualifier exam. How long is the qualifier exam result valid for? Can I join the program at a later term if I clear the qualifier exam now? How long is the qualifier exam result valid for? Can I join the program at a later term if I clear the qualifier exam now? The Qualifier Exam result is valid for a period of 3 terms (or 1 year). So, a learner may choose to not register for Foundational Level immediately after clearing the Qualifier Exam and register for the Foundational level in the second or third term following the Qualifier Exam. How many times a year will there be admissions? Will it be only once a year? How many times a year will there be admissions? Will it be only once a year? For now, we are running applications / admissions thrice a year. What are the documents / files required to apply for the qualifier process of the program? What are the documents / files required to apply for the qualifier process of the program? The list of required documents is available on the Application Process section of the admissions page. Can the credits from this online degree program be transferred to learner's college or university (like on the NPTEL platform)? Can the credits from this online degree program be transferred to learner's college or university (like on the NPTEL platform)? IITM's Online BSc Degree in Programming and Data Science is a stand alone program. Credits cannot be transferred. Will IIT Madras provide the course material for the program in hard copy through courier (like IGNOU)? Will IIT Madras provide the course material for the program in hard copy through courier (like IGNOU)? No, the course content will be provided only in online mode so you can watch them anytime, anywhere. There will be no hard copy provided. Depending on the course, learners may be recommended reference books / material that they may buy separately. Can I submit an older version of the OBC-NCL / EWS certificate while applying or registering for courses? Can I submit an older version of the OBC-NCL / EWS certificate while applying or registering for courses? Student has to submit valid certificates while applying / registering. These will be verified by our team. An approved certificate will be valid for three terms. After applying, can I get a refund of application fee if I can't write the qualifier exam or if I fail the qualifier exam? After applying, can I get a refund of application fee if I can't write the qualifier exam or if I fail the qualifier exam? No. There will be no refund of application fee once paid. After registering for a course in a term, can I carry over the fees to the next term if I am not able to complete the course? After registering for a course in a term, can I carry over the fees to the next

term if I am not able to complete the course? No. A course registration is valid only for one term. If a learner is not able to clear a course in a term, they will be considered as having failed the course and will need to register for the course again at a later term along with the required fee. Note that a learner will be allowed to drop off from a course within the first four weeks of the term. In such cases, a part of the course fee will be retained as admin charges and the balance, if any, may be carried over to the next term. What is the Fee structure? Should we submit the entire fees at once or in installments? What is the Fee structure? Should we submit the entire fees at once or in installments? The overall program fees will not be paid at one stretch. The actual fees you will be paying in each term will be in proportion to the number of courses you register for in the respective term. So, if you register for 2 courses in a term, you have to pay the fees only for those 2 courses. For more details, please refer to Fee Structure in Academics Page. What is the mode of payment? What is the mode of payment? Fees can be paid only through online mode. Fees through DD will not be accepted. Note that payment cannot be made using Debit Card. You can pay using any Credit Card, Netbanking (all Indian Banks), Wallet, UPI (Google Pay, BHIM, etc.). Will I get any confirmation on successful payment of fee? Will I get any confirmation on successful payment of fee? Yes. After successful completion of payment, you will receive a confirmation email from Razorpay. If my payment fails, how many days will it take to the money back in my bank account? If my payment fails, how many days will it take to the money back in my bank account? In case of failed payments, it will take 3 to 4 weeks for the money to be credited back in your bank account. Can I edit my application form after submitting it? Can I edit my application form after submitting it? Your application form will be considered as submitted only upon making the application fee payment. Until then, you may edit the contents of your application form. After the application fee has been paid, you will not be allowed to edit the application form. In case your uploaded document(s) gets "returned / rejected" during verification, you will be given a chance to re-upload a valid document within a stipulated deadline. My application status says "Verification Under Process". How long will it take for my application to be verified? My application status says "Verification Under Process". How long will it take for my application to be verified? Verification of documents may take upto 3 weeks. Please be patient. We will keep you updated about your application status by email / SMS. How to avoid getting my application "returned / rejected"? How to avoid getting my application "returned / rejected"? After you submit your application, we verify the same before changing the status of uploaded document(s) to "accepted" or "returned / rejected". Be careful when filling the application form and double check the information you enter. We verify the files / documents you have uploaded (photograph, signature, ID card, SC / ST / OBC-NCL / EWS / PwD document if applicable). If any of the files / documents uploaded is unclear or broken or found to be wrong or incorrect, your application may be "returned / rejected". In case your uploaded document(s) gets "returned / rejected" during verification, you will be given a chance to re-upload a valid document within a stipulated deadline. Being honest and careful while filling the application form and uploading correct documents in the correct formats will help get your application "accepted". Check Application Process for required documents, document formats and sizes. Can I select only one city as my Exam City instead of selecting two preferences? Can I select only one city as my Exam City instead of selecting two preferences? No. You will need to pick two different preferences for exam cities in the order of your preference. Your exam centre shall be allotted in any one of the two exam cities picked depending on availability. We recommend that you familiarise with the current available Exam City options to be able to pick your preferred exam cities. Can I change my exam cities for the qualifier exam after having paid and submitted my application? Can I change my exam cities for the qualifier exam after having paid and submitted my application? You will not be allowed to change your exam city for the qualifier exam after submitting your preferences in the application form. If there is any unavoidable situation because of which you need to have the qualifier exam city changed, please write to us. We will try to accommodate your request based on availability, but cannot guarantee a change of exam city. Will the Exam City preferences I select for the Qualifier Exam in the application form be fixed for all the later exams? Will the Exam City preferences I select for the Qualifier Exam in the application form be fixed for all the later exams? No. The Exam city preferences selected in the application form is for the Qualifier Exam only. You will have the option of picking a different set of Exam City options, if you wish, after qualifying for the later invigilated exams. Will I get a scholarship / loan for this programme? Will I get a scholarship / loan for this programme? We are trying to see if this is possible. Please watch out for announcements regarding scholarships / loans. Is there any concession for SC / ST / OBC-NCL / EWS / PwD candidates in terms of scores? Is there any concession for SC / ST / OBC-NCL / EWS / PwD candidates in terms of

scores? SC / ST / OBC-NCL / EWS / PwD candidates will have concession in minimum scores required during the qualifier process to enter the program. Check out Qualifier Process in Admissions page. Note that there will be no such concessions after entering the program. (OBC candidates not belonging to the OBC-NCL category cannot avail any concession) Is there any fee waiver for SC / ST / OBC-NCL / EWS / PwD candidates or candidates with lower family income? Is there any fee waiver for SC / ST / OBC-NCL / EWS / PwD candidates or candidates with lower family income? Only SC / ST / PwD candidates may avail fee waivers in the application stage. After clearing the qualifier process and exam, candidates belonging to any category (General / OBC / EWS / SC / ST / PwD) may avail fee waivers in course fees based on family income. Check Fee Structure in Academics page for details. What does "family income" in the fee structure mean? What does "family income" in the fee structure mean? The term family income for the purpose of availing fee waivers includes the income of the candidate, the income of his/her parents and spouse, also the income of his/her siblings and children below the age of 18 years. After clearing the Qualifier Exam, all learners who wish to avail fee waivers based on Family Income required to submit Family Income Certificate in the format provided in the Fee Structure section. Note that the Family Income Certificates are valid only for one year and will need to be submitted afresh each year to continue availing fee waiver based on Family Income through the program. I belong to the general category and I want to avail fee waiver since my family income is below 5 lakhs per annum. Why do I need to submit EWS + Family Income Certificate to avail the waiver? I belong to the general category and I want to avail fee waiver since my family income is below 5 lakhs per annum. Why do I need to submit EWS + Family Income Certificate to avail the waiver? Economically Weaker Section (EWS) in India, as defined by the Govt. of India, is a sub-category of people belonging to the General category with an annual family income less than 8 lakhs per annum and who do not belong to any category such as SC/ST/OBC. Course fee waivers from IIT Madras are available for general category learners with family income less than 5 lakhs per annum. As per the policy of IIT Madras, and as part of our documentation process to ensure that we give fee waiver benefits to the deserving learners, we require general category learners with family income less than 5 lakhs per annum to submit both EWS certificate and Family Income certificate. EWS and Family Income certificates will need to be obtained in the format mentioned in the Fee Structure section in Academics page. Will students who enter the program have internship / recruitment opportunities provided by IIT Madras? Will students who enter the program have internship / recruitment opportunities provided by IIT Madras? We will try to make internship / recruitment opportunities available to learners; we will notify learners when the opportunities arise. How does IIT Madras plan to provide placements for lakhs of applicants? How does IIT Madras plan to provide placements for lakhs of applicants? A large number of learners apply and participate in the qualifier process. After clearing the qualifier process, learners will need to clear foundational level courses, diploma level courses and then the degree level courses to finally get a BSc degree from IIT Madras. That's a total of 31 courses of IIT standard and 116 course credits. When a student is able to successfully clear these courses and fulfill all the academic requirements, we are confident that the students will be employable. Do I get placement opportunities after I complete the BSc Degree? Do I get placement opportunities after I complete the BSc Degree? The demand for data analysts / scientists and full stack developers is very high. Through our program, we do our best to equip our learners with required subject expertise. We are also planning to give soft skills training as part of the program. It is all about enabling IITM BSc graduates with the right job opportunities. IIT Madras will actively reach out to the recruiters in the context of placement opportunities for the graduates of the Online BSc Degree Program. What is the registration process for the Foundational Level? What is the registration process for the Foundational Level? Once you clear the Qualifier Exam, you will be allowed to access the Course Registration Form from your dashboard upon logging in. In the Course Registration Form, you will need to fill the required details, upload necessary documents and pay the course fee to register for the first term of your Foundational Level. You may choose to register for one or more Foundational Level courses with the upper limit of courses you can register for depending on your Qualifier Exam Score. Note that there will be an added Exam Fee applicable for learners opting to write their quizzes and end term exams outside India. What are the documents / files that are required to be uploaded while registering for the Foundational Level? What are the documents / files that are required to be uploaded while registering for the Foundational Level? It is mandatory any one of these documents while registering for Foundational Level: - 12th or equivalent mark sheet OR - Degree Certificate OR - Certificate of the highest level of education What are the documents needed to avail fee waiver at Foundational Level and later? What are the documents needed

to avail fee waiver at Foundational Level and later? Please refer to the Fee Structure section in the Academics page to see which fee waiver may be applicable to you and the relevant documents / certificates that will need to be submitted. I have already submitted my category certificate while applying for the Qualifier Process. Do I need to submit them again while registering for the Foundational Level? I have already submitted my category certificate while applying for the Qualifier Process. Do I need to submit them again while registering for the Foundational Level? No, not required to submit again. However, the EWS / OBC-NCL certificate need to be submitted again if the previously submitted certificate is not valid until the end of the current financial year. I can't afford to pay the entire Foundational Level fees at one shot and I do not come under any fee waiver category too, can I pay the fees in 2 or 3 installments? I can't afford to pay the entire Foundational Level fees at one shot and I do not come under any fee waiver category too, can I pay the fees in 2 or 3 installments? Please be informed that you will not be paying the entire Program fee or Foundational Level fee at one stretch. The actual fees you will be paying will be in proportion to the number of courses you register for in every term. So, if you register for 2 courses in the January 2021 Term, you have to pay the course fees only for those 2 courses. In the Fee Structure section, select your goal to be able to see a detailed PDF with break down of course fee over each term. Can I change my email ID in the Foundational Level? Will we get any official student email ID? Can I change my email ID in the Foundational Level? Will we get any official student email ID? The personal email ID you applied for the program with cannot be changed. This email ID is used to access the whole Qualifier Process and the Foundational Level Course Registration Form. Once all the documents uploaded in the Foundational Level Course Registration Form are approved, each registered learner will be assigned a roll number and a corresponding official IIT Madras Online Degree student email ID. After that, all further communication and course access will be through the official student email ID. Is it possible to get an educational loan for this Program? Is it possible to get an educational loan for this Program? We are working on the process of getting the bank loans approved for this Program. Please do look out for updates from our side on this. Will I be given a new portal to access courses at Foundational Level? Will I be given a new portal to access courses at Foundational Level? No, the current portal will be used for all the Levels. You will be given a new official IITM Online Degree student email ID to access the portal. Will I be issued an ID card? Will I be issued an ID card? An ID card in electronic format will be provided, subject to conditions on use of ID card. Can I take a break of 1 or 2 year(s) after completing the Foundational Level? Can I take a break of 1 or 2 year(s) after completing the Foundational Level? The BSc Degree has to be completed within a maximum period of 6 years. While a 1 or 2 year break between Levels is allowed, we recommend that you time the length of your breaks depending on whether you want to pursue a Diploma or Degree, and how many courses you are able to take up in a term. I am unable to attend the Qualifier Exam but received hall ticket / I didn't clear the Qualifier Exam. What will be the procedure to re-apply? Do I need to pay application fee again? I am unable to attend the Qualifier Exam but received hall ticket / I didn't clear the Qualifier Exam. What will be the procedure to re-apply? Do I need to pay application fee again? You can re-apply again for the immediate next Qualifier Process with partial application fee payment. Your previous assignment scores will be considered and you will be directly eligible to write the Qualifier Exam without having to submit assignments again. I applied for the Qualifier Exam but I didn't obtain the minimum required average assignment scores to take Qualifier Exam, and hence didn't receive any hall ticket for the same. What will be the procedure to re-apply? I applied for the Qualifier Exam but I didn't obtain the minimum required average assignment scores to take Qualifier Exam, and hence didn't receive any hall ticket for the same. What will be the procedure to re-apply? You have to re-apply as a new applicant with payment of full application fee. I'm eligible to apply 4 courses in the upcoming term, but I have only 2 Foundational Level courses left to complete. Will I be allowed to register for Diploma Level courses along with the Foundational Level courses? I'm eligible to apply 4 courses in the upcoming term, but I have only 2 Foundational Level courses left to complete. Will I be allowed to register for Diploma Level courses along with the Foundational Level courses? No, you have to complete all the 8 courses in Foundation Level before enrolling to the Diploma Level courses. What is the eligibility to write the End Term Exam for a course? What is the eligibility to write the End Term Exam for a course? To be eligible to write the End Term Exam for a course, it is mandatory for the learner to have (i) obtained in the course an Average Assignment Score $\geq 40/100$ AND (ii) appeared for at least one out of the three proctored in-person Quizzes. Learners who are not eligible to write a specific course's End Term Exam will not be issued hall ticket for the same. They will have to repeat the entire course including assignments and quizzes in a

later term. Is it mandatory to take the proctored in-person Quizzes? Is it mandatory to take the proctored in-person Quizzes? It is mandatory to attempt at least one of the three proctored in-person quizzes in a term to be eligible to appear for the End Term Exams. Will Qualifier phase assignment scores be included while calculating the eligibility for the End Term? Will Qualifier phase assignment scores be included while calculating the eligibility for the End Term? For the courses you register for immediately after clearing your Qualifier Exam, yes, your Qualifier phase assignment scores will be included while calculating eligibility for the End Term Exam. For courses that you register for in a later term, you will be required to repeat the assignments completed in the Qualifier phase. Will my Qualifier Exam Score be considered in the subsequent term? Will my Qualifier Exam Score be considered in the subsequent term? The Qualifier Exam Score will be counted as Quiz 1 Score for the courses registered in the Foundation level in the term immediately after the Qualifier exam. What will happen if I am absent for an End Term Exam? What will happen if I am absent for an End Term Exam? Learner has two options: 1. Register for the course in the subsequent term with the option of taking the End Term Exam alone and by paying a reduced fee (Rs.1000 per Foundational Level course and Rs.2000 per Diploma / Degree Level Course). 2. Repeat the entire course (including assignments and quizzes) by paying the full course fee. What is the procedure to add / drop a course? What is the procedure to add / drop a course? Once the registration window closes in any term, adding courses will not be allowed. Dropping a course will be allowed within 4 weeks of the term start. Can I get a refund if I drop a course within the first four weeks of the term start? Can I get a refund if I drop a course within the first four weeks of the term start? For courses dropped within the first four weeks of the term, admin charges will be retained and the balance course fee, if any, will be refunded. Admin charges for a Foundational Level course is Rs.2000 and the admin charges for a Diploma / Degree Level course is Rs.4000. For learners who registered to take exams outside India, 50% of End Term Exam Fee for the dropped course will be refunded. If such a learner chooses to drop all courses in a term, 50% of Quiz 2 & Quiz 3 fee will also be refunded. For more details, please refer to the operations document shared with registered students named "Part II - Foundation + Diploma" under section "13.7. Dropping a Course". Is it possible to repeat a course for improving grades? Is it possible to repeat a course for improving grades? Though it is not recommended, a learner may choose to repeat a course for improving grades any number of times. The course fee for repeating a course will be twice the regular course fee and the learner will have to submit the online graded weekly assignments, appear for the Quiz(zes) and End Term Exam. The highest score among all attempts of a course will be used for calculating the CGPA. What is the procedure to change exam city from UAE to India / India to UAE? What is the procedure to change exam city from UAE to India / India to UAE? Please send an email to support@onlinedegree.iitm.ac.in How can I change the exam city within India? How can I change the exam city within India? Each exam has a deadline before which change of exam city is allowed. Option to change the exam city will be available till each deadline in the student Dashboard, in the "Exam Cities and Hall Tickets" page. Does IIT Madras offer B.Sc in Programming & Data Science on-campus? Does IIT Madras offer B.Sc in Programming & Data Science on-campus? No, there is no equivalent on-campus version. IIT Madras has carefully curated this exclusively as an online program. Will those enrolled to this program have access to IIT Madras campus facilities? Will those enrolled to this program have access to IIT Madras campus facilities? Due to limitations of campus facilities and students being spread out geographically, learners enrolled in the program will not have access to IITM campus facilities. What is the language of instruction for these courses? Are they available in other regional languages? What is the language of instruction for these courses? Are they available in other regional languages? All our program courses are taught in English. Hence, we expect a minimum proficiency in English language to participate in the program. I am a CA / B.Com Graduate / Lawyer / B.Sc Graduate / Mechanical engineer / MBBS student and do not have any knowledge of coding. Does this course cover the basics of coding before progressing to advanced levels? I am a CA / B.Com Graduate / Lawyer / B.Sc Graduate / Mechanical engineer / MBBS student and do not have any knowledge of coding. Does this course cover the basics of coding before progressing to advanced levels? It is not necessary to have a prior knowledge of coding to learn from our program. Our program is structured in such a way that once a learner starts from the Foundational level and progresses towards the Degree level, in sequence, he / she will obtain sufficient proficiency in Programming and Data Science. How long will it take to complete the online degree program if I am working? How long will it take to complete the online degree program if I am working? The full program can take anywhere between 3 and 6 years to complete. On an average, we anticipate that a learner studying part time will finish the degree in 4 to 5 years. While this is the estimated time for the full

degree, a diploma can potentially be obtained faster (around 8 months - 2 years). Check Academics page to better understand the program structure. What are the technological requirements for this program? What are the technological requirements for this program? Access to good internet connection as well as a laptop / desktop device will be a key requirement to learn effectively from our courses. Familiarity with Google tools would be an advantage. What is the overall structure of the program? What are Levels? What is the overall structure of the program? What are Levels? The program is split into three levels that have to be done strictly in sequence: 1: Foundational Level (8 courses) 2: Diploma Level (6 Programming courses + 6 Data Science courses) 3: Degree Level (11 courses) Check Overall Structure in Academics page. How / where do I ask questions or doubts related to the course content of the program? How / where do I ask questions or doubts related to the course content of the program? Each course page will have a discussion forum where learners can raise their course-related questions and interact with the course instructor or course support team. For all questions not related to the course, you may write to support@onlinedegree.iitm.ac.in Are there any communication groups on WhatsApp, Telegram etc for the IITM Online Degree Program? Are there any communication groups on WhatsApp, Telegram etc for the IITM Online Degree Program? We have NOT created any official groups anywhere yet. We currently answer all questions / doubts via support email / calls. We have plans to create official groups for our learners when the qualifier month starts. We will reach out to you through whatsapp, email and SMS. Kindly look out for communication from our side on this. Are there any sample video content or assignments? Are there any sample video content or assignments? As a sample, Week 1 content videos have been made available for the first four Foundational Level courses for you to try and learn from. We recommend you to check out these lectures and try the sample assignment we have put out for each course. The links to Week 1 Content & Assignment pages can be accessed from the Foundational Level courses section in Academics page. When will the term start? What is the timeline? When will the term start? What is the timeline? Learners who clear the Qualifier Exam will be expected to register for the program right after their results are announced. In the first term alone, classes start (with week 5) immediately after the completion of week 4 in the qualifier phase with no gap. Please check Important Dates in Admissions page to get to know the timeline. Can I pursue only a Diploma instead of Degree? Can I pursue only a Diploma instead of Degree? Learners who join the IIT Madras Online Degree Program have the option of exiting the program earlier with a Diploma in Programming AND / OR Diploma in Data Science. Learners who wish to exclusively pursue a Diploma in Programming OR Data Science alone and already have a basic understanding of the foundations can check out IIT Madras Diploma Program website . Can the credits from this online degree program be transferred to learner's college or university (like on the NPTEL platform)? Can the credits from this online degree program be transferred to learner's college or university (like on the NPTEL platform)? IITM's Online BSc Degree in Programming and Data Science is a stand alone program. Credits cannot be transferred. Will students who enter the program have internship / recruitment opportunities provided by IIT Madras? Will students who enter the program have internship / recruitment opportunities provided by IIT Madras? We will try to make internship / recruitment opportunities available to learners; we will notify learners when the opportunities arise. How does IIT Madras plan to provide placements for lakhs of applicants? How does IIT Madras plan to provide placements for lakhs of applicants? A large number of learners apply and participate in the qualifier process. After clearing the qualifier process, learners will need to clear foundational level courses, diploma level courses and then the degree level courses to finally get a BSc degree from IIT Madras. That's a total of 31 courses of IIT standard and 116 course credits. When a student is able to successfully clear these courses and fulfill all the academic requirements, we are confident that the students will be employable. Do I get placement opportunities after I complete the BSc Degree? Do I get placement opportunities after I complete the BSc Degree? The demand for data analysts / scientists and full stack developers is very high. Through our program, we do our best to equip our learners with required subject expertise. We are also planning to give soft skills training as part of the program. It is all about enabling IITM BSc graduates with the right job opportunities. IIT Madras will actively reach out to the recruiters in the context of placement opportunities for the graduates of the Online BSc Degree Program. I am a CA / B.Com Graduate / Lawyer / B.Sc Graduate / Mechanical engineer / MBBS student and do not have any knowledge of coding. Does this course cover the basics of coding before progressing to advanced levels? I am a CA / B.Com Graduate / Lawyer / B.Sc Graduate / Mechanical engineer / MBBS student and do not have any knowledge of coding. Does this course cover the basics of coding before progressing to advanced levels? It is not necessary to have a prior knowledge of coding to

learn from our program. Our program is structured in such a way that once a learner starts from the Foundational level and progresses towards the Degree level, in sequence, he / she will obtain sufficient proficiency in Programming and Data Science. How / where do I ask questions or doubts related to the course content of the program? How / where do I ask questions or doubts related to the course content of the program? Each course page will have a discussion forum where learners can raise their course-related questions and interact with the course instructor or course support team. For all questions not related to the course, you may write to support@onlinedegree.iitm.ac.in I ran into an error or issue in the application form. What do I do? I ran into an error or issue in the application form. What do I do? Please send us your registered email ID and a screenshot of the error / issue with relevant description to support@onlinedegree.iitm.ac.in If the error is after payment has been made, please forward the confirmation email from Razorpay along with email ID, application number and screenshot with description. What if I want to request for a city not listed in the current list of exam cities? What if I want to request for a city not listed in the current list of exam cities? If the city of your choice is not in our current exam cities list, please send an email to support@onlinedegree.iitm.ac.in. We will consider your request, but there is no guarantee that we will add it. Can I pursue only a Diploma instead of Degree? Can I pursue only a Diploma instead of Degree? Learners who join the IIT Madras Online Degree Program have the option of exiting the program earlier with a Diploma in Programming AND / OR Diploma in Data Science. Learners who wish to exclusively pursue a Diploma in Programming OR Data Science alone and already have a basic understanding of the foundations can check out IIT Madras Diploma Program website . What is the eligibility criteria to apply for the Degree Program? What is the eligibility criteria to apply for the Degree Program? Check Eligibility section in Admissions page for the latest update of the eligibility criteria. Is the program available to students currently in class 12 or equivalent? Is the program available to students currently in class 12 or equivalent? Students currently in class 12 (or equivalent) will be allowed to apply for the program, go through the qualifier phase and write the qualifier exam, but will not be allowed to register for the foundational level of the program until they clear class 12 (or equivalent). Note that a Qualifier Exam result is valid only for 3 terms (about 1 year) right after the exam. So, plan accordingly. I took a break year after class 12 to prepare for JEE / NEET. Can I Apply for the Program? I took a break year after class 12 to prepare for JEE / NEET. Can I Apply for the Program? Yes, you may apply for the Program if you have studied Mathematics & English in class 10 and have cleared class 12 or equivalent. I had dropped out of degree over two decades ago. Would I be eligible to apply? I had dropped out of degree over two decades ago. Would I be eligible to apply? Yes. If you cleared class 12 or equivalent in 2019 or earlier, you may apply for our program - there is no requirement to have completed a degree program. Check our latest eligibility criteria . How and where can I apply for the program? How and where can I apply for the program? Anyone who is eligible may apply by filling in the application form, uploading required documents and paying the application fee. We recommend that you go through the Academics Page to better understand the program and the Admissions Page to understand the admission process before applying. What is the qualifier process? What is the qualifier process? All applicants will have to go through a Qualifier Process, like a trial month, wherein they will get access to 4 weeks of content for the four foundational level courses - English I, Mathematics for Data Science I, Statistics for Data Science I and Computational Thinking. Check Qualifier Process in Admissions page Will everyone who goes through the qualifier process be allowed to write the qualifier exam? What is the passing criteria? Will everyone who goes through the qualifier process be allowed to write the qualifier exam? What is the passing criteria? No. Only the learners who get the minimum required marks in the online assignments during the qualifier process of 4 weeks will allowed to attend the qualifier exam. Only those learners allowed to write the qualifier exam shall be provided with hall tickets. Refer to Qualifier Process and the section below it to learn about the minimum required marks in the qualifier assignments and minimum required marks to pass / clear the qualifier exam. How long is the qualifier exam result valid for? Can I join the program at a later term if I clear the qualifier exam now? How long is the qualifier exam result valid for? Can I join the program at a later term if I clear the qualifier exam now? The Qualifier Exam result is valid for a period of 3 terms (or 1 year). So, a learner may choose to not register for Foundational Level immediately after clearing the Qualifier Exam and register for the Foundational level in the second or third term following the Qualifier Exam. How many times a year will there be admissions? Will it be only once a year? How many times a year will there be admissions? Will it be only once a year? For now, we are running applications / admissions thrice a year. What are the documents / files required to apply for the qualifier process of the program? What are the documents / files required to apply for the

qualifier process of the program? The list of required documents is available on the Application Process section of the admissions page. Can I submit an older version of the OBC-NCL / EWS certificate while applying or registering for courses? Can I submit an older version of the OBC-NCL / EWS certificate while applying or registering for courses? Student has to submit valid certificates while applying / registering. These will be verified by our team. An approved certificate will be valid for three terms. After applying, can I get a refund of application fee if I can't write the qualifier exam or if I fail the qualifier exam? After applying, can I get a refund of application fee if I can't write the qualifier exam or if I fail the qualifier exam? No. There will be no refund of application fee once paid. What is the mode of payment? What is the mode of payment? Fees can be paid only through online mode. Fees through DD will not be accepted. Note that payment cannot be made using Debit Card. You can pay using any Credit Card, Netbanking (all Indian Banks), Wallet, UPI (Google Pay, BHIM, etc.). Will I get any confirmation on successful payment of fee? Will I get any confirmation on successful payment of fee? Yes. After successful completion of payment, you will receive a confirmation email from Razorpay. If my payment fails, how many days will it take to the money back in my bank account? If my payment fails, how many days will it take to the money back in my bank account? In case of failed payments, it will take 3 to 4 weeks for the money to be credited back in your bank account. Can I edit my application form after submitting it? Can I edit my application form after submitting it? Your application form will be considered as submitted only upon making the application fee payment. Until then, you may edit the contents of your application form. After the application fee has been paid, you will not be allowed to edit the application form. In case your uploaded document(s) gets "returned / rejected" during verification, you will be given a chance to re-upload a valid document within a stipulated deadline. My application status says "Verification Under Process". How long will it take for my application to be verified? My application status says "Verification Under Process". How long will it take for my application to be verified? Verification of documents may take upto 3 weeks. Please be patient. We will keep you updated about your application status by email / SMS. How to avoid getting my application "returned / rejected"? How to avoid getting my application "returned / rejected"? After you submit your application, we verify the same before changing the status of uploaded document(s) to "accepted" or "returned / rejected". Be careful when filling the application form and double check the information you enter. We verify the files / documents you have uploaded (photograph, signature, ID card, SC / ST / OBC-NCL / EWS / PwD document if applicable). If any of the files / documents uploaded is unclear or broken or found to be wrong or incorrect, your application may be "returned / rejected". In case your uploaded document(s) gets "returned / rejected" during verification, you will be given a chance to re-upload a valid document within a stipulated deadline. Being honest and careful while filling the application form and uploading correct documents in the correct formats will help get your application "accepted". Check Application Process for required documents, document formats and sizes. Can I select only one city as my Exam City instead of selecting two preferences? Can I select only one city as my Exam City instead of selecting two preferences? No. You will need to pick two different preferences for exam cities in the order of your preference. Your exam centre shall be allotted in any one of the two exam cities picked depending on availability. We recommend that you familiarise with the current available Exam City options to be able to pick your preferred exam cities. Can I change my exam cities for the qualifier exam after having paid and submitted my application? Can I change my exam cities for the qualifier exam after having paid and submitted my application? You will not be allowed to change your exam city for the qualifier exam after submitting your preferences in the application form. If there is any unavoidable situation because of which you need to have the qualifier exam city changed, please write to us. We will try to accommodate your request based on availability, but cannot guarantee a change of exam city. Will the Exam City preferences I select for the Qualifier Exam in the application form be fixed for all the later exams? Will the Exam City preferences I select for the Qualifier Exam in the application form be fixed for all the later exams? No. The Exam city preferences selected in the application form is for the Qualifier Exam only. You will have the option of picking a different set of Exam City options, if you wish, after qualifying for the later invigilated exams. Is there any concession for SC / ST / OBC-NCL / EWS / PwD candidates in terms of scores? Is there any concession for SC / ST / OBC-NCL / EWS / PwD candidates in terms of scores? SC / ST / OBC-NCL / EWS / PwD candidates will have concession in minimum scores required during the qualifier process to enter the program. Check out Qualifier Process in Admissions page. Note that there will be no such concessions after entering the program. (OBC candidates not belonging to the OBC-NCL category cannot avail any concession) I am unable to attend the Qualifier Exam but received hall ticket / I didn't clear the Qualifier

Exam. What will be the procedure to re-apply? Do I need to pay application fee again? I am unable to attend the Qualifier Exam but received hall ticket / I didn't clear the Qualifier Exam. What will be the procedure to re-apply? Do I need to pay application fee again? You can re-apply again for the immediate next Qualifier Process with partial application fee payment. Your previous assignment scores will be considered and you will be directly eligible to write the Qualifier Exam without having to submit assignments again. I applied for the Qualifier Exam but I didn't obtain the minimum required average assignment scores to take Qualifier Exam, and hence didn't receive any hall ticket for the same. What will be the procedure to re-apply? I applied for the Qualifier Exam but I didn't obtain the minimum required average assignment scores to take Qualifier Exam, and hence didn't receive any hall ticket for the same. What will be the procedure to re-apply? You have to re-apply as a new applicant with payment of full application fee. What is the procedure to change exam city from UAE to India / India to UAE? What is the procedure to change exam city from UAE to India / India to UAE? Please send an email to support@onlinedegree.iitm.ac.in How can I change the exam city within India? How can I change the exam city within India? Each exam has a deadline before which change of exam city is allowed. Option to change the exam city will be available till each deadline in the student Dashboard, in the "Exam Cities and Hall Tickets" page. I am a CA / B.Com Graduate / Lawyer / B.Sc Graduate / Mechanical engineer / MBBS student and do not have any knowledge of coding. Does this course cover the basics of coding before progressing to advanced levels? I am a CA / B.Com Graduate / Lawyer / B.Sc Graduate / Mechanical engineer / MBBS student and do not have any knowledge of coding. Does this course cover the basics of coding before progressing to advanced levels? It is not necessary to have a prior knowledge of coding to learn from our program. Our program is structured in such a way that once a learner starts from the Foundational level and progresses towards the Degree level, in sequence, he / she will obtain sufficient proficiency in Programming and Data Science. I ran into an error or issue in the application form. What do I do? I ran into an error or issue in the application form. What do I do? Please send us your registered email ID and a screenshot of the error / issue with relevant description to support@onlinedegree.iitm.ac.in If the error is after payment has been made, please forward the confirmation email from Razorpay along with email ID, application number and screenshot with description. What if I want to request for a city not listed in the current list of exam cities? What if I want to request for a city not listed in the current list of exam cities? If the city of your choice is not in our current exam cities list, please send an email to support@onlinedegree.iitm.ac.in. We will consider your request, but there is no guarantee that we will add it. What is the eligibility criteria to apply for the Degree Program? What is the eligibility criteria to apply for the Degree Program? Check Eligibility section in Admissions page for the latest update of the eligibility criteria. Is the program available to students currently in class 12 or equivalent? Is the program available to students currently in class 12 or equivalent? Students currently in class 12 (or equivalent) will be allowed to apply for the program, go through the qualifier phase and write the qualifier exam, but will not be allowed to register for the foundational level of the program until they clear class 12 (or equivalent). Note that a Qualifier Exam result is valid only for 3 terms (about 1 year) right after the exam. So, plan accordingly. I took a break year after class 12 to prepare for JEE / NEET. Can I Apply for the Program? I took a break year after class 12 to prepare for JEE / NEET. Can I Apply for the Program? Yes, you may apply for the Program if you have studied Mathematics & English in class 10 and have cleared class 12 or equivalent. I had dropped out of degree over two decades ago. Would I be eligible to apply? I had dropped out of degree over two decades ago. Would I be eligible to apply? Yes. If you cleared class 12 or equivalent in 2019 or earlier, you may apply for our program - there is no requirement to have completed a degree program. Check our latest eligibility criteria . How and where can I apply for the program? How and where can I apply for the program? Anyone who is eligible may apply by filling in the application form, uploading required documents and paying the application fee. We recommend that you go through the Academics Page to better understand the program and the Admissions Page to understand the admission process before applying. What is the qualifier process? What is the qualifier process? All applicants will have to go through a Qualifier Process, like a trial month, wherein they will get access to 4 weeks of content for the four foundational level courses - English I, Mathematics for Data Science I, Statistics for Data Science I and Computational Thinking. Check Qualifier Process in Admissions page Will everyone who goes through the qualifier process be allowed to write the qualifier exam? What is the passing criteria? Will everyone who goes through the qualifier process be allowed to write the qualifier exam? What is the passing criteria? No. Only the learners who get the minimum required marks in the online assignments

during the qualifier process of 4 weeks will allowed to attend the qualifier exam. Only those learners allowed to write the qualifier exam shall be provided with hall tickets. Refer to Qualifier Process and the section below it to learn about the minimum required marks in the qualifier assignments and minimum required marks to pass / clear the qualifier exam. How long is the qualifier exam result valid for? Can I join the program at a later term if I clear the qualifier exam now? How long is the qualifier exam result valid for? Can I join the program at a later term if I clear the qualifier exam now? The Qualifier Exam result is valid for a period of 3 terms (or 1 year). So, a learner may choose to not register for Foundational Level immediately after clearing the Qualifier Exam and register for the Foundational level in the second or third term following the Qualifier Exam. How many times a year will there be admissions? Will it be only once a year? How many times a year will there be admissions? Will it be only once a year? For now, we are running applications / admissions thrice a year. What are the documents / files required to apply for the qualifier process of the program? What are the documents / files required to apply for the qualifier process of the program? The list of required documents is available on the Application Process section of the admissions page. Can I submit an older version of the OBC-NCL / EWS certificate while applying or registering for courses? Can I submit an older version of the OBC-NCL / EWS certificate while applying or registering for courses? Student has to submit valid certificates while applying / registering. These will be verified by our team. An approved certificate will be valid for three terms. After applying, can I get a refund of application fee if I can't write the qualifier exam or if I fail the qualifier exam? After applying, can I get a refund of application fee if I can't write the qualifier exam or if I fail the qualifier exam? No. There will be no refund of application fee once paid. What is the mode of payment? What is the mode of payment? Fees can be paid only through online mode. Fees through DD will not be accepted. Note that payment cannot be made using Debit Card. You can pay using any Credit Card, Netbanking (all Indian Banks), Wallet, UPI (Google Pay, BHIM, etc.). Will I get any confirmation on successful payment of fee? Will I get any confirmation on successful payment of fee? Yes. After successful completion of payment, you will receive a confirmation email from Razorpay. If my payment fails, how many days will it take to the money back in my bank account? If my payment fails, how many days will it take to the money back in my bank account? In case of failed payments, it will take 3 to 4 weeks for the money to be credited back in your bank account. Can I edit my application form after submitting it? Can I edit my application form after submitting it? Your application form will be considered as submitted only upon making the application fee payment. Until then, you may edit the contents of your application form. After the application fee has been paid, you will not be allowed to edit the application form. In case your uploaded document(s) gets "returned / rejected" during verification, you will be given a chance to re-upload a valid document within a stipulated deadline. My application status says "Verification Under Process". How long will it take for my application to be verified? My application status says "Verification Under Process". How long will it take for my application to be verified? Verification of documents may take upto 3 weeks. Please be patient. We will keep you updated about your application status by email / SMS. How to avoid getting my application "returned / rejected"? How to avoid getting my application "returned / rejected"? After you submit your application, we verify the same before changing the status of uploaded document(s) to "accepted" or "returned / rejected". Be careful when filling the application form and double check the information you enter. We verify the files / documents you have uploaded (photograph, signature, ID card, SC / ST / OBC-NCL / EWS / PwD document if applicable). If any of the files / documents uploaded is unclear or broken or found to be wrong or incorrect, your application may be "returned / rejected". In case your uploaded document(s) gets "returned / rejected" during verification, you will be given a chance to re-upload a valid document within a stipulated deadline. Being honest and careful while filling the application form and uploading correct documents in the correct formats will help get your application "accepted". Check Application Process for required documents, document formats and sizes. Can I select only one city as my Exam City instead of selecting two preferences? Can I select only one city as my Exam City instead of selecting two preferences? No. You will need to pick two different preferences for exam cities in the order of your preference. Your exam centre shall be allotted in any one of the two exam cities picked depending on availability. We recommend that you familiarise with the current available Exam City options to be able to pick your preferred exam cities. Can I change my exam cities for the qualifier exam after having paid and submitted my application? Can I change my exam cities for the qualifier exam after having paid and submitted my application? You will not be allowed to change your exam city for the qualifier exam after submitting your preferences in the application form. If there is any unavoidable situation because of which you need to have the qualifier exam city changed, please write to

us. We will try to accommodate your request based on availability, but cannot guarantee a change of exam city. Will the Exam City preferences I select for the Qualifier Exam in the application form be fixed for all the later exams? Will the Exam City preferences I select for the Qualifier Exam in the application form be fixed for all the later exams? No. The Exam city preferences selected in the application form is for the Qualifier Exam only. You will have the option of picking a different set of Exam City options, if you wish, after qualifying for the later invigilated exams. Is there any concession for SC / ST / OBC-NCL / EWS / PwD candidates in terms of scores? Is there any concession for SC / ST / OBC-NCL / EWS / PwD candidates in terms of scores? SC / ST / OBC-NCL / EWS / PwD candidates will have concession in minimum scores required during the qualifier process to enter the program. Check out Qualifier Process in Admissions page. Note that there will be no such concessions after entering the program. (OBC candidates not belonging to the OBC-NCL category cannot avail any concession) How long will it take to complete the online degree program if I am working? How long will it take to complete the online degree program if I am working? The full program can take anywhere between 3 and 6 years to complete. On an average, we anticipate that a learner studying part time will finish the degree in 4 to 5 years. While this is the estimated time for the full degree, a diploma can potentially be obtained faster (around 8 months - 2 years). Check Academics page to better understand the program structure. Will the classes be taught live? Will there be any interaction? Will the classes be taught live? Will there be any interaction? No. Pre-recorded lessons and assignments will be made available on our portal on a weekly basis. Learners can learn from the content released each week at their own pace, but will be required to submit the weekly assignments online within stipulated deadlines. One or two LIVE sessions per course may be conducted to clear doubts and interact with the course instructor and course support team. What is the overall structure of the program? What are Levels? What is the overall structure of the program? What are Levels? The program is split into three levels that have to be done strictly in sequence: 1: Foundational Level (8 courses) 2: Diploma Level (6 Programming courses + 6 Data Science courses) 3: Degree Level (11 courses) Check Overall Structure in Academics page. How much time do I need to spend on a course per day? How much time do I need to spend on a course per day? The expected effort to do well in one course is about 10 hours per week. How many courses can I complete in a year? How many courses can I complete in a year? There are 3 terms in a year. Learner may be allowed to register for a maximum of 2 - 4 courses in a term depending on their performance in previous exams and their preferred pace of learning. Note that all courses of one level need to be completed before registering for courses in the next level, and all prerequisites of a course need to be completed before registering for that course. How / where do I ask questions or doubts related to the course content of the program? How / where do I ask questions or doubts related to the course content of the program? Each course page will have a discussion forum where learners can raise their course-related questions and interact with the course instructor or course support team. For all questions not related to the course, you may write to support@onlinedegree.iitm.ac.in Are there any sample video content or assignments? Are there any sample video content or assignments? As a sample, Week 1 content videos have been made available for the first four Foundational Level courses for you to try and learn from. We recommend you to check out these lectures and try the sample assignment we have put out for each course. The links to Week 1 Content & Assignment pages can be accessed from the Foundational Level courses section in Academics page. Is there an attendance policy for this program? Is there an attendance policy for this program? There is no daily attendance, but once you register for the courses, submission of weekly assignment is taken as an attendance indicator. Minimum required scores in weekly assignments of a course will determine if a learner will be allowed to write the end term exam for that course or not. Can I take my exams from home? Can I take my exams from home? No. Every term will have 3 quizzes and an end term exam for each course. All quizzes and end term exams will be in-person, invigilated exams at designated centres across the country. You need to travel to the exam centre and take these exams. Check Exam Cities in Academics Page. What is a quiz? What is a quiz? A quiz is similar or equivalent to a monthly test in schools and colleges. Marks obtained in quizzes count towards the total score obtained in the course. All quizzes will be in-person, invigilated exams at designated centres across the country. Are the exam dates flexible? Are the exam dates flexible? No, the exam dates are not flexible. The quiz and end term exam dates are fixed for all learners taking the same course in a term. We try our best to schedule all exams during the weekends though it may not be possible for every exam. What if I want to request for a city not listed in the current list of exam cities? What if I want to request for a city not listed in the current list of exam cities? If the city of your choice is not in our current exam cities list, please send

an email to support@onlinedegree.iitm.ac.in. We will consider your request, but there is no guarantee that we will add it. Will there be multiple exam centres within an exam city? How many? Will there be multiple exam centres within an exam city? How many? There may be more than one exam centre in any exam city. The count depends on the number of learners in each city and availability of centres on given date with our exam partner. Can the credits from this online degree program be transferred to learner's college or university (like on the NPTEL platform)? Can the credits from this online degree program be transferred to learner's college or university (like on the NPTEL platform)? IITM's Online BSc Degree in Programming and Data Science is a stand alone program. Credits cannot be transferred. Will IIT Madras provide the course material for the program in hard copy through courier (like IGNOU)? Will IIT Madras provide the course material for the program in hard copy through courier (like IGNOU)? No, the course content will be provided only in online mode so you can watch them anytime, anywhere. There will be no hard copy provided. Depending on the course, learners may be recommended reference books / material that they may buy separately. After registering for a course in a term, can I carry over the fees to the next term if I am not able to complete the course? After registering for a course in a term, can I carry over the fees to the next term if I am not able to complete the course? No. A course registration is valid only for one term. If a learner is not able to clear a course in a term, they will be considered as having failed the course and will need to register for the course again at a later term along with the required fee. Note that a learner will be allowed to drop off from a course within the first four weeks of the term. In such cases, a part of the course fee will be retained as admin charges and the balance, if any, may be carried over to the next term. Can I select only one city as my Exam City instead of selecting two preferences? Can I select only one city as my Exam City instead of selecting two preferences? No. You will need to pick two different preferences for exam cities in the order of your preference. Your exam centre shall be allotted in any one of the two exam cities picked depending on availability. We recommend that you familiarise with the current available Exam City options to be able to pick your preferred exam cities. Can I change my exam cities for the qualifier exam after having paid and submitted my application? Can I change my exam cities for the qualifier exam after having paid and submitted my application? You will not be allowed to change your exam city for the qualifier exam after submitting your preferences in the application form. If there is any unavoidable situation because of which you need to have the qualifier exam city changed, please write to us. We will try to accommodate your request based on availability, but cannot guarantee a change of exam city. Will the Exam City preferences I select for the Qualifier Exam in the application form be fixed for all the later exams? Will the Exam City preferences I select for the Qualifier Exam in the application form be fixed for all the later exams? No. The Exam city preferences selected in the application form is for the Qualifier Exam only. You will have the option of picking a different set of Exam City options, if you wish, after qualifying for the later invigilated exams. After applying, can I get a refund of application fee if I can't write the qualifier exam or if I fail the qualifier exam? After applying, can I get a refund of application fee if I can't write the qualifier exam or if I fail the qualifier exam? No. There will be no refund of application fee once paid. After registering for a course in a term, can I carry over the fees to the next term if I am not able to complete the course? After registering for a course in a term, can I carry over the fees to the next term if I am not able to complete the course? No. A course registration is valid only for one term. If a learner is not able to clear a course in a term, they will be considered as having failed the course and will need to register for the course again at a later term along with the required fee. Note that a learner will be allowed to drop off from a course within the first four weeks of the term. In such cases, a part of the course fee will be retained as admin charges and the balance, if any, may be carried over to the next term. What is the Fee structure? Should we submit the entire fees at once or in installments? What is the Fee structure? Should we submit the entire fees at once or in installments? The overall program fees will not be paid at one stretch. The actual fees you will be paying in each term will be in proportion to the number of courses you register for in the respective term. So, if you register for 2 courses in a term, you have to pay the fees only for those 2 courses. For more details, please refer to Fee Structure in Academics Page. What is the mode of payment? What is the mode of payment? Fees can be paid only through online mode. Fees through DD will not be accepted. Note that payment cannot be made using Debit Card. You can pay using any Credit Card, Netbanking (all Indian Banks), Wallet, UPI (Google Pay, BHIM, etc.). Will I get any confirmation on successful payment of fee? Will I get any confirmation on successful payment of fee? Yes. After successful completion of payment, you will receive a confirmation email from Razorpay. If my payment fails, how many days will it take to the money back in my bank account? If my payment fails, how many days will it take to the money back in my bank account? In case

of failed payments, it will take 3 to 4 weeks for the money to be credited back in your bank account. Will I get a scholarship / loan for this programme? Will I get a scholarship / loan for this programme? We are trying to see if this is possible. Please watch out for announcements regarding scholarships / loans. Is there any fee waiver for SC / ST / OBC-NCL / EWS / PwD candidates or candidates with lower family income? Is there any fee waiver for SC / ST / OBC-NCL / EWS / PwD candidates or candidates with lower family income? Only SC / ST / PwD candidates may avail fee waivers in the application stage. After clearing the qualifier process and exam, candidates belonging to any category (General / OBC / EWS / SC / ST / PwD) may avail fee waivers in course fees based on family income. Check Fee Structure in Academics page for details. What does "family income" in the fee structure mean? What does "family income" in the fee structure mean? The term family income for the purpose of availing fee waivers includes the income of the candidate, the income of his/her parents and spouse, also the income of his/her siblings and children below the age of 18 years. After clearing the Qualifier Exam, all learners who wish to avail fee waivers based on Family Income required to submit Family Income Certificate in the format provided in the Fee Structure section. Note that the Family Income Certificates are valid only for one year and will need to be submitted afresh each year to continue availing fee waiver based on Family Income through the program. I belong to the general category and I want to avail fee waiver since my family income is below 5 lakhs per annum. Why do I need to submit EWS + Family Income Certificate to avail the waiver? I belong to the general category and I want to avail fee waiver since my family income is below 5 lakhs per annum. Why do I need to submit EWS + Family Income Certificate to avail the waiver? Economically Weaker Section (EWS) in India, as defined by the Govt. of India, is a sub-category of people belonging to the General category with an annual family income less than 8 lakhs per annum and who do not belong to any category such as SC/ST/OBC. Course fee waivers from IIT Madras are available for general category learners with family income less than 5 lakhs per annum. As per the policy of IIT Madras, and as part of our documentation process to ensure that we give fee waiver benefits to the deserving learners, we require general category learners with family income less than 5 lakhs per annum to submit both EWS certificate and Family Income certificate. EWS and Family Income certificates will need to be obtained in the format mentioned in the Fee Structure section in Academics page. What is the registration process for the Foundational Level? What is the registration process for the Foundational Level? Once you clear the Qualifier Exam, you will be allowed to access the Course Registration Form from your dashboard upon logging in. In the Course Registration Form, you will need to fill the required details, upload necessary documents and pay the course fee to register for the first term of your Foundational Level. You may choose to register for one or more Foundational Level courses with the upper limit of courses you can register for depending on your Qualifier Exam Score. Note that there will be an added Exam Fee applicable for learners opting to write their quizzes and end term exams outside India. What are the documents / files that are required to be uploaded while registering for the Foundational Level? What are the documents / files that are required to be uploaded while registering for the Foundational Level? It is mandatory any one of these documents while registering for Foundational Level: - 12th or equivalent mark sheet OR - Degree Certificate OR - Certificate of the highest level of education. What are the documents needed to avail fee waiver at Foundational Level and later? What are the documents needed to avail fee waiver at Foundational Level and later? Please refer to the Fee Structure section in the Academics page to see which fee waiver may be applicable to you and the relevant documents / certificates that will need to be submitted. I have already submitted my category certificate while applying for the Qualifier Process. Do I need to submit them again while registering for the Foundational Level? I have already submitted my category certificate while applying for the Qualifier Process. Do I need to submit them again while registering for the Foundational Level? No, not required to submit again. However, the EWS / OBC-NCL certificate need to be submitted again if the previously submitted certificate is not valid until the end of the current financial year. I can't afford to pay the entire Foundational Level fees at one shot and I do not come under any fee waiver category too, can I pay the fees in 2 or 3 installments? I can't afford to pay the entire Foundational Level fees at one shot and I do not come under any fee waiver category too, can I pay the fees in 2 or 3 installments? Please be informed that you will not be paying the entire Program fee or Foundational Level fee at one stretch. The actual fees you will be paying will be in proportion to the number of courses you register for in every term. So, if you register for 2 courses in the January 2021 Term, you have to pay the course fees only for those 2 courses. In the Fee Structure section, select your goal to be able to see a detailed PDF with break down of course fee over each term. Can I change my email ID in the Foundational Level? Will we get any

official student email ID? Can I change my email ID in the Foundational Level? Will we get any official student email ID? The personal email ID you applied for the program with cannot be changed. This email ID is used to access the whole Qualifier Process and the Foundational Level Course Registration Form. Once all the documents uploaded in the Foundational Level Course Registration Form are approved, each registered learner will be assigned a roll number and a corresponding official IIT Madras Online Degree student email ID. After that, all further communication and course access will be through the official student email ID. Is it possible to get an educational loan for this Program? Is it possible to get an educational loan for this Program? We are working on the process of getting the bank loans approved for this Program. Please do look out for updates from our side on this. Will I be given a new portal to access courses at Foundational Level? Will I be given a new portal to access courses at Foundational Level? No, the current portal will be used for all the Levels. You will be given a new official IITM Online Degree student email ID to access the portal. Will I be issued an ID card? Will I be issued an ID card? An ID card in electronic format will be provided, subject to conditions on use of ID card. Can I take a break of 1 or 2 year(s) after completing the Foundational Level? Can I take a break of 1 or 2 year(s) after completing the Foundational Level? The BSc Degree has to be completed within a maximum period of 6 years. While a 1 or 2 year break between Levels is allowed, we recommend that you time the length of your breaks depending on whether you want to pursue a Diploma or Degree, and how many courses you are able to take up in a term. I'm eligible to apply 4 courses in the upcoming term, but I have only 2 Foundational Level courses left to complete. Will I be allowed to register for Diploma Level courses along with the Foundational Level courses? I'm eligible to apply 4 courses in the upcoming term, but I have only 2 Foundational Level courses left to complete. Will I be allowed to register for Diploma Level courses along with the Foundational Level courses? No, you have to complete all the 8 courses in Foundation Level before enrolling to the Diploma Level courses. What is the eligibility to write the End Term Exam for a course? What is the eligibility to write the End Term Exam for a course? To be eligible to write the End Term Exam for a course, it is mandatory for the learner to have (i) obtained in the course an Average Assignment Score $\geq 40/100$ AND (ii) appeared for at least one out of the three proctored in-person Quizzes. Learners who are not eligible to write a specific course's End Term Exam will not be issued hall ticket for the same. They will have to repeat the entire course including assignments and quizzes in a later term. Is it mandatory to take the proctored in-person Quizzes? Is it mandatory to take the proctored in-person Quizzes? It is mandatory to attempt at least one of the three proctored in-person quizzes in a term to be eligible to appear for the End Term Exams. Will Qualifier phase assignment scores be included while calculating the eligibility for the End Term? Will Qualifier phase assignment scores be included while calculating the eligibility for the End Term? For the courses you register for immediately after clearing your Qualifier Exam, yes, your Qualifier phase assignment scores will be included while calculating eligibility for the End Term Exam. For courses that you register for in a later term, you will be required to repeat the assignments completed in the Qualifier phase. Will my Qualifier Exam Score be considered in the subsequent term? Will my Qualifier Exam Score be considered in the subsequent term? The Qualifier Exam Score will be counted as Quiz 1 Score for the courses registered in the Foundation level in the term immediately after the Qualifier exam. What will happen if I am absent for an End Term Exam? What will happen if I am absent for an End Term Exam? Learner has two options: 1. Register for the course in the subsequent term with the option of taking the End Term Exam alone and by paying a reduced fee (Rs.1000 per Foundational Level course and Rs.2000 per Diploma / Degree Level Course). 2. Repeat the entire course (including assignments and quizzes) by paying the full course fee. What is the procedure to add / drop a course? What is the procedure to add / drop a course? Once the registration window closes in any term, adding courses will not be allowed. Dropping a course will be allowed within 4 weeks of the term start. Can I get a refund if I drop a course within the first four weeks of the term start? Can I get a refund if I drop a course within the first four weeks of the term start? For courses dropped within the first four weeks of the term, admin charges will be retained and the balance course fee, if any, will be refunded. Admin charges for a Foundational Level course is Rs.2000 and the admin charges for a Diploma / Degree Level course is Rs.4000. For learners who registered to take exams outside India, 50% of End Term Exam Fee for the dropped course will be refunded. If such a learner chooses to drop all courses in a term, 50% of Quiz 2 & Quiz 3 fee will also be refunded. For more details, please refer to the operations document shared with registered students named "Part II - Foundation + Diploma" under section "13.7. Dropping a Course". Is it possible to repeat a course for improving grades? Is it possible to repeat a course for improving grades? Though it is not recommended, a learner may choose to repeat a

course for improving grades any number of times. The course fee for repeating a course will be twice the regular course fee and the learner will have to submit the online graded weekly assignments, appear for the Quiz(zes) and End Term Exam. The highest score among all attempts of a course will be used for calculating the CGPA. What is the procedure to change exam city from UAE to India / India to UAE? What is the procedure to change exam city from UAE to India / India to UAE? Please send an email to support@onlinedegree.iitm.ac.in How can I change the exam city within India? How can I change the exam city within India? Each exam has a deadline before which change of exam city is allowed. Option to change the exam city will be available till each deadline in the student Dashboard, in the "Exam Cities and Hall Tickets" page. Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

Our normal response time is 3 working days. It might take a little longer during busy periods. We will share Google Meet links during such periods.

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Degree Program in Programming and Data Science. Help Video 1 of 12 Why an Online Degree Initiative from IIT Madras? Help Video 2 of 12 Why Learn Programming and Data Science? Help Video 3 of 12 Who is this Program Designed for? What is the Eligibility to

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Level Sample Certificates Academic Calendar Admissions Important Dates Mandatory Requirements Eligibility to Apply Application Process Admission to the Foundation Level 1. Regular Entry 2. JEE-based Entry International Students Resources Help Videos In the Media Archive Student Life Student Houses & Societies PARADOX / Student Festivals School Connect Achievements Recognition 1. Toppers Page 2. Student's Best Projects 3. Teaching Assistance Testimonials Research and Publication Events FAQ About IITM About IIT Madras Faculty Co-ordinators Contact Us Merchandise Partnerships Placements SIGN IN Applications Open now for September 2024 Batch | Applications Close: Sep 15, 2024 | Exam: Oct 27, 2024 APPLY NOW Applications Open now for September 2024 Batch | Applications Close: Sep 15, 2024 | Exam: Oct 27, 2024 APPLY NOW Privacy Policy | Terms of Service | Code of Conduct | Honour Code Honour Code Effective Date: 15/06/2020 In order to participate in IIT Madras online degree programme, you must

agree to the Honor Code given below and any additional terms specific to a course or program. This Honor Code, and any additional terms, will be posted on our website - study.iitm.ac.in/ds. Honour Code Pledge By registering in an IIT Madras Online Degree programme, I agree that I will:

- Complete all tests and assignments on my own, unless collaboration on an assignment is explicitly permitted.
- Maintain only one user account, unless IIT Madras has approved the use of a separate user account in connection with an employer-sponsored or university-sponsored program.
- Not let anyone else use my username and/or password.
- Not engage in any activity that would dishonestly improve my results, or improve or hurt the results of others.
- Not engage in any activity that will cause grief or harm to the online degree websites/portals or study materials, including activities like hacking or accessing restricted materials.
- Not post answers to problems that are being used to assess learner performance either inside the course forums or in any other website.
- Not resubmit or submit work (in identical or similar form) for multiple assignments without prior explicit approval.
- Not submit false or altered or fabricated admission documents including signatures or certificates of enrollment or standing, registration forms, and medical certifications.

Violations If you are found in violation of the Terms of Service or Honor Code, you may be subject to one or more of the following actions:

- Receiving a zero or no credit for an assignment;
- Having any certificate/degree earned in the course or programme withheld or revoked;
- Being unenrolled from a course or programme; or
- Termination of your use of the IIT Madras ONLINE DEGREE Site.

Additional actions may be taken at the sole discretion of IIT Madras. No refunds will be issued in the case of any corrective action for such violations. Honor Code violations will be determined at the sole discretion of IIT Madras. You will be notified if a determination has been made that you have violated this Honor Code and you will be informed of the corresponding action that will be taken as a result of the violation. Changing the Honour Code

Please note that we review and may make changes to this Honor Code from time to time. Any changes to this Honor Code will be effective immediately upon posting on study.iitm.ac.in/ds page, with an updated effective date. By accessing the IIT Madras ONLINE DEGREE Site after any changes have been made, you signify your agreement on a prospective basis to the modified Honor Code and any changes contained therein. Be sure to return to this page periodically to ensure familiarity with the most current version of this Honor Code. Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

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view them. Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

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PARADOX'22 Student Festival Organised by the students of IITM BS Degree Program at the IIT Madras Campus 20th, 21st & 22nd May 2022 1500+ Programming & Data Science students of IIT Madras attended the first on-campus three day

festival, which was fully curated and organised by the students. This was a huge platform for interaction between fellow students, faculty, industry experts, and companies. Paradox '22 also marked the formal distribution of provisional diploma certificates to 101 students,

including 17 students from families of income less than 1 lakh per annum. Sports Previous Next As an icebreaker and warm-up to the three day festival, a whole series of games (chess, table tennis, box cricket, football 5s, etc.) were organised where students competed against each other.

On day two,

over 700 participants woke up early for a 5km run / walk exploring the beautiful, green IIT Madras campus. The

fastest runner completed the five kilometres in 19 minutes and 38 seconds! The much awaited faculty vs students

cricket match on day two drew in a lot of spectators cheering on while the faculty team went ahead to win the

match. Interactive Sessions Previous Next The Director of IIT Madras, Prof. V.Kamakoti, formally addressed the gathering of 1500+ students

at the SAC Auditorium and with that began a series of formal and informal interactive sessions with the faculty

and instructors of the BS Degree program. This was also a platform where students with the 10 best projects were

selected to present them to a larger audience for discussion and feedback. Being a unique program with students of all age groups and of varying educational / professional backgrounds,

students were able to learn a lot from meeting and interacting each other as well. Cultural Events Previous Next Cultural events during the IITM Paradox included competitive events and entertainment events.

Students who participated in competitive events such as Controversia (Debate), Qutopia (Quiz) and Hack-o-pitch

were evaluated by a panel of judges and mentors who picked the winners and also gave valuable feedback for all

participants and spectators to learn from. The evenings were for unwinding. Students from across the country put on a wonderful display of

their talents on

stage in the form of open mic, music and dance. On day two, all faculty and students joined in for a festive

dinner under the stars at the open air theatre, and enjoyed the late night screening of a movie together. Workshops Previous Next Apart from the talks and project presentations, spanning over two days, there were a

total of nine professional workshops conducted at different seminar halls that the students could

pick to

attend. These workshops were conducted by IIT Madras Faculty. Over a hundred students signed up for and

attended each of these workshops. Company Discussions Previous Next Day three was marked with Placement Cell interaction, sessions by IITM Incubation Cell, IITM

Research Park, panel discussions and Q&A sessions. The panel discussion titled "Is Data the eternal fuel?" was attended by industry leaders in the field of data

science and data analytics from IBM Client Innovation Center India, Renault Nissan Technology and Business

Center India, Walmart Global Tech India, Capgemini, TCS, Latent view. The Q&A session that followed with the

topic of "Careers in Data Science" were answered by leaders from Tech Mahindra, Infosys Springboard Program,

Aditya Birla Management Corporation Pvt Ltd, L&T Construction, Power Transmission & Distribution, Tiger

Analytics, Walmart Labs India. Additionally, Startups by IITM BS degree students were showcased and judged in an exhibit by

professors and industry experts. Sponsors Main Sponsor Tiger Analytics is an advanced analytics and AI consulting company enabling enterprises to generate

business value through data. They are the trusted data sciences and data engineering partner for

several Fortune 500 firms. They bring expertise in marketing science, customer analytics, and operations & planning analytics. Other Sponsors

Companies and organizations can partner, contribute and benefit in the following ways: 1. Knowledge Partners 2. CSR Partners 3. "Professionals Speak" on current industry and technology trends 4. Mentorship of students 5. Internships and Recruitment 6. Support your employees upskill with a

Diploma in Programming or Data Science or both Knowledge Partners Top leaders / researchers from companies such as Google, Flipkart, Paypal, Gramener are contributing content to the courses in the Diploma level , drawing from their rich experience on the ground and sharing with our learners. Insights from Industry leaders are vital to nurture future talent in the area

of Data Science. CSR Partners IIT Madras has instituted Merit-cum-Means scholarships for its students with CSR support from various companies. These funds will support deserving students with their tuition fees, making IIT Madras more accessible for everyone. Companies such as Verizon India, L&T Technology Services, L&T Thales Technology Services Private Limited, Dun & Bradstreet, Natesan, Synchrocones, Walmart, Renault-Nissan, Ram Shriram Foundation, Tata AIA, Tiger Analytics, Cargill Business Services, Cochin Shipyard and RR Donnelley have generously contributed to institute merit-cum-means scholarships to remove financial blocks from the path of economically disadvantaged students thirsting to learn from the best. More than 1700 students with family income less than 5LPA are currently being supported in their journey of earning Diplomas and the BS degree from IIT Madras. We profoundly thank our donors for their generous support. We are very glad to share that as the implementing institute, the IIT Madras BS Degree Program has been recognized with: The ASSOCHAM CSR and Sustainability Award for Excellence in Supporting Education and Skill for 2022 (Article1) The CSRUniverse Social Impact Awards 2023 in the Education category (Article2) All CSR funds are routed through IIT Madras which is the authorized body to receive CSR donations from companies. Currently, there are 22,000+ students pursuing the IIT Madras BS Degree program. The program takes in students 3 times a year; around 7500 new students join our program each year, of which 25-30% fall in the < 5lpa category. Appeal to donors Due to increasing educational costs, financial assistance is more than ever required. We believe that funding through CSR will make a real, significant impact on the lives of our students. Here is a glimpse of the eligible students who are awaiting support. Annual Family Income < 1Lakh Annual Family Income 1 to 5 lakhs Total Female 155 154 309 Male 1267 744 2011 Total 1422 898 2320 If you wish to obtain more details on how you can create an impact by donating to our causes, please refer to the Proposal for CSR Support for Merit-cum-Means Scholarship document and write to

jayabala@study.iitm.ac.in for any further information needed in this regard. The 1700+ students supported through industry CSR support are from the lengths and breadths of our country. Hear from our student beneficiaries HSBC scholarship beneficiaries: Other CSR beneficiaries: "Professionals Speak" on current industry and technology trends Employees of Industry partners who have more than 10+ years of experience in relevant fields have

delivered multiple talks on topics related to application development, programming and data science. This gives students in the course a valuable opportunity to interact with experienced professionals

and get a perspective on the latest technological trends in top companies. More than 50 sessions

have been delivered so far by professionals from companies such as IBM, CapGemini, Infosys, etc. The

links to the expert sessions from the industry are given in this sheet . BSBT4001 Degree Level Course Algorithmic Thinking in Bioinformatics To prepare students to develop an algorithmic thinking to address key data science challenges in bioinformatics, to acquire knowledge of various problem formulations and algorithm paradigms, which have transformed the field of biomedicine in modern times, to obtain insights into many key bioinformatics algorithms on strings, trees, and graphs, many of which can be applied to other areas as well. Course ID: BSBT4001 Course Credits: 4 Course Type: Elective Pre-requisites:

None Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Why computational biology? WEEK 2 Where in the Genome Does DNA Replication Begin? - Algorithmic warmup (frequent exact/inexact k-mers in a string). WEEK 3 Which DNA Patterns Play the Role of Molecular Clocks? - Randomized Algorithms (randomized motif search, Gibbs sampling). WEEK 4 How Do We Assemble Genomes? - Graph Algorithms (Eulerian paths, de Bruijn graphs). WEEK 5 How Do We Compare Biological Sequences? - Dynamic Programming (edit distance, single/multiple sequence alignment). WEEK 6 Which Animal Gave Us SARS? - Evolutionary Tree Reconstruction (distance-based phylogeny, neighbor-joining algorithm). WEEK 7 How Did Yeast Become a Winemaker? - Clustering Algorithms (hard and soft k-means). WEEK 8 How Do We Locate Disease-Causing Mutations? - Combinatorial Pattern Matching (suffix trees/arrays, Burrows-Wheeler transform). WEEK 9 Why Have Biologists Still Not Developed an HIV Vaccine? - Hidden Markov Models (Viterbi and forward-backward algorithms). WEEK 10 Was T. rex Just a Big Chicken? - Computational Proteomics (peptide identification and spectral match). WEEK 11 Which Motifs Are Hidden in a Biological Network? - Randomized Algorithms (colour coding for long paths in graphs). + Show all weeks View all Degree Level courses Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

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September 2024 Batch | Applications Close: Sep 15, 2024 | Exam: Oct 27, 2024 APPLY NOW Home Academics BSBT4002 Degree Level Course Big Data and Biological Networks To enable the students to “understand” biological data, to represent, and analyze various datasets from a network perspective, to encourage network thinking applied to problems across disciplines, to understand various network models used to model real-world networks, to apply network analytics techniques to understand biological networks, to implement basic network analysis algorithms in Python, to learn different AI/ML problem formulations for biological data, and to apply AI/ML techniques for analysis of biological data using Python. by Dr. Nirav P Bhatt , Karthik Raman , Prof. Himanshu Sinha Course ID: BSBT4002 Course Credits: 4 Course Type: Elective Pre-requisites:

None Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Introduction to Biological Big Data. Information Flow in Biological Systems. WEEK 2 Omics datasets: Various flavours of big biological datasets (genomic, transcriptomic, proteomic, metabolomic, etc.). WEEK 3 Introduction to Graph theory. History. Types of graphs. Representing biological networks. WEEK 4 Network structure: Key parameters, measures of centrality WEEK 5 Key Network Models: Erdos-Renyi, Watts-Strogatz (small-world) and Barabasi-Albert (power-law models) WEEK 6 Network clustering/community detection. Identifying motifs in networks. Studying network perturbations. WEEK 7 Applications of network biology: Predicting drug targets, predicting drug molecules, synthesis of new molecules (chemoinformatics) WEEK 8 Applications of network biology: Epidemiology, Centrality-lethality hypothesis. WEEK 9 AI & ML for Biological Data Analysis. Introduction to AI & ML tasks in biological networks. WEEK 10 Biological network reconstruction from omics and literature data WEEK 11 Property prediction using network data. Node classification and link prediction. WEEK 12 Analysis of heterogeneous and multi-layer/multiplex networks. Future Perspectives. + Show all weeks About the Instructors Dr. Nirav P Bhatt Assistant Professor,

Department of Biotechnology,

IIT Madras Dr Nirav P Bhatt earned his Bachelor in Chemical Engineering from The M S University of Baroda, Masters in Chemical Engineering from IIT Madras, and Docteur es Science (DSc) from EPFL, Switzerland. Currently, He is Assistant Professor with Bio Tech Department in IIT Madras. less Karthik Raman Assistant Professor,

Department of Biotechnology,

IIT Madras Dr. Karthik Raman is an Assistant Professor at the Department of Biotechnology, Indian Institute of Technology Madras since April 2011. His research interests are in the areas of metabolic network analysis, with applications in metabolic engineering and drug target identification. He received his Ph.D. in 2009 from the lab of Prof. Nagasuma Chandra at the Supercomputer Education and Research Centre at the Indian Institute of Science, Bangalore. His Ph.D. thesis involved the computational analysis of metabolic networks and protein-protein interaction networks in Mycobacterium tuberculosis, for the prediction of potential drug targets. Following his Ph.D., Karthik was a post-doctoral researcher at the lab of Prof. Dr. Andreas Wagner, at the University of Zürich, Switzerland. Karthik’s post-doctoral research was involved the analysis of signalling circuits in yeast as well as synthetic logic circuits, for their robustness and evolvability. less Prof. Himanshu Sinha Associate Professor,

Department of Biotechnology,

IIT Madras Dr. Himanshu Sinha is an Associate Professor at the Indian Institute of Technology Madras in the Department of Biotechnology. He is also a Co-ordinator for the Initiative for Biological Systems Engineering. His research Area is Complex Genetics, Systems Biology. He received his Ph.D. in Department of Plant Science at the [Downing College, Cambridge University]. He carried out his postdoctorate at the Center for Microbial Pathogenesis, Department of Molecular Biology and Microbiology, Duke University Medical Center, Durham, NC USA. He was a Senior Postdoc at Genome Biology Unit, European Molecular Biology Laboratory, Heidelberg, Germany. Following this he was a Reader at Department of Biological Sciences, TIFR, Mumbai, India. less View all Degree Level courses BSCS1001 Foundational Level Course Computational Thinking The students will be introduced to a number of programming concepts using illustrative examples which will be solved almost entirely manually. The manual execution of each solution allows for close inspection of the concepts being discussed. by Madhavan Mukund , Dr. G Venkatesh Course ID: BSCS1001 Course Credits: 4 Course Type: Foundational Pre-requisites:

None What you'll learn VIEW COURSE VIDEOS Applying a procedural approach to real life problems: sequencing basic steps, identifying common patterns. Communicating procedural descriptions: flowcharts, pseudo-code. Understanding underlying abstractions used in programming, through examples: variables, iteration, accumulation, filtering, parametrised procedures, polymorphism and state. Selecting appropriate data structures to store relationships between data: lists, trees, matrices, graphs. Identifying algorithmic techniques to solve a given problem: searching, sorting, indexing, matching. Decomposing problems into smaller units to find a solution: recursion, divide and conquer. Understanding and checking algorithms: predict their behaviour, design tests to verify their output, perform simple debugging. Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Variables, Initialization, Iterators, Filtering, Datatypes, Flowcharts, Sanity of data WEEK 2 Iteration, Filtering, Selection, Pseudocode, Finding max and min, AND operator WEEK 3 Multiple iterations (non-nested), Three prizes problem, Procedures, Parameters, Side effects, OR operator WEEK 4 Nested iterations, Birthday paradox, Binning WEEK 5 List, Insertion sort WEEK 6 Table, Dictionar WEEK 7 Graph, Matrix WEEK 8 Adjacency matrix, Edge labelled graph WEEK 9 Backtracking, Tree, Depth First Search (DFS), Recursion WEEK 10 Object oriented programming, Class, Object, Encapsulation, Abstraction, Information hiding, Access specifiers WEEK 11 Message passing, Remote Procedure Call (RPC), Cache memory, Parallelism, Concurrency, Polling, Preemption, Multithreading, Producer Consumer, Atomicity, Consistency, Race condition, Deadlock, Broadcasting WEEK 12 Top-down approach, Bottom-up approach, Decision tree, Numerical prediction, Behaviour analysis, Classification + Show all weeks About the Instructors Madhavan Mukund Director,

Chennai Mathematical Institute Madhavan Mukund studied at IIT Bombay (BTech) and Aarhus University (PhD). He has been a faculty member at Chennai Mathematical Institute since 1992. His main research area is formal verification. He has active research collaborations within and outside India and serves on international conference programme committees and editorial boards of journals. ... more He has served as President of both the Indian Association for Research in Computing Science (IARCS) (2011-2017) and the ACM India Council (2016-2018). He has been the National Coordinator of the Indian Computing Olympiad since 2002. He served as the Executive Director of the International Olympiad in Informatics from 2011-2014. In addition to the NPTEL MOOC programme, he has been involved in organizing IARCS Instructional Courses for college teachers. He is a member of ACM India's Education Committee. He has contributed lectures on algorithms to the Massively Empowered Classroom (MEC) project of Microsoft Research and the QEEE programme of MHRD. less Visit website Other courses by the same instructor: BSCS2002 -

Programming, Data Structures and Algorithms using Python , BSCS2005 -
Programming Concepts using Java and BSMA1001 -
Mathematics for Data Science I Dr. G Venkatesh Professor of Practice,

Department of Humanities and Social Sciences,

IIT Madras Dr. Venkatesh is a Professor of Practice at IIT Madras, where he is involved with several projects in the field of education. He is also a Fellow and Director of Sasken Communication Technologies Ltd, a leading Indian R&D services provider, and a founder of Mylspot, an education technology startup that aims to bridge knowledge gaps of students through a mentored learning platform. ... more Dr Venkatesh is a graduate in electronics from IIT Madras, PhD in Computer Science from TIFR, Mumbai and was a faculty member of the Computer Science & Engineering Dept of IIT Bombay for 8 years where his research interests revolved around declarative languages and their application to the design of embedded systems. He moved to the industry when Sasken was being formed, where he led their technology activities for over two decades. He was a visiting/adjunct faculty at IIM Bangalore for 10 years and a Chair Professor in the department of EE at IIT Madras for 3 years. Dr. Venkatesh was elected as a fellow of the Indian National Academy of Engineers in 2006 and the IETE in 2012. He won the Technomenter award of the Indian Electronics and Semiconductor Association in 2013 and the Vasvik award for industrial research in 2015. Dr. Venkatesh serves on a number of government, industry and investor committees and boards in the areas of microelectronics, telecommunications and education. less

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Structure Course Registrations BSCS1002 Foundational Level Course Programming in Python This will be the first formal programming course that students will see in this programme. The goal of this course is to introduce Python programming, which is used throughout the programme, with a basic problem solving and algorithmic flavour. by Sudarshan Iyengar Course ID: BSCS1002 Course Credits: 4 Course Type: Foundational Pre-requisites: BSCS1001 - Computational Thinking What you'll learn VIEW COURSE VIDEOS Using basic programming concepts such as variables, expressions, loops, conditionals and functions in Python Creating, manipulating, and using more Python specific features such as lists, tuples, and dictionaries Familiarising with and using common Python libraries such as random, math, datetime, scipy, matplotlib, Pandas etc Analysing real life activities and casting them as programming problems Applying programming concepts to analyse and solve diverse problems Writing Readable code and debugging it Building small applications using python Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Introduction to algorithms WEEK 2 Conditionals WEEK 3 Conditionals (Continued) WEEK 4 Iterations and Ranges WEEK 5 Iterations and Ranges (Continued) WEEK 6 Basic Collections in Python WEEK 7 Basic Collections in Python (Continued) WEEK 8 Basic Collections in Python (Continued) WEEK 9 File Operations WEEK 10 File Operations (Continued) WEEK 11 Module system in python WEEK 12 Basic Pandas and Numpy processing of data + Show all weeks Prescribed Books The following are the suggested books for the course: Title: Python for Everybody. Author: Charles R. Severance. Publisher: Shroff Publishers. ISBN: 9789352136278 (The PDF of this book is currently available freely at

http://do1.dr-chuck.com/pythonlearn/EN_us/pythonlearn.pdf) About the Instructors Sudarshan Iyengar Associate Professor and Head ,

Department of Computer Science and Engineering,

IIT Ropar Sudarshan Iyengar has a PhD from the Indian Institute of Science and is currently working as an Associate Professor and Head of CSE at IIT Ropar. less Visit website View all Foundational Level courses Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

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BSCS2001 Diploma Level Course Database Management Systems A comprehensive introduction to databases, database management, and relevant topics like database security, integrity, concurrency, and data warehousing. by Partha Pratim Das Course ID: BSCS2001 Course Credits: 4 Course Type: Programming Pre-requisites:

None Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Course Overview WEEK 2 Relational Model and Basic SQL WEEK 3 Intermediate and Advanced SQL WEEK 4 Relational Query Languages and Database Design WEEK 5 Functional Dependency and Normal Forms WEEK 6 Functional Dependency and Normal Forms (cont.) WEEK 7 Application Development WEEK 8 Storage Management WEEK 9 Indexing and Hashing WEEK 10 Transactions WEEK 11 Backup and Recovery WEEK 12 Query Optimization and Conclusion + Show all weeks Prescribed Books The following are the suggested books for the course: Database Management Systems - Abraham Silberschatz , Henry F. Korth, S. Sudarshan About the Instructors Partha Pratim Das Professor,

Computer Science and Engineering,

IIT Kharagpur Dr. Das obtained his B Tech, M Tech and Ph D degrees in 1984, 1985 and 1988 respectively from IIT Kharagpur. He served as a faculty member in the Department of Computer Science and Engineering, IIT Kharagpur from 1988 to 1998. In 1998, he moved to the Industry and served in Senior Director positions. In 2011, Dr. Das joined back the Department as a Professor. He is the Joint PI of National Digital Library of India project of MoE and leads the national initiative to integrate the digital learning contents. ... more Dr. Das is a regular contributor to the SWAYAM Program and his courses on Programming in C++, Object Oriented Analysis and Design, and Data Base Management Systems have been attended by thousands of students since 2017. Over the last decade he has been teaching Compilers, Software Engineering, Image Processing, Foundations of Algorithms & Machine Learning, and Principles of Programming Languages for which he received top students' feedback 6 times during 2014 to 2018. Dr. Das has published over 50 papers in international journals in his interest areas spanning Computer Vision, Digital Learning, Digital Geometry, Human-Computer Interaction, Medical Image Analysis, Computer Analysis of Indian Classical Dance, and Productivity in Software Engineering. less View all Diploma Level courses Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any

queries regarding the program.

BSCS2002 Diploma Level Course Programming, Data Structures and Algorithms using Python A good foundation course to introduce basic concepts in the design and analysis of algorithms as well as standard data structures, using Python as a base language for implementing these. by Madhavan Mukund Course ID: BSCS2002 Course Credits: 4 Course Type: Programming Pre-requisites:

None What you'll learn VIEW COURSE VIDEOS Evaluating asymptotic upper bounds for algorithms using big O notation Using standard data structures such as lists, arrays, stacks, queues, heaps Comparing algorithms for sorting and searching Representing, manipulating and analysing graphs Mastering algorithm design techniques such as divide and conquer and dynamic programming Applying linear programming and network flows to model computational problems. Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Python Refresher WEEK 2 Complexity, Notations, Sorting and Searching Algorithms WEEK 3 Arrays, Lists, Stacks, Queues, Hashing WEEK 4 Graph Algorithms WEEK 5 Graph Algorithms (Continued) WEEK 6 Union-Find Data Structure, Priority Queue, Heap, Binary Search Tree WEEK 7 Balanced Search Tree, Greedy Algorithms WEEK 8 Divide and Conquer WEEK 9 Dynamic Programming WEEK 10 String or Pattern Matching Algorithms WEEK 11 Network Flows, Linear Programming, Class of Algorithms WEEK 12 Summary + Show all weeks About the Instructors Madhavan Mukund Director,

Chennai Mathematical Institute Madhavan Mukund studied at IIT Bombay (BTech) and Aarhus University (PhD). He has been a faculty member at Chennai Mathematical Institute since 1992. His main research area is formal verification. He has active research collaborations within and outside India and serves on international conference programme committees and editorial boards of journals. ... more He has served as President of both the Indian Association for Research in Computing Science (IARCS) (2011-2017) and the ACM India Council (2016-2018). He has been the National Coordinator of the Indian Computing Olympiad since 2002. He served as the Executive Director of the International Olympiad in Informatics from 2011-2014. In addition to the NPTEL MOOC programme, he has been involved in organizing IARCS Instructional Courses for college teachers. He is a member of ACM India's Education Committee. He has contributed lectures on algorithms to the Massively Empowered Classroom (MEC) project of Microsoft Research and the QEEE programme of MHRD. less Visit website Other courses by the same instructor: BSCS1001 -

Computational Thinking , BSCS2005 -

Programming Concepts using Java and BSMA1001 -

Mathematics for Data Science I View all Diploma Level courses BSCS2003

Diploma Level Course Modern Application Development I Building a modern application involves many different aspects: front end, recording transactions, storage, connecting to a remote server, using APIs etc. The courses Modern Application Development I and II go through all these aspects through a detailed and evolving case study, teaching the relevant programming skills as the course progresses. by Thejesh G N , Nitin Chandrachoodan Course ID: BSCS2003 Course Credits: 4 Course Type: Programming Pre-requisites:

None Co-requisites: BSCS2001 - Database Management Systems What you'll learn VIEW COURSE VIDEOS To be able to design a web application To be able to distinguish between the frontend, the backend, and the database activities To create such an application with Python and MySQL Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Basic terminologies of Web WEEK 2 Webpages written in HTML and CSS WEEK 3 Presentation layer - View WEEK 4 Models - Introduction to databases WEEK 5 Controllers - Business logic WEEK 6 APIs and REST APIs WEEK 7 Backend Systems WEEK 8 Application Frontend WEEK 9 Application Security WEEK 10 Testing of Web Applications WEEK 11 HTML Evolution and Beyond HTML WEEK 12

IITM BSc Degree,

IIT Madras Thejesh GN is an Electronics and Communication graduate from Bangalore, India. He started his career as a software engineer at Infosys technologies limited. He was awarded Infosys Community Empathy Fellowship in 2010, which allowed him to work for a not-for-profit organization for a year. He was also a senior software engineer for NPTEL / CourseBuilder team, which is now offered as Seek, an Open Source Online Education delivery platform. ... more He loves free and open-source software. He has been an active contributor to various open-source projects. He was awarded IBM Champion in the years 2018 and 2019. Currently, he runs DataMeet – India's biggest Open Data Community and works as an Engineering Head. less Visit website Other courses by the same instructor: BSCS2006 -

Modern Application Development II Nitin Chandrachoodan Professor,

Department of Electrical Engineering,

IIT Madras Nitin Chandrachoodan received his BTech (electronics and communication engineering) from IIT Madras in 1996, and PhD from the University of Maryland at College Park in 2002, in the area of high-level synthesis techniques for mapping DSP algorithms to architectures. He has been with the department of electrical engineering at IIT Madras since 2004, where he is currently an professor. ... more His research interests include digital systems design and design automation tools and techniques, as well as design of embedded systems with a special focus on assistive technologies. He has taught graduate courses on digital integrated circuit design and on mapping algorithms to architectures, and a UG course on data structures and algorithms, as well as a laboratory course on digital design using FPGAs. He is an associate editor of the Springer Journal of Signal Processing Systems. less Visit website Other courses by the same instructor: BSCS2006 -

BSCS2003P Diploma Level Course Modern Application Development I - Project "Modern Application Development - I project" is a comprehensive course designed to introduce learners to the fundamentals of web application development. The course covers essential technologies such as HTML, CSS, JavaScript, Flask, API implementation, and SQLite for data storage. Learners will gain practical knowledge in building secure, efficient, and deployable web applications while understanding key concepts in web development. by Thejesh G N , Nitin Chandrachoodan Course ID: BSCS2003P Course Credits: 2 Course Type: Programming Pre-requisites:

None Co-requisites: BSCS2003 - Modern Application Development I Project Course

Overview The objective of this course project is to provide hands-on experience in developing a web application from scratch, integrating various technologies taught throughout the course. Students will apply their knowledge to create a functional web application that incorporates secure authentication, efficient data management, and API integration. The project aims to reinforce understanding of key concepts, foster problem-solving skills, and enhance proficiency in web application development. What you'll learn Upon completing this course project, learners will acquire proficiency in HTML, CSS, JavaScript, Flask, and SQLite, enabling them to develop robust web applications. Students will gain practical experience in implementing secure authentication mechanisms, optimizing application performance, and integrating APIs to enhance functionality. The project will equip learners with skills in deploying web applications, considering security measures, and ensuring efficient data storage and retrieval. Best Projects Puneet Bhagat (21f1004363@ds.study.iitm.ac.in) View Project Aniket Kalra (21f3002102@ds.study.iitm.ac.in) View Project ANABIL KANUNGOE (21f1003580@ds.study.iitm.ac.in) View Project Rahul Kurian Jacob (21f1000481@ds.study.iitm.ac.in) View Project Rajashree Das (21f1003047@ds.study.iitm.ac.in) View Project About the Instructors Thejesh G N Software Consultant,

IITM BSc Degree,

IIT Madras Thejesh GN is an Electronics and Communication graduate from Bangalore, India. He started his career as a software engineer at Infosys technologies limited. He was awarded Infosys Community Empathy Fellowship in 2010, which allowed him to work for a not-for-profit organization for a year. He was also a senior software engineer for NPTEL / CourseBuilder team, which is now offered as Seek, an Open Source Online Education delivery platform. ... more He loves free and open-source software. He has been an active contributor to various open-source projects. He was awarded IBM Champion in the years 2018 and 2019. Currently, he runs DataMeet – India's biggest Open Data Community and works as an Engineering Head. less Visit website Other courses by the same instructor: BSCS2003 -

Modern Application Development I and BSCS2006 -

Modern Application Development II Nitin Chandrachoodan Professor,

Department of Electrical Engineering,

IIT Madras Nitin Chandrachoodan received his BTech (electronics and communication engineering) from IIT Madras in 1996, and PhD from the University of Maryland at College Park in 2002, in the area of high-level synthesis techniques for mapping DSP algorithms to architectures. He has been with the department of electrical engineering at IIT Madras since 2004, where he is currently an professor. ... more His research interests include digital systems design and design automation tools and techniques, as well as design of embedded systems with a special focus on assistive technologies. He has taught graduate courses on digital integrated circuit design and on mapping algorithms to architectures, and a UG course on data structures and algorithms, as well as a laboratory course on digital design using FPGAs. He is an associate editor of the Springer Journal of Signal Processing Systems. less Visit website Other courses by the same instructor: BSCS2003 -

Modern Application Development I , BSCS2006 -

Modern Application Development II and BSCS3005 -

Programming in C

BSCS2004 Diploma Level Course Machine Learning Foundations This course lays the groundwork for the upcoming ML courses by covering various fundamentals that do not necessarily fall under Machine Learning but are quite necessary for a comprehensive understanding of Machine Learning. by Harish Guruprasad Ramaswamy , Arun Rajkumar , Prashanth LA Course ID: BSCS2004 Course Credits: 4 Course Type: Data Science Pre-requisites:

None What you'll learn VIEW COURSE VIDEOS Recognising if a particular problem can be viewed as a Machine Learning problem. Breaking down standard Machine Learning problems into more fundamental problems using tools from Calculus, Linear Algebra, Probability and Optimisation. Recognising relationships between equation solving, projection onto a subspace, and the supervised learning problem of linear least squares regression. Visualising eigenvalue/eigenvectors as a property of a matrix, and recognising its potential in practical unsupervised learning problems like dimensionality reduction and image compression. Using, identifying failure modes, programming and debugging simple gradient descent methods for solving unconstrained optimisation problems. Recognising the value of simple models like Gaussian mixture models for data, constructing algorithms for learning the parameters of such models, and interpreting these parameters. Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Introduction to machine learning WEEK 2 Calculus WEEK 3 Linear Algebra - Least Squares Regression WEEK 4 Linear Algebra - Eigenvalues and eigenvectors WEEK 5 Linear Algebra - Symmetric matrices WEEK 6 Linear Algebra - Singular value decomposition, Principal Component Analysis in Image

Processing WEEK 7 Unconstrained Optimisation WEEK 8 Convex sets, functions, and optimisation problems WEEK 9 Constrained Optimisation and Lagrange Multipliers. Logistic regression as an optimization problem WEEK 10 Examples of probabilistic models in machine learning problems WEEK 11 Exponential Family of distributions WEEK 12 Parameter estimation. Expectation Maximization. + Show all weeks About the Instructors Harish Guruprasad Ramaswamy Assistant Professor,

Department of Computer Sciences & Engineering,

IIT Madras I am currently an assistant professor at the computer science and engineering (CSE) department of IIT Madras. My primary areas of interest are in machine learning, statistical learning theory and optimisation. I was previously a research scientist at IBM research labs and a post-doc at University of Michigan. I completed my PhD at the Computer Science and Automation (CSA) department of the Indian Institute of Science (IISc), Bangalore advised by Prof. Shivani Agarwal. I have been fortunate to work with Profs. Ambuj Tewari and Clayton Scott during my PhD and postdoc. Earlier, I finished my M.E. under the supervision of Prof. Chiranjib Bhattacharyya. less Visit website Arun Rajkumar Assistant Professor,

Department of Computer Sciences & Engineering,

IIT Madras I am currently an Assistant Professor at the Computer Science and Engineering department of IIT Madras. Prior to joining IIT Madras, I was a research scientist at the Xerox Research Center (now Conduent Labs), Bangalore for three years. I earned my Ph.D from the Indian Institute of Science where I worked on 'Ranking from Pairwise Comparisons'. My research interests are in the areas of Machine learning, statistical learning theory with applications to education and healthcare. less Visit website Other courses by the same instructor: BSCS2007 -

Machine Learning Techniques Prashanth LA Assistant Professor,

Department of Computer Sciences & Engineering,

IIT Madras Prashanth L.A. is an Assistant Professor in the Department of Computer Science and Engineering at Indian Institute of Technology Madras. Prior to this, he was a postdoctoral researcher at the Institute for Systems Research, University of Maryland - College Park from 2015 to 2017 and at INRIA Lille - Team SequeL from 2012 to 2014. From 2002 to 2009, he was with Texas Instruments (India) Pvt Ltd, Bangalore, India. ... more He received his Masters and Ph.D degrees in Computer Science and Automation from Indian Institute of Science, in 2008 and 2013, respectively. He was awarded the third prize for his Ph.D. dissertation, by the IEEE Intelligent Transportation Systems Society (ITSS). He is the coauthor of a book entitled 'Stochastic Recursive Algorithms for Optimization: Simultaneous Perturbation Methods', published by Springer in 2013. His research interests are in reinforcement learning, simulation optimization and multi-armed bandits, with applications in transportation systems, wireless networks and recommendation systems.

BSCS2005 Diploma Level Course Programming Concepts using Java This course uses Java to provide an understanding of core ideas in object oriented programming, exception handling, event driven programming, concurrent programming and functional programming. by Madhavan Mukund Course ID: BSCS2005 Course Credits: 4 Course Type: Programming Pre-requisites:

None What you'll learn VIEW COURSE VIDEOS Creating simple object-oriented programs in Java Understanding encapsulation, separating interface from implementation Implementing abstraction through a hierarchy of classes and objects Dealing gracefully with errors and exceptions

Controlling concurrent access to data through locks, semaphores and monitors Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Basic Object Oriented Programming: Class Hierarchy WEEK 2 Basic Object Oriented Programming: Inheritance, Overriding WEEK 3 Basic Object Oriented Programming: Polymorphism WEEK 4 Basic Object Oriented Programming: Abstract Classes WEEK 5 Collections. Iterators. WEEK 6 Generics. Callbacks. WEEK 7 Cloning. I/O serializations. Packages WEEK 8 Cloning. I/O serializations. Packages (Continued) WEEK 9 Exception handling WEEK 10 Concurrent programming WEEK 11 Concurrent programming (Continued) WEEK 12 Concurrent programming (Continued) + Show all weeks About the Instructors Madhavan Mukund Director,

Chennai Mathematical Institute Madhavan Mukund studied at IIT Bombay (BTech) and Aarhus University (PhD). He has been a faculty member at Chennai Mathematical Institute since 1992. His main research area is formal verification. He has active research collaborations within and outside India and serves on international conference programme committees and editorial boards of journals. ... more He has served as President of both the Indian Association for Research in Computing Science (IARCS) (2011-2017) and the ACM India Council (2016-2018). He has been the National Coordinator of the Indian Computing Olympiad since 2002. He served as the Executive Director of the International Olympiad in Informatics from 2011-2014. In addition to the NPTEL MOOC programme, he has been involved in organizing IARCS Instructional Courses for college teachers. He is a member of ACM India's Education Committee. He has contributed lectures on algorithms to the Massively Empowered Classroom (MEC) project of Microsoft Research and the QEEE programme of MHRD. less Visit website Other courses by the same instructor: BSCS1001 -

Computational Thinking , BSCS2002 -

Programming, Data Structures and Algorithms using Python and BSMA1001 -
Mathematics for Data Science I

BSCS2006 Diploma Level Course Modern Application Development II Building a modern application involves many different aspects: front end, recording transactions, storage, connecting to a remote server, using APIs etc. The courses Modern Application Development I and II go through all these aspects through a detailed and evolving case study, teaching the relevant programming skills as the course progresses. by Thejesh G N , Nitin Chandrachoodan Course ID: BSCS2006 Course Credits: 4 Course Type: Programming Pre-requisites: BSCS2003 - Modern Application Development I What you'll learn VIEW COURSE VIDEOS To be able to build highly interactive frontends using Vue To be able to integrate the Vue frontend with the backend via APIs To learn best practices involved in designing web APIs, and authentication mechanisms To be able to handle asynchronous backend jobs execution To be able to implement caching, and performance measurement for a web application To be able to distinguish between the frontend, the backend, and the database activities Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Basics of JavaScript WEEK 2 Advanced JavaScript WEEK 3 Introduction to Web Frontend WEEK 4 Introduction to VueJS WEEK 5 Vue with APIs WEEK 6 Advanced Vuejs WEEK 7 Advanced State Management WEEK 8 Authentication and Designing APIs WEEK 9 Asynchronous Jobs WEEK 10 Inter-Service Messaging and Webhooks WEEK 11 Performance WEEK 12 Project + Show all weeks About the Instructors Thejesh G N Software Consultant,

IITM BSc Degree,

IIT Madras Thejesh GN is an Electronics and Communication graduate from Bangalore,

India. He started his career as a software engineer at Infosys technologies limited. He was awarded Infosys Community Empathy Fellowship in 2010, which allowed him to work for a not-for-profit organization for a year. He was also a senior software engineer for NPTEL / CourseBuilder team, which is now offered as Seek, an Open Source Online Education delivery platform. ... more He loves free and open-source software. He has been an active contributor to various open-source projects. He was awarded IBM Champion in the years 2018 and 2019. Currently, he runs DataMeet – India's biggest Open Data Community and works as an Engineering Head. less Visit website Other courses by the same instructor: BSCS2003 -

Modern Application Development I Nitin Chandrachoodan Professor,

Department of Electrical Engineering,

IIT Madras Nitin Chandrachoodan received his BTech (electronics and communication engineering) from IIT Madras in 1996, and PhD from the University of Maryland at College Park in 2002, in the area of high-level synthesis techniques for mapping DSP algorithms to architectures. He has been with the department of electrical engineering at IIT Madras since 2004, where he is currently an professor. ... more His research interests include digital systems design and design automation tools and techniques, as well as design of embedded systems with a special focus on assistive technologies. He has taught graduate courses on digital integrated circuit design and on mapping algorithms to architectures, and a UG course on data structures and algorithms, as well as a laboratory course on digital design using FPGAs. He is an associate editor of the Springer Journal of Signal Processing Systems. less Visit website Other courses by the same instructor: BSCS2003 -

Modern Application Development I and BSCS3005 -

Programming in C

BSCS2006P Diploma Level Course Modern Application Development II - Project "Modern Application Development - II project" is an advanced course designed to build upon the foundations of web application development introduced in "Modern Application Development - I." The course focuses on advanced frontend technologies, such as Vue.js, to create interactive and sophisticated user interfaces. It also covers additional concepts like token-based authentication, asynchronous task execution using Celery and Redis, caching, and security considerations.

The course covers some important concepts of web like Token-based Authentication, Asynchronous Task Execution with Celery and Redis, Caching Techniques. The course also talks about Security and Privacy Considerations and Cross-Origin Resource Sharing (CORS). by Thejesh G N , Nitin Chandrachoodan Course ID: BSCS2006P Course Credits: 2 Course Type: Programming Pre-requisites: BSCS2003P - Modern Application Development I - Project Co-requisites: BSCS2006 - Modern Application Development II Project Course Overview The objective of this course project is to provide learners with hands-on experience in developing advanced web applications using Vue.js and related technologies. Students will work on building a functional web application that incorporates interactive frontend components, efficient state management using Vuex, token-based authentication for enhanced security, and asynchronous task execution using Celery and Redis. The project aims to reinforce knowledge gained in "Modern Application Development - I" and introduce advanced concepts in web development. What you'll learn Proficiency in advanced frontend technologies such as Vue.js, Vue Router, and Vuex, enabling them to build interactive and dynamic user interfaces. Understanding and implementation of token-based authentication for secure user authentication and authorization. Knowledge and practical experience in using Celery and Redis for asynchronous task execution, improving application performance and scalability. Familiarity with caching techniques to optimize data retrieval and enhance application efficiency. Understanding of security and privacy considerations in web development, including handling CORS (Cross-Origin Resource Sharing) and ensuring secure user interactions. Best Projects JAIDEV VIVEK DESHPANDE

(21f1003751@ds.study.iitm.ac.in) View Project LOLLA AJAY KUMAR (21f1000200@ds.study.iitm.ac.in)

View Project Afnan Ahmad (21f1003730@ds.study.iitm.ac.in) View Project VIGNESHWARAN S

(21f1004210@ds.study.iitm.ac.in) View Project HIMANSHU SANJAY SINGH SEEMA

(21f1003237@ds.study.iitm.ac.in) View Project About the Instructors Thejesh G N Software Consultant,

IITM BSc Degree,

IIT Madras Thejesh GN is an Electronics and Communication graduate from Bangalore, India. He started his career as a software engineer at Infosys technologies limited. He was awarded Infosys Community Empathy Fellowship in 2010, which allowed him to work for a not-for-profit organization for a year. He was also a senior software engineer for NPTEL / CourseBuilder team, which is now offered as Seek, an Open Source Online Education delivery platform. ... more He loves free and open-source software. He has been an active contributor to various open-source projects. He was awarded IBM Champion in the years 2018 and 2019. Currently, he runs DataMeet – India's biggest Open Data Community and works as an Engineering Head. less Visit website Other courses by the same instructor: BSCS2003 -

Modern Application Development I and BSCS2006 -

Modern Application Development II Nitin Chandrachoodan Professor,

Department of Electrical Engineering,

IIT Madras Nitin Chandrachoodan received his BTech (electronics and communication engineering) from IIT Madras in 1996, and PhD from the University of Maryland at College Park in 2002, in the area of high-level synthesis techniques for mapping DSP algorithms to architectures. He has been with the department of electrical engineering at IIT Madras since 2004, where he is currently an professor. ... more His research interests include digital systems design and design automation tools and techniques, as well as design of embedded systems with a special focus on assistive technologies. He has taught graduate courses on digital integrated circuit design and on mapping algorithms to architectures, and a UG course on data structures and algorithms, as well as a laboratory course on digital design using FPGAs. He is an associate editor of the Springer Journal of Signal Processing Systems. less Visit website Other courses by the same instructor: BSCS2003 -

Modern Application Development I , BSCS2006 -

Modern Application Development II and BSCS3005 -

Programming in C

BSCS2007 Diploma Level Course Machine Learning Techniques To introduce the main methods and models used in machine learning problems of regression, classification and clustering. To study the properties of these models and methods and learn about their suitability for different problems. by Arun Rajkumar Course ID: BSCS2007 Course Credits: 4 Course Type: Data Science Pre-requisites:

None Co-requisites: BSCS2004 - Machine Learning Foundations What you'll learn VIEW COURSE VIDEOS Demonstrating In depth understanding of machine learning algorithms - model, objective or loss function, optimization algorithm and evaluation criteria. Tweaking machine learning algorithms based on the outcome of experiments - what steps to take in case of underfitting and overfitting. Being able to choose among multiple algorithms for a given task. Developing an understanding of unsupervised learning techniques. Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Introduction; Unsupervised Learning - Representation learning - PCA WEEK 2 Unsupervised Learning - Representation learning - Kernel PCA WEEK 3 Unsupervised Learning - Clustering - K-means/Kernel K-means WEEK 4 Unsupervised Learning - Estimation - Recap of MLE + Bayesian estimation, Gaussian Mixture Model - EM algorithm. WEEK 5 Supervised Learning - Regression - Least Squares; Bayesian view WEEK 6 Supervised Learning - Regression - Ridge/LASSO WEEK 7 Supervised Learning - Classification - K-NN, Decision tree WEEK 8 Supervised Learning - Classification - Generative Models - Naive Bayes WEEK 9 Discriminative Models - Perceptron; Logistic Regression WEEK 10 Support Vector Machines WEEK 11 Ensemble methods - Bagging and Boosting (Adaboost) WEEK 12 Artificial Neural

networks: Multiclass classification. + Show all weeks Prescribed Books The following are the suggested books for the course: Pattern Classification by David G. Stork, Peter E. Hart, and Richard O. Duda Pattern Recognition and Machine Learning by Christopher M. Bishop The Elements of Statistical Learning: Data Mining, Inference, and Prediction by Trevor Hastie, Robert Tibshirani, and Jerome Friedman About the Instructors Arun Rajkumar Assistant Professor,

Department of Computer Sciences & Engineering,

IIT Madras I am currently an Assistant Professor at the Computer Science and Engineering department of IIT Madras. Prior to joining IIT Madras, I was a research scientist at the Xerox Research Center (now Conduent Labs), Bangalore for three years. I earned my Ph.D from the Indian Institute of Science where I worked on 'Ranking from Pairwise Comparisons'. My research interests are in the areas of Machine learning, statistical learning theory with applications to education and healthcare. less Visit website Other courses by the same instructor: BSCS2004 -

Machine Learning Foundations

BSCS2008 Diploma Level Course Machine Learning Practice This companion course to the ML Theory course introduces the student to scikit-learn, a popular Python machine learning module, to provide hands-on problem solving experience for all the methods and models learnt in the Theory course. by Ashish Tendulkar Course ID: BSCS2008 Course Credits: 4 Course Type: Data Science Pre-requisites: BSCS2004 - Machine Learning Foundations BSCS2007 - Machine Learning Techniques What you'll learn VIEW COURSE VIDEOS Understand the life cycle of a machine learning project - typical steps involved and tools that can be used in each step. Using machine learning algorithms to solve practical problems using libraries like scikit-learn and tensorflow. Fine tuning the algorithms through regularization, feature selection, and better models. Develop an understanding of evaluation of machine learning algorithms and decide the next steps based on the analysis. Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 End-to-end machine learning project on scikit-learn WEEK 2 Graph Theory(VOL 3) WEEK 3 Regression on scikit-learn - Linear regression Gradient descent - batch and stochastic. WEEK 4 Polynomial regression, Regularized models WEEK 5 Logistic regression WEEK 6 Classification on scikit-learn - Binary classifier WEEK 7 Classification on scikit-learn - Multiclass classifier WEEK 8 Support Vector Machines using scikit-learn WEEK 9 Decision Trees, Ensemble Learning and Random Forests WEEK 10 Decision Trees, Ensemble Learning and Random Forests (Continued) WEEK 11 Neural networks models in scikit-learn WEEK 12 Unsupervised learning + Show all weeks About the Instructors Ashish Tendulkar Research Software Engineer,

Google AI,

Google Dr. Ashish Tendulkar is a researcher with Google Research Bangalore. He holds Masters and PhD from IIT Bombay. Before his current position, he was an Assistant Professor at IIT Madras and Head of data sciences at Persistent Systems Pune. Ashish is passionate about teaching ML and writing AI related contents in Indian languages.

BSCS2008P Diploma Level Course Machine Learning Practice - Project The purpose of a machine learning project is to apply ML models learnt in ML courses, on real world data and to create an effective predictive model. Discover patterns in your data and then make predictions based on often complex findings to answer business questions, detect and analyze trends and help solve problems. by Ashish Tendulkar Course ID: BSCS2008P Course Credits: 2 Course Type: Data Science Pre-requisites:

None Co-requisites: BSCS2008 - Machine Learning Practice Project Course Overview The MLP Project is conducted on Kaggle platform. Kaggle is a well recognized platform among

data science professionals that will familiarize you with many latest problems being currently solved by organizations across the world. Good place to practice your ML skills and knowledge. Looks good on your resume, especially if you have won medals and badges. The project runs for 12 to 15 weeks. The project is divided into several milestones. These milestones divide the ML cycle into smaller and manageable steps. These milestones guide you to make steady progress. What you'll learn After completing the project you will gain experience of applying different ML techniques on real world data. You will gain proficiency in numpy, panda and sklearn libraries. You will become familiar with the 5 components of any ML project i.e. data, model, cost function, optimization and evaluation, i.e. in short, with complete end to end process of a machine learning project. In order to successfully complete the project, a viva will be conducted by an industry expert. This viva prepares you for ML interviews. About the Instructors Ashish Tendulkar Research Software Engineer,

Google AI,

Google Dr. Ashish Tendulkar is a researcher with Google Research Bangalore. He holds Masters and PhD from IIT Bombay. Before his current position, he was an Assistant Professor at IIT Madras and Head of data sciences at Persistent Systems Pune. Ashish is passionate about teaching ML and writing AI related contents in Indian languages. less Other courses by the same instructor: BSCS2008 -

Machine Learning Practice View all Diploma Level courses Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

Our normal response time is 3 working days. It might take a little longer during busy periods.

We will share Google Meet links during such periods.

Due to the high volume of calls we receive every day, there might be long wait times.

In some cases, you might have to call multiple times to successfully connect to us. View Site Map © IIT Madras. All rights reserved. View Site Map © IIT Madras. All rights reserved. Privacy Policy | Terms of Service

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BSCS3001 Degree Level Course Software Engineering To prepare students to develop the essential skills required to become effective software engineers by introducing them to fundamental concepts in developing software, and essential practices employed by software developers, such as requirement gathering, creating software conceptual designs, software comprehension, debugging, testing and deployment. by Dr. Sridhar Iyer , Dr. Prajish Prasad Course ID: BSCS3001 Course Credits: 4 Course Type: Core Option I Pre-requisites:

None Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Deconstructing the software development process WEEK 2 Identify different types of software requirements (functional, non-functional) WEEK 3 Software Conceptual Design WEEK 4 Software Usability WEEK 5 Software Design - Modeling and Architecture WEEK 6 Software Design - Quality and Evaluation WEEK 7 Software Development - Program Comprehension WEEK 8 Software Development - Program Debugging WEEK 9 Software - Code Reviewing and Documentation WEEK 10 Software Testing WEEK 11 Software Deployment and Monitoring WEEK 12 Conclusion and other Aspects: Communication, Productivity and Organizations + Show all weeks Prescribed Books The following are the suggested books for the course: Software Engineering: A Precise Approach – Dr. Pankaj Jalote Cooperative Software Development – Dr. Amy Ko Engineering Software as a Service: An Agile Approach Using Cloud Computing – Armando Fox, David Patterson About the Instructors Dr. Sridhar Iyer Professor,

Department of Computer Science and Engineering & Inter-disciplinary Program in Educational Technology,

IIT Bombay Sridhar Iyer is a Professor in the Department of Computer Science & Engg, and the Head of the Interdisciplinary Programme on Educational Technology, at IIT Bombay. He is also the Head of the Centre for Distance Engineering Education and the Principal Investigator of the National Programme on Technology Enhanced Learning at IIT Bombay. ... more His current research interests are in the field of Educational Technology. This includes: Technology enhanced learning environments for thinking skills, Pedagogies for effective use of educational technologies, Development of ICT tools for educational applications, and Computer Science education research. Some development projects that that he has conceptualized and led are: Project OSCAR, a repository of ~450 Interactive Visualizations for topics at the school and higher education levels, and Computer Masti, a series of books for teaching-learning of Computers in schools. These products have seen more than 100K downloads from 120 countries. In 2016, Computer Masti was acquired by a company and the books are now being used in ~1000 schools in India. Prior to Educational Technology, he has worked in wireless networking protocols and mobile applications. Sridhar Iyer received his BTech, MTech and PhD from the Dept of Computer Science & Engg at IIT Bombay. less Visit website Dr. Prajish Prasad Assistant Professor,

Computer Science,

FLAME University Prajish Prasad is an Assistant Professor in the Department of Computing and Data Sciences at FLAME University, Pune.. He completed his PhD from the Interdisciplinary Programme in Educational Technology at IIT Bombay. His bachelor and master degrees are in Computer Science. He is a computing education researcher, and specializes in designing technology-enhanced learning environments for topics in computer science. Prior to joining his PhD, he worked as a software developer in an EdTech startup, and as an engineering instructor, teaching courses for computer science undergraduates.

BSCS3002 Degree Level Course Software Testing To prepare the students to understand the phases of testing based on requirements for a project, to apply the concepts taught in the course to formulate test requirements precisely, to design and execute test cases as a part of a standard software development IDE, and to apply specially designed test case design techniques for specific application domains. by Meenakshi D'Souza Course ID: BSCS3002 Course Credits: 4 Course Type: Core Option I Pre-requisites:

None Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Software Testing: Motivation, Software Development Life Cycle, Terminologies and Processes, Software Test Automation: JUnit as an example WEEK 2 Basics of Graphs, Fundamental Graph Algorithms, Elementary Graph Algorithms, Structural Graph Coverage Criteria, Algorithms: Structural Graph Coverage Criteria WEEK 3 Graph Coverage Criteria: Applied to Test Code, Data Flow in Graphs,, Data Flow Testing Example, Unit Testing Based on Graphs: Summary WEEK 4 Software Design and Integration Testing, Design Integration Testing and Graph Coverage, Specification Testing and Graph Coverage, Graph Coverage and Finite State Machines (FSM), Testing Source Code: Classical Coverage Criteria WEEK 5 Logic: Basics needed for Software Testing, Coverage Criteria, Logic Coverage Criteria: Making clauses determine predicate, Applied to test code WEEK 6 Logic: Coverage Example, Coverage Specification, Coverage FSM, Coverage Summary, SMT - Solvers WEEK 7 Symbolic Testing, Concolic Execution, Example and Summary Symbolic Execution WEEK 8 Requirements, Functional Testing, ISP, ISP Example WEEK 9 Regular Expense CFGs, Mutation Testing, Mutation Operators Source Code, Mutation Testing Vs Other Criteria, Mutation Testing For Integration And Tools WEEK 10 Basic Object

Oriented (OO) Integration Concepts, Mutation Operators OO Integration, Mutation Operators OO Integration, OO Faults, Coupling Criteria WEEK 11 Web Apps Intro, Client Side Testing, Server Side Testing WEEK 12 Regression Testing, Software Quality Metrics, Non Functional Testing, TDD, Course Summary + Show all weeks Prescribed Books The following are the suggested books for the course: Paul Ammann and Jeff Offutt, Introduction to Software Testing, Cambridge University Press, 2008. Glenford J. Myers, The Art of Software Testing, Second edition, 2008. Paul C. Jorgensen, Software Testing: A Craftsman's Approach, Fourth edition, CRC Press, 2014. Lisa Crispin and Janet Gregory, Agile Testing: A Practical Guide for Testers and Agile Teams, Addison-Wesley, 2009. Appropriate research papers on testing techniques, information regarding testing tools, as applicable. About the Instructors Meenakshi D'Souza Associate Professor,

Department of Computer Science and Engineering,

IIIT Bangalore Meenakshi D'Souza is an Associate Professor at IIIT-Bangalore and has been with the institute for the past ten years. Prior to joining IIIT-Bangalore, Meenakshi worked for Honeywell Technology Solutions, Bangalore. Meenakshi is a council member of ACM India and an Associate Editor of Sadhana, a journal of Indian Academy of Sciences. ... more Her research interests are in the areas of software testing and formal verification of embedded software. Meenakshi teaches courses on Theory of Computation, Software Testing (in NPTEL too), Design and Analysis of Algorithms and Graph Theory. Meenakshi is also interested in gender diversity and accessibility in STEM and IT. I BSCS3003 Degree Level Course AI: Search Methods for Problem Solving We look at how an intelligent agent solves new problems. Starting with blind search we quickly move on to heuristic search, and look at several variations designed to combat the combinatorial explosion that search has to face. We study how board games like Chess and Go are played; how search facilitates logical reasoning; and approaches to domain independent planning of actions to achieve a goal. We end with looking at an alternative formulation that combines search and reasoning as constraint processing. by Deepak Khemani Course ID: BSCS3003 Course Credits: 4 Course Type: Core Option II Pre-requisites:

None What you'll learn VIEW COURSE VIDEOS Get a historical and philosophical perspective on artificial intelligence. The ability to formulate problems in a general problem solving framework. Knowledge of domain independent search based problem solving algorithms. Knowledge of stochastic, local, and population based search algorithms. The foundations of problem decomposition and rule based methods. Ability to implement game playing algorithms. An understanding of the relation between search methods and other with other formulations including planning, constraints and logical reasoning. Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Introduction and philosophy. The Turing Test. The Winograd Schema Challenge. Placing search in the landscape of AI. WEEK 2 Search spaces. Examples. State space search. Depth First, Breadth First, Iterative Deepening. Analysis. WEEK 3 Heuristic search. Heuristic functions. Solution space search. Escaping local optima. Stochastic local search. WEEK 4 Population based methods. Genetic Algorithms, emergent systems, Ant Colony Optimization. WEEK 5 Finding optimal paths. Algorithm A*. Admissibility of A*. WEEK 6 The monotone condition. Space saving versions of A*. Sequence alignment. WEEK 7 Game playing. Board games. Algorithms Minimax, Alpha-Beta, and SSS*. WEEK 8 Automated domain independent planning. Goal Stack Planning, Partial Order Planning. WEEK 9 Problem decomposition with goal trees. Algorithm AO*. WEEK 10 Pattern directed inference systems. Forward chaining inference engine. The Rete algorithm. WEEK 11 Constraint processing. Algorithm Backtracking. Arc consistency. Combining search and reasoning. Waltz algorithm. Model based diagnosis. + Show all weeks Prescribed Books The following are the suggested books for the course: Deepak Khemani. A First Course in Artificial Intelligence, McGraw Hill Education (India), 2013. (Chapters 1 – 8, some parts from Chapters 9 and 10)) Reference John Haugeland, Artificial

Intelligence: The Very Idea, A Bradford Book, The MIT Press, 1985. Pamela McCorduck, Machines Who Think: A Personal Inquiry into the History and Prospects of Artificial Intelligence, A K Peters/CRC Press; 2nd edition, 2004. Eugene Charniak and Drew McDermott, Introduction to Artificial Intelligence, Addison-Wesley Publ., 1985. Zbigniew Michalewicz and David B. Fogel. How to Solve It: Modern Heuristics. Springer; 2nd edition, 2004. Judea Pearl. Heuristics: Intelligent Search Strategies for Computer Problem Solving, Addison-Wesley, 1984. Elaine Rich and Kevin Knight. Artificial Intelligence, Tata McGraw Hill, 1991. Stuart Russell and Peter Norvig. Artificial Intelligence: A Modern Approach, 3rd Edition, Prentice Hall, 2009. Patrick Henry Winston. Artificial Intelligence, Addison-Wesley, 1992. Stefan Edelkamp and Stefan Schroedl. Heuristic Search: Theory and Applications, Morgan Kaufmann, 2011. About the Instructors Deepak Khemani Professor,

Department of Computer Science and Engineering,

IIT Madras Deepak Khemani is a Professor in the Department of Computer Science and Engineering, IIT Madras, India. He graduated with three degrees from IIT Bombay, including two in Computer Science. His areas of research are broadly in Artificial Intelligence. He is the author of a text book 'A First Course in Artificial Intelligence'. He has three online courses on Swayam developed as part of the NPTEL program, covering problem-solving using search, knowledge representation and reasoning, and constraint satisfaction. ... more His research focus is in the areas of knowledge, memory, reasoning and planning. He plans to employ these to build articulate systems that can take a problem-solving approach to teaching by a machine, especially in the areas of high school mathematics and science. More recently he has worked in the domain of multi-agent systems where an agent has to reason with what other agents know and believe. He is working towards implementing a contract bridge playing program that reasons like a human expert. The human-level contract bridge playing agent will be required to do epistemic planning while collaborating with a team member and competing against opponents in an environment of incomplete information. less Visit website View all Degree Level courses Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

BSCS3004 Degree Level Course Deep Learning To study the basics of Neural Networks and their various variants such as the Convolutional Neural Networks and Recurrent Neural Networks, to study the different ways in which they can be used to solve problems in various domains such as Computer Vision, Speech and NLP. by Mitesh M.Khapra Course ID: BSCS3004 Course Credits: 4 Course Type: Core Option II Pre-requisites:

None What you'll learn VIEW COURSE VIDEOS A brief history of deep learning and its success stories. Perceptrons, Sigmoid neurons and Multi-Layer Perceptrons (MLP) with specific emphasis on their representation power and algorithms used for training them (such as Perceptron Learning Algorithm and Backpropagation). Gradient Descent (GD) algorithm and its variants like Momentum based GD, AdaGrad, Adam etc Principal Component Analysis and its relation to modern Autoencoders. The bias variance tradeoff and regularisation techniques used in DNNs (such as L2 regularisation, noisy data augmentation, dropout, etc). Different activation functions and weight initialization strategies Convolutional Neural Networks (CNNs) such as AlexNet, ZFNet, VGGNet, InceptionNet and ResNet. Recurrent Neural Network (RNNs) and their variants such as LSTMs and GRUs (in particular, understanding the vanishing/exploding gradient problem and how LSTMs overcome the vanishing gradient problem) Applications of CNN and RNN models for various computer vision and Natural Language Processing (NLP) problems. Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 History of Deep Learning, McCulloch Pitts Neuron, Thresholding Logic, Perceptron Learning Algorithm and Convergence WEEK 2 Multilayer Perceptrons (MLPs), Representation Power of MLPs, Sigmoid

Neurons, Gradient Descent WEEK 3 Feedforward Neural Networks, Representation Power of Feedforward Neural Networks, Backpropagation WEEK 4 Gradient Descent(GD), Momentum Based GD, Nesterov Accelerated GD, Stochastic GD, Adagrad, AdaDelta, RMSProp, Adam, AdaMax, NAdam, learning rate schedulers WEEK 5 Autoencoders and relation to PCA, Regularization in autoencoders, Denoising autoencoders, Sparse autoencoders, Contractive autoencoders WEEK 6 Bias Variance Tradeoff, L2 regularization, Early stopping, Dataset augmentation, Parameter sharing and tying, Injecting noise at input, Ensemble methods, Dropout WEEK 7 Greedy Layer Wise Pre-training, Better activation functions, Better weight initialization methods, Batch Normalization WEEK 8 Learning Vectorial Representations Of Words, Convolutional Neural Networks, LeNet, AlexNet, ZF-Net, VGGNet, GoogLeNet, ResNet WEEK 9 Visualizing Convolutional Neural Networks, Guided Backpropagation, Deep Dream, Deep Art, Fooling Convolutional Neural Networks WEEK 10 Recurrent Neural Networks, Backpropagation Through Time (BPTT), Vanishing and Exploding Gradients, Truncated BPTT WEEK 11 Gated Recurrent Units (GRUs), Long Short Term Memory (LSTM) Cells, Solving the vanishing gradient problem with LSTM WEEK 12 Encoder Decoder Models, Attention Mechanism, Attention over images, Hierarchical Attention, Transformers. + Show all weeks Prescribed Books The following are the suggested books for the course: Ian Goodfellow and Yoshua Bengio and Aaron Courville. Deep Learning. An MIT Press book. 2016. Charu C. Aggarwal. Neural Networks and Deep Learning: A Textbook. Springer. 2019. About the Instructors Mitesh M. Khapra Associate Professor,

Department of Computer Science and Engineering,

IIT Madras Mitesh M. Khapra is an Associate Professor in the Department of Computer Science and Engineering at IIT Madras and is affiliated with the Robert Bosch Centre for Data Science and AI. He is also a co-founder of One Fourth Labs, a startup whose mission is to design and deliver affordable hands-on courses on AI and related topics. He is also a co-founder of AI4Bharat, a voluntary community with an aim to provide AI-based solutions to India-specific problems. His research interests span the areas of Deep Learning, Multimodal Multilingual Processing, Natural Language Generation, Dialog systems, Question Answering and Indic Language Processing. Prior to IIT Madras, he was a Researcher at IBM Research India for four and a half years, where he worked on several interesting problems in the areas of Statistical Machine Translation, Cross Language Learning, Multimodal Learning, Argument Mining and Deep Learning. Prior to IBM, he completed his PhD and M.Tech from IIT Bombay in Jan 2012 and July 2008 respectively. During his PhD he was a recipient of the IBM PhD Fellowship (2011) and the Microsoft Rising Star Award (2011). He is also a recipient of the Google Faculty Research Award (2018), the IITM Young Faculty Recognition Award (2019) and the Prof. B. Yegnanarayana Award for Excellence in Research and Teaching (2020). less View all Degree Level courses Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

BSCS3005 Degree Level Course Programming in C This course is intended as a practical introduction to C programming. The focus is on gaining experience with writing and debugging programs.

At the end of this course, a student should be able to:

- write, compile, and run programs in C
 - use debugging tools to find and correct errors in programs
 - use various constructs in C and the standard library of C to implement basic data structures and algorithms
 - understand the need for an OS and how programs interact with the system by Nitin Chandrachoodan
- Course ID: BSCS3005 Course Credits: 4 Course Type: Elective Pre-requisites:

None Course structure & Assessments 8 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Write, compile, and run programs in C in a Linux environment; debugging tools WEEK 2 Variables, built-in

datatypes, operators; Control flow - conditionals, loops WEEK 3 Modularity and functions; variable scope WEEK 4 Input/Output; Files WEEK 5 Pointers, memory, arrays, strings WEEK 6 Multi-dimensional arrays, dynamic memory allocation; issues - memory leaks, management WEEK 7 Standard library and common extensions (math, time, etc.) WEEK 8 Implementation concepts: compilation and execution process; heap/stack; runtime and OS interface + Show all weeks Prescribed Books The following are the suggested books for the course: "The C programming language," Kernighan and Ritchie Practical C Programming, S. Oualline, O'Reilly Publications Online sources and language reference About the Instructors Nitin Chandrachoodan Professor,

Department of Electrical Engineering,

IIT Madras Nitin Chandrachoodan received his BTech (electronics and communication engineering) from IIT Madras in 1996, and PhD from the University of Maryland at College Park in 2002, in the area of high-level synthesis techniques for mapping DSP algorithms to architectures. He has been with the department of electrical engineering at IIT Madras since 2004, where he is currently an professor. ... more His research interests include digital systems design and design automation tools and techniques, as well as design of embedded systems with a special focus on assistive technologies. He has taught graduate courses on digital integrated circuit design and on mapping algorithms to architectures, and a UG course on data structures and algorithms, as well as a laboratory course on digital design using FPGAs. He is an associate editor of the Springer Journal of Signal Processing Systems. less Visit website Other courses by the same instructor: BSCS2003 - Modern Application Development I and BSCS2006 - Modern Application Development II

BSCS3006 Degree Level Course Introduction to Big Data This course will introduce students to practical aspects of analytics at a large scale, i.e. big data. The course will start with a basic introduction to big data and cloud concepts spanning hardware, systems and software, and then delve into the details of algorithm design and execution at large scale. by Rangarajan Vasudevan Course ID: BSCS3006 Course Credits: 4 Course Type: Elective Pre-requisites:

None What you'll learn VIEW COURSE VIDEOS This course will introduce students to practical aspects of analytics at a large scale, i.e. big data. The course will start with a basic introduction to big data and cloud concepts spanning hardware, systems and software, and then delve into the details of algorithm design and execution at large scale. Introduction to Cloud Concepts: Cloud-Native architecture, serverless computing, message queues, PaaS, SaaS, IaaS Introduction to Big Data concepts: divide-and-conquer, parallel algorithms, distributed virtualized storage, distributed resource management, real-time processing. Data Processing Fundamentals: data formats, sources and their semantics, processing patterns for large data (the ETL vs ELT difference), processing + storage options on cloud, lakehouse architecture Technology deep-dive on Open Source as well as Google Cloud echnologies covered: Spark (PySpark, Spark ML, Spark Streaming), SQL (SparkSQL), Kafka, Google Pub/Sub, Google Dataproc, Google Cloud Functions Course structure & Assessments 11 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Introduction: Big data concepts & GCP Platform Setup WEEK 2 Cloud concepts : Cloud-Native architecture, serverless computing, message queues, PaaS, SaaS, IaaS WEEK 3 Types of Data : Data formats, sources & their semantics, processing & storage options on Cloud. Use of serverless to get started (e.g. Google Cloud Functions) WEEK 4 Intro to Big Data Engineering : Hadoop and PySpark WEEK 5 ELT : ETL, processing patterns for large data, ETL vs ELT, role of a scheduler WEEK 6 SQL & NoSQL: For most analysis tasks, SQL is sufficient. Tools like Spark SQL allow that familiarity to translate to big data solutions. Types of NoSQL, evolution, best-of-fit options. WEEK 7 Streaming : Overview, Fundamental Concepts, Walkthrough of Google Pub/Sub & Google DataFlow as example technologies WEEK 8

Streaming : Kafka as another example of message queue technology & Spark Streaming WEEK 9 Big Data ML : DataProc with ML - including Spark ML (Batch processing) WEEK 10 Deep Learning with big data on cloud. WEEK 11 Prep week for final project, summarizing key concepts, and also for Q&A and clarifications + Show all weeks About the Instructors Rangarajan Vasudevan Co-Founder & Chief Data Officer

Lentra.ai Rangarajan Vasudevan is the Co-Founder & CDO of Lentra.ai, India's fastest growing lending cloud. He did "big data" & "data science" before it was fashionable, building data-native applications across industries and geographies over 15+ years. ... more Ranga joined Lentra by way of an acquisition in June 2022 of his company TheDataTeam, creators of Cadenz.ai customer intelligence platform. Prior to founding TheDataTeam, Ranga served as Director, Big Data with Teradata Corporation's international business unit. Ranga joined Teradata via the acquisition of Aster Data Systems, where he was a founding engineer and co-invented a company-defining, patented, pattern recognition algorithm. He is a recipient of both the Distinguished Engineer (R&D) and Consulting Excellence awards while at Teradata. Ranga has degrees in Computer Science from the University of Michigan and IIT Madras.

BSCS3007 Degree Level Course Privacy & Security in Online Social Media by Ponnurangam Kumaraguru Course ID: BSCS3007 Course Credits: 4 Course Type: Elective Pre-requisites:

None What you'll learn VIEW COURSE VIDEOS List various privacy and security concerns (spam, phishing, fraud nodes, identity theft) on online social networks Describe different methodologies used for solving security and privacy problems on online social networks Student will be able to collect data from OSM, analyze, and visualize the data within the context of Privacy & Security in Online Social Media Design a project idea to attack one problem discussed in the course or any topic you identify in the online social networks (through Mini-Project)(Optional) Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Topics – Assessments Social network analysis 101 – WEEK 2 Collecting data from social media – Collect data, analyze, and report WEEK 3 Text analysis of social media data – Analyze data and report WEEK 4 Cyber crime on social media – Analyze data and report WEEK 5 Cyber crime on social media – Reading paper and report WEEK 6 Fake news on social media – Analyze data and report WEEK 7 Fake news on social media – Reading paper and report WEEK 8 Privacy on social media – Analyze data and report WEEK 9 Privacy on social media – Reading paper and report WEEK 10 Ethics, bias on online social media – Reading paper and report WEEK 11 Computational social science – Reasoning / Comprehension of ideas WEEK 12 Computational social science on online social media – Reading paper and report + Show all weeks About the Instructors Ponnurangam Kumaraguru Professor

Computer Science

IIIT Hyderabad Prof. Ponnurangam Kumaraguru ("PK") is a Professor of Computer Science at IIIT-Hyderabad. He is a Visiting Faculty at IIT Kanpur, an Adjunct faculty at IIIT Delhi, and Associated Researcher at Robert Bosch Centre for Data Science and AI, IIT Madras. PK was inducted an

ACM Distinguished Member in 2021. PK is an ACM India Council Member, and Chair of the Research Facilitation Committee of ACM India. PK is a TEDx and an ACM Distinguished & ACM India Eminent Speaker. PK received his Ph.D. from the School of Computer Science at Carnegie Mellon University (CMU). His Ph.D. thesis work on anti-phishing research at CMU contributed in creating an award-winning startup - Wombat Security Technologies, wombatsecurity.com. Wombat was acquired in March 2018 for USD 225 Million. PK was listed in the World's 2% Scientists by Stanford University in Nov 2020. He has co-authored research papers in the field of Computational Social Science, Privacy and Security in Online Social Media, Cyber Security, Social Computing, Data Science for Social Good, amongst others. PK's research work regularly gets featured on news media, including print, online, and TV within India and across the world. PK started and successfully manages PreCog (precog.iit.ac.in), a research group at IIT-Hyderabad. less View all Degree Level courses Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

BSCS3031 Degree Level Course Computer Systems Design To learn about the internal organisation of the computer. To learn about the architecture of a computer's CPU. by Ayon Chakraborty
Course ID: BSCS3031 Course Credits: 4 Course Type: Elective Pre-requisites:

None Course structure & Assessments 8 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Course Overview, Building Blocks of Computer Systems WEEK 2 Foundation of Logical Circuits, Introduction to Boolean Algebra WEEK 3 Canonical Forms (SOP & POS), Universal Gates and Timing Diagrams WEEK 4 N-bit Comparator, Multiplexer, Encoder and Decoder WEEK 5 Adder and PLA, Boolean Logic Simplification, K-maps WEEK 6 Introduction to Circuit verse, 7 Segment LED Display WEEK 7 Introduction to Sequential Circuits WEEK 8 Registers, Counters WEEK 9 Sequential logic design, FSM Design WEEK 10 Instruction Set architecture WEEK 11 ALU Design WEEK 12 CPU Design + Show all weeks Prescribed Books The following are the suggested books for the course: Computer Organization and Design, 4th Ed, D. A. Patterson and J. L. Hennessy W. Stallings, Computer Organization and Architecture – Designing for Performance, 9th Edition, Pearson, 2013 About the Instructors Ayon Chakraborty Assistant Professor

Computer science and Engineering,

IIT Madras Prof. Ayon Chakraborty is an Assistant Professor in the Department of CSE at IIT Madras. He received his PhD from SUNY Stony Brook, NY, and had a three-year stint as a researcher at NEC Labs America, Princeton, NJ. His research interests are in designing IoT-based/mobile systems that interact with and interpret (sense) the physical world, spanning both algorithm design as well as end-to-end system prototyping. BSCS4001 Degree Level Course Data Visualization Design To provide students with the foundations necessary for understanding and extending the current state of the art in data visualization, to gain an understanding of the key techniques and theory used in visualization, including data models, graphical perception and techniques for visual encoding and interaction, to plan for data-based storytelling through charts, maps, and diagrams, to use visualization tools to transform quantitative information to visual representation, and to gain practical experience building and evaluating visualizations. by Venkat Course ID: BSCS4001 Course Credits: 4 Course Type: Elective Pre-requisites:

None Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Information visualization overview, historical perspective WEEK 2 Vision, perception and cognition principles of information visualization WEEK 3 Data principles and models WEEK 4 Analysis and Insights WEEK 5 Geo-visualization WEEK 6 Map Abstraction WEEK 7 Visual encoding of data WEEK 8

Visualization design WEEK 9 Data Stories WEEK 10 Project presentations, Wrap up and course summary + Show all weeks About the Instructors Venkat Professor,

IDC School of Design

IIT Bombay Venkatesh Rajamanickam is a Professor at the IDC School of Design, IIT Bombay. He is a HCI designer, educator and researcher. His Information Design Lab at IIT Bombay utilizes graphic design, interactive computer graphics, data-processing algorithms and emerging technologies to address challenging problems in data, design and art. His research focuses on data-based and visual understanding of a range of issues from public understanding of science, urban living, politics, education, transportation, to generative art. less View all Degree Level courses Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

BSCS4002 Degree Level Course Special topics in Machine Learning (Reinforcement Learning) To enable the student to understand the reinforcement learning paradigm, to be able to identify when an RL formulation is appropriate, to understand the basic solution approaches in RL, to implement and evaluate various RL algorithms. by Balaraman Ravindran Course ID: BSCS4002 Course Credits: 4 Course Type: Elective Pre-requisites: BSCS3004 - Deep Learning Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Review of ML fundamentals – Classification, Regression. Review of probability theory and optimization concepts. WEEK 2 RL Framework; Supervised learning vs. RL; Explore-Exploit Dilemma; Examples. WEEK 3 MAB: Definition, Uses, Algorithms, Contextual Bandits, Transition to full RL, Intro to full RL problem WEEK 4 Intro to MDPs: Definitions , Returns, Value function, Q-function. WEEK 5 Bellman Equation, DP, Value Iteration, Policy Iteration, Generalized Policy Iteration. WEEK 6 Evaluation and Control: TD learning, SARSA, Q-learning, Monte Carlo, TD Lambda, Eligibility Traces. WEEK 7 Maximization-Bias & Representations: Double Q learning, Tabular learning vs. Parameterized, Q-learning with NNs WEEK 8 Function approximation: Semi-gradient methods, SGD, DQNs, Replay Buffer. WEEK 9 Policy Gradients: Introduction, Motivation, REINFORCE, PG theorem, Introduction to AC methods WEEK 10 Actor-Critic Methods, Baselines, Advantage AC, A3C

Advanced Value-Based Methods: Double DQN, Prioritized Experience Replay, Dueling Architectures, Expected SARSA. WEEK 11 Advanced PG/A-C methods: Deterministic PG and DDPG, Soft Actor-Critic (SAC)

HRL: Introduction to hierarchies, types of optimality, SMDPs, Options, HRL algorithms POMDPs: Intro, Definitions, Belief states, Solution Methods; History-based methods, LSTM, Q-MDPs, Direct Solutions, PSR. WEEK 12 Model-Based RL: Introduction, Motivation, Connections to Planning, Types of MBRL, Benefits, RL with a Learnt Model, Dyna-style models, Latent variable models, Examples, Implicit MBRL.

Case study on design of RL solution for real-world problems. + Show all weeks About the Instructors Balaraman Ravindran Professor,

CSE

IIT Madras B. Ravindran heads the Robert Bosch Centre for Data Science & Artificial

Intelligence (RBCDSAI) at IIT Madras. He is the Mindtree Faculty Fellow, TCS Affiliate Faculty and Professor in the Department of Computer Science and Engineering at IIT Madras. He has held visiting positions at the Indian Institute of Science, University of Technology, Sydney, and Google Research. Currently, his research interests span the areas of geometric deep learning and reinforcement learning. He is one of the founding executive committee members of the India chapter of ACM SIGKDD. He is currently serving on the editorial boards of Machine Learning Journal, JAIR, ACM Transactions on Intelligent Systems and Technology, PLOS One, and Frontiers in Big Data and AI. He has published more than 100 papers in premier journals and conferences. His work with students have won multiple best paper awards, the most recent being the best application paper at PAKDD 2021. His video lectures on NPTEL are widely viewed and have received accolades for their depth and delivery. He received his PhD from the University of Massachusetts, Amherst and his Master's degree from the Indian Institute of Science, Bangalore. He is a senior member of the Association for Advancement of AI (AAAI) and an ACM Distinguished Member.

BSCS4004 Degree Level Course Sequential Decision Making At the end of the course, students will be able to understand the differences between the various sequential decision making problems based on the type of feedback involved, recognize practical ML problems as sequential decision making problems whenever they are, learn about optimal algorithms for several sequential decision making settings, and apply the algorithms studied in the course to various practical sequential decision making scenarios. by Arun Rajkumar Course ID: BSCS4004 Course Credits: 4 Course Type: Elective Pre-requisites:

None Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Introduction to Online Learning, Halving algorithm WEEK 2 Online Machine Learning; Perceptron and Winnow WEEK 3 Intro to Regret; Online learning with expert advice - Hedge algorithm WEEK 4 Online linear optimization WEEK 5 Online convex optimization; Online learning summary WEEK 6 Introduction to Multi armed Bandits - EXP3 WEEK 7 Contextual MAB - EXP4 WEEK 8 Stochastic MAB, Epsilon Greedy, Explore then commit WEEK 9 Stochastic MAB, UCB, Thompson Sampling WEEK 10 Stochastic MAB - Linear Bandits - LinUCB algorithm; MAB summary WEEK 11 Introduction to Reinforcement Learning - Markov Decision Process WEEK 12 Q-learning + Show all weeks About the Instructors Arun Rajkumar Assistant Professor,

Department of Computer Sciences & Engineering,

IIT Madras I am currently an Assistant Professor at the Computer Science and Engineering department of IIT Madras. Prior to joining IIT Madras, I was a research scientist at the Xerox Research Center (now Conduent Labs), Bangalore for three years. I earned my Ph.D from the Indian Institute of Science where I worked on 'Ranking from Pairwise Comparisons'. My research interests are in the areas of Machine learning, statistical learning theory with applications to education and healthcare. less Visit website Other courses by the same instructor: BSCS2004 -

Machine Learning Foundations and BSCS2007 -

Machine Learning Techniques View all Degree Level courses Contact

BSCS4021 Degree Level Course Advanced Algorithms To introduce advanced ideas in design of algorithms; To study the performance guarantees of algorithms; To introduce methods for coping with NP-hard problems. by Neeldhara Misra Course ID: BSCS4021 Course Credits: 4 Course Type: Elective Pre-requisites:

None Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Greedy Algorithms: Storing Files on Tape; Scheduling Classes; Stable Matchings WEEK 2 Matroids: A

Generic Optimization Problem, Motivating the Definition, Examples of Matroids, Scheduling with Deadlines WEEK 3 Dynamic Programming: Longest Increasing Subsequence, Edit Distance, Subset Sum, Optimal BSTs WEEK 4 Maximum Flows: Flows, Cuts, Maxflow-Mincut, Augmenting Paths, Bipartite Matchings, Other Settings WEEK 5 Applications of Flows: Exam Scheduling, Baseball Elimination, Project Selection WEEK 6 NP-hardness: P, NP, NP-hardness, NP-completeness, Reductions and SAT, 3SAT, Maximum Independent Set, Graph Coloring, Subset Sum WEEK 7 Approximation Algorithms: Introduction to Approximation Frameworks, Vertex Cover via Maximal Matchings, Vertex Cover via LP rounding, TSP, Set Cover WEEK 8 Randomized Algorithms – Monte Carlo v. Las Vegas, Min-Cut Algorithm, MAX SAT via the Probabilistic Methods, 2SAT via Markov Chains, Primality Testing WEEK 9 Exact Algorithms – Branch and Bound, An Inclusion-Exclusion approach to Hamiltonian Path, Dynamic Programming for TSP, Local Search WEEK 10 Parameterized Algorithms – Closest String, Iterative Compression for FVS, Randomized Algorithm for k-Path, DP over subsets - Set Cover WEEK 11 Kernelization – Vertex Cover, Matrix Rigidity, Feedback Arc Set on Tournaments, Max Sat, Edge Clique Cover WEEK 12 Practical Approaches to Coping with Hardness – SAT Solvers, SAT reductions, LP solvers, LP reductions + Show all weeks Prescribed Books The following are the suggested books for the course: Cormen, Leiserson, Rivest, and Stein. Introduction to Algorithms. 2nd ed. Cambridge, MA: MIT Press, 2001. David P. Williamson and David B. Shmoys, The Design of Approximation Algorithms About the Instructors Neeldhara Misra Faculty,

CSE,

IIT Gandhinagar Neeldhara Misra is an Assistant Professor of Computer Science and Engineering at the Indian Institute of Technology, Gandhinagar. Her primary research interest involves the design and analysis of efficient algorithms for “hard” problems in general, and parameterized algorithms in particular. The problems considered are typically concerned with combinatorial optimization, frequently in the context of graph theory, social choice, games, geometry, and constraint satisfaction.

BSCS5001 Degree Level Course Large Language Models Understanding the Transformer architecture
Understanding the concept of pretraining and fine-tuning language models
Compare and contrast different types of tokenizers like BPE, wordpiece, sentencepiece
Understanding different LLMs architectures: encoder-decoder, encoder-only, decoder-only
Exploring common datasets like C4,mc4,Pile, Stack and so on
Addressing the challenges of applying vanilla attention mechanisms for long range context windows.
Apply different types of fine-tuning techniques to fine-tune large language models by Mitesh M.Khapra
Course ID: BSCS5001 Course Credits: 4 Course Type: Elective Pre-requisites:

None Course structure & Assessments For details of standard course structure and assessments, visit Academics page. WEEK 1 Transformers: Introduction to transformers - Self-attention - cross- attention-Masked attention-Positional encoding WEEK 2 A deep dive into number of parameters, computational complexity and FLOPs- Introduction to language modeling WEEK 3 Causal Language Modeling: What is a language model?- Generative Pretrained Transformers (GPT) - Training and inference WEEK 4 Masked Language Modeling : Bidirectional Encoder Representations of Transformers (BERT) - Fine-tuning - A deep dive into tokenization: BPE, SentencePiece, wordpiece WEEK 5 Bigger Picture: T5, A deep dive into text-to-text (genesis of prompting), taxonomy of models, road ahead WEEK 6 Data: Datasets, Pipelines, effectiveness of clean data, Architecture: Types of attention, positional encoding (PE) techniques, scaling techniques WEEK 7 Training: Revisiting optimizers, LION vs Adam, Loss functions, Learning schedules, Gradient Clipping, typical failures during training WEEK 8 Fine Tuning: Prompt Tuning,Multi-task Fine-tuning,Parametric Efficient Fine-Tuning, Instruction fine-tuning datasets WEEK 9 Benchmarks: MMLU, BigBench, HELM,OpenLLM, Evaluation Frameworks WEEK 10 Training Large Models: Mixed precision training,Activation checkpointing, 3D parallelism, ZERO, Bloom as a case study WEEK 11 Scaling Laws: Chinchilla,Gopher, Palm v2 WEEK 12 Recent advances + Show all weeks Prescribed Books The following are the suggested books for the

course: Research papers, articles About the Instructors Mitesh M.Khapra Associate Professor,

Department of Computer Science and Engineering,

IIT Madras Mitesh M. Khapra is an Associate Professor in the Department of Computer Science and Engineering at IIT Madras and is affiliated with the Robert Bosch Centre for Data Science and AI. He is also a co-founder of One Fourth Labs, a startup whose mission is to design and deliver affordable hands-on courses on AI and related topics. He is also a co-founder of AI4Bharat, a voluntary community with an aim to provide AI-based solutions to India-specific problems. His research interests span the areas of Deep Learning, Multimodal Multilingual Processing, Natural Language Generation, Dialog systems, Question Answering and Indic Language Processing. Prior to IIT Madras, he was a Researcher at IBM Research India for four and a half years, where he worked on several interesting problems in the areas of Statistical Machine Translation, Cross Language Learning, Multimodal Learning, Argument Mining and Deep Learning. Prior to IBM, he completed his PhD and M.Tech from IIT Bombay in Jan 2012 and July 2008 respectively. During his PhD he was a recipient of the IBM PhD Fellowship (2011) and the Microsoft Rising Star Award (2011). He is also a recipient of the Google Faculty Research Award (2018), the IITM Young Faculty Recognition Award (2019) and the Prof. B. Yegnanarayana Award for Excellence in Research and Teaching (2020). less Other courses by the same instructor: BSCS3004 -

BSCS5002 Degree Level Course Introduction to Natural Language Processing (i-NLP)
Natural language (NL) refers to the language spoken/written by humans. NL is the primary mode of communication for humans. With the growth of the world wide web, data in the form of text has grown exponentially. It calls for the development of algorithms and techniques for processing natural language for the automation and development of intelligent machines: Natural Language Processing (NLP).

On the completing the course, the participant will learn the following:

1. Why is processing language computationally hard and why specialized techniques need to be developed to process texts?
2. Knowledge and in-depth understanding of linguistics techniques and classical (statistical) approaches (pre-deep learning era) to NLP and their limitations.
3. Knowledge and in-depth understanding of deep learning approaches (RNN and CNN) to NLP.
4. Knowledge and in-depth understanding of Attention Mechanism, Transformers and Large Language Models (LLMs)
5. Ability to read and understand latest NLP-related research papers.
6. Ability to identify applicable NLP technique to solve a real-world problem involving text processing.
7. Ability to implement NLP models and algorithms for problems related to text processing.
8. Ability to develop applications based on textual generative models (LLMs - Large Language Models) by Parameswari Krishnamurthy , Rahul Mishra Course ID: BSCS5002 Course Credits: 4 Course Type: Elective Pre-requisites:

None Course structure & Assessments For details of standard course structure and assessments, visit Academics page. WEEK 1 Introduction to Natural Language (NL) Why is it hard to process a natural language? Levels of Language Processing, Linguistic Fundamentals for NLP WEEK 2 Text Processing and Preprocessing: Tokenization, Normalization, Stop word removal, Stemming, lemmatization, Morphological Analysis & Finite State Transducers, Part-of-speech tagging and Named entities WEEK 3 Classical Sequence Models: HMM and CRF WEEK 4 Syntax and Parsing: Constituency parsing, Dependency parsing, Parsing algorithms WEEK 5 Meaning Representation: Distributional Semantics, Logical Semantics, Semantic Role Labelling WEEK 6 -Language Models: n-gram and Word2Vec, GloVe -Discourse Processing: Anaphora and Coreference Resolution and Discourse Connectives. Machine Translation WEEK 7 Naïve Bayes Classifier Expectation Maximization Algorithm Logistic Regression

Maximum Entropy Models WEEK 8 Recurrent neural networks, LSTMs/GRUs, Neural Sequence Models, Contextualized Word Embeddings: TagLM, ELMO, ULMFIT, etc., Attention Mechanism (Code demo: LSTM/GRU) WEEK 9 Transformers, Self-attention Mechanism, Sub-word tokenization, Positional encoding, Pre-trained Language Models (PLMs): BERT, GPT, etc. Fine-tuning and transfer learning (Code demo: Transformers) WEEK 10 Natural Language Generation, Decoding schemes: greedy, Random sampling, Top-k, Top-p, Speculative sampling, etc., Retrieval Augmented generation (RAG) WEEK 11 Large Language Models (LLMs) Parameter Efficient Fine Tuning: Prefix-coding, LORA, QLORA, etc. Emergent Behavior: In-context learning, Instruction Fine Tuning, RLHF, DPO (Code demo: LLMs with Hugging face) WEEK 12 NLP applications: QnA, Summarization, NLI, Fact-checking, etc. Model Explainability: Attention maps, Attention-flow/rollout, Integrated gradients, etc. + Show all weeks Prescribed Books The following are the suggested books for the course: Speech and Language Processing, Daniel Jurafsky, James H. Martin Foundations of Statistical Natural Language Processing, CH Manning, H Schuetze Introduction to Natural Language Processing, Jacob Eisenstein Natural Language Understanding, James Allen Deep Dive into Deep Learning, Aston Zhang, Zack C. Lipton, Mu Li, Alexander J. Smola Neural Network Methods for Natural Language Processing, Yoav Goldeberg About the Instructors Parameswari Krishnamurthy Assistant Professor,

Language Technologies Research Center (LTRC),

IIIT Hyderabad Parameswari Krishnamurthy is as an Assistant Professor at the Language Technologies Research Centre, International Institute of Information Technology, Hyderabad. Her doctoral research at the University of Hyderabad delved into Computational Linguistics, with a focus on Telugu-Tamil Machine Translation, emphasizing divergence. Prior to her current position, she held the role of Assistant Professor at the University of Hyderabad. Krishnamurthy's expertise lies in Computational Linguistics and Machine Translation, spanning areas such as Morphological Analysis & Generation, Parsing, Linguistic Divergence, Contrastive Grammar, and Corpus Linguistics. She actively participates in numerous Natural Language Processing projects, particularly those concerning Indian languages and Dravidian languages, aiming to advance core technology tools and NLP applications. less Rahul Mishra Assistant Professor,

Language Technologies Research Center (LTRC), Computer Science,

IIIT Hyderabad Rahul Mishra is an Assistant Professor at IIIT Hyderabad's Language Technology Research Centre (LTRC), where his research focuses on Controllable Text Summarization, Misinformation Detection, Model Explainability, Graph Representation Learning, and Natural Language Generation. Previously, he served as a senior postdoctoral researcher at the University of Geneva, Switzerland, specializing in biomedical NLP. Prior to that, as a Senior Staff Engineer/Researcher, he contributed to research projects at Samsung Research Lab in Bangalore, optimizing and benchmarking large language models on process in memory (PIM) enabled GPUs. He holds a PhD from the University of Stavanger, Norway and an M.Tech from IIIT Delhi. During his doctoral studies, he also worked as a visiting researcher at the Computer Science Department of ETH, Zurich, Switzerland and University of Hannover, Germany. Before pursuing his PhD, he worked as an NLP data scientist in automatic vehicle diagnostic department at KPIT Technologies, Pune, focusing on automatic fact extraction from car service manuals. Prior to that, he also held roles as a consultant researcher at Tata Research Development and Design Centre (TRDDC) and a research intern at IBM Research Bangalore.

BSCS5003 Degree Level Course Deep Learning for Computer Vision -Knowledge of basics of image

processing and computer vision

- Knowledge of building blocks of deep learning including feedforward networks, convolutional neural networks, recurrent neural networks and transformers
 - Knowledge of generative AI models in computer vision
 - Knowledge of recent trends including explainability/zero-shot learning, few-shot learning, self-supervised learning, etc
 - Hands-on experience on implementation of basic image processing tasks
 - Hands-on experience on implementation of deep learning models for computer vision tasks
 - Hands-on experience on implementation of advanced computer vision tasks such as explainability, self-supervised learning, etc by Vineeth N B
- Course ID: BSCS5003 Course Credits: 4 Course Type: Elective Pre-requisites:

None Course structure & Assessments For details of standard course structure and assessments, visit Academics page. WEEK 1 Introduction and Overview: Course Overview and Motivation; Introduction to Image Formation, Capture and Representation; Linear Filtering, Correlation, Convolution WEEK 2 Visual Features and Representations: Edge, Blobs, Corner Detection; Scale Space and Scale Selection; SIFT, SURF; HoG,LBP, etc. WEEK 3 Visual Matching: Bag-of-words, VLAD; RANSAC, Hough transform; Pyramid Matching; Optical Flow WEEK 4 Deep Learning Review: Review of Deep Learning, Multi-layer Perceptrons, Backpropagation WEEK 5 Convolutional Neural Networks (CNNs): Introduction to CNNs; Evolution of CNN Architectures: AlexNet, ZFNet, VGG, InceptionNets, ResNets, DenseNets WEEK 6 Visualization and Understanding CNNs: Visualization of Kernels; Backprop-to-image/Deconvolution Methods; Deep Dream, Hallucination, Neural Style Transfer; CAM, Grad-CAM, Grad-CAM++; Recent Methods (IG, Segment-IG, SmoothGrad) WEEK 7 CNNs for Recognition, Verification, Detection, Segmentation: CNNs for Recognition and Verification (Siamese Networks, Triplet Loss, Contrastive Loss, Ranking Loss); CNNs for Detection: Background of Object Detection, R-CNN, Fast R-CNN, Faster R-CNN, YOLO, SSD, RetinaNet; CNNs for Segmentation: FCN, SegNet, U-Net, Mask-RCNN WEEK 8 Recurrent Neural Networks (RNNs): Review of RNNs; CNN + RNN Models for Video Understanding: Spatio-temporal Models, Action/Activity Recognition WEEK 9 Attention Models: Introduction to Attention Models in Vision; Vision and Language: Image Captioning, Visual QA, Visual Dialog; Spatial Transformers; Transformer Networks WEEK 10 Deep Generative Models: Review of (Popular) Deep Generative Models: GANs, VAEs; Other Generative Models: PixelRNNs, NADE, Normalizing Flows, etc WEEK 11 Variants and Applications of Generative Models in Vision: Applications: Image Editing, Inpainting, Superresolution, 3D Object Generation, Security; Variants: CycleGANs, Progressive GANs, StackGANs, Pix2Pix, etc WEEK 12 Recent Trends: Zero-shot, One-shot, Few-shot Learning; Self-supervised Learning; Reinforcement Learning in Vision; Other Recent Topics and Applications + Show all weeks Prescribed Books The following are the suggested books for the course: Ian Goodfellow, Yoshua Bengio, Aaron Courville, Deep Learning, 2016 Michael Nielsen, Neural Networks and Deep Learning, 2016 Yoshua Bengio, Learning Deep Architectures for AI, 2009 Richard Szeliski, Computer Vision: Algorithms and Applications, 2010. Simon Prince, Computer Vision: Models, Learning, and Inference, 2012. David Forsyth, Jean Ponce, Computer Vision: A Modern Approach, 2002. About the Instructors Vineeth N B Professor,

Computer science and Engineering,

None What you'll learn VIEW COURSE VIDEOS To understand the concepts of speech and speech technologies, and to apply them to real-world scenarios To gain hands-on experience of the relevant toolkits used for speech processing Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Review of Signals and Systems, Continuous time signals and transforms Discrete time signals, Discrete Fourier transform, Autocorrelation and Cross-Correlation WEEK 2 Acoustic Feature Analysis of Speech Signals I, II Gaussian mixture models (GMM), universal background model (UBM-GMM), singular value decomposition (SVD) WEEK 3 Hidden Markov model (HMM), Examples of HMM based approach for ASR, TTS, speaker diarization Information bottleneck (IB) based clustering for diarization WEEK 4 Introduction and History of ASR and TTS Components of ASR: Acoustic Modelling, Punctuation Model (Lexicon) and language modelling (N-Gram Language models) WEEK 5 HMMs for Acoustic Modelling - Monophone, Triphone Speech Synthesis: unit selection, statistical parametric synthesis (HTS) WEEK 6 Neural networks for building speech technologies NN for Acoustic Modelling - Hybrid modelling- Hybrid-NN: DNN,CNN,TDNN WEEK 7 End-to-End Approaches I: CTC, Encoder-decoder Architecture E2E with RNN WEEK 8 Applications to ASR and TTS End-to-End Approaches II WEEK 9 Encoder-decoder Architecture E2E with transformers for ASR and TTS Interesting Problems WEEK 10 Speaker recognition/verification: with ivector, xvector Speaker diarization: using x-vector WEEK 11 Speaker adaptation: (revisit i, x vectors) and introduce s-vectors. Code Switched Speech recognition; Speech Translation WEEK 12 Singing voice synthesis; voice conversion; generic voice synthesis + Show all weeks Prescribed Books The following are the suggested books for the course: L R Rabiner and R W Schafer, "Theory and Application of Digital Speech Processing", PH, Pearson, 2011. L R Rabiner, B-H Juang and B Yegnanarayana, "Fundamentals of Speech Recognition", Pearson, 2009 (Indian subcontinent adaptation). Xuedong Huang, Alex Acero, Hsiao-wuen Hon, "Spoken Language Processing: A guide to Theory, Algorithm, and System Development", Prentice Hall PTR, 2001. References: Thomas Quatieri, "Discrete-time Speech Processing: Principles and Practice", PH, 2001. Rabiner and Schafer, "Digital Processing of Speech Signals", Pearson Education, 1993. Recent research papers About the Instructors Prof. S. Umesh Professor,

Department of Electrical Engineering,
Indian Institute of Technology,

IIT Madras S. Umesh is a Professor of Electrical Engineering at IIT-Madras. He completed his PhD from the University of Rhode Island, USA and his PostDoctoral Fellowship from the City University of New York. He has also been a visiting researcher at AT&T Research Laboratories, USA; at Machine Intelligence Laboratory Cambridge University Engineering Department, UK and the Department of Computer Science, RWTH-Aachen, Germany. ... more He is a recipient of the AICTE Career Award for Young Teachers in 1997 and the Alexander von Humboldt Research Fellowship in 2004. During his stint at Cambridge University in 2004, he was part of the U.S. DARPA's Effective, Affordable Reusable Speech-to-text (EARS) programme. Similarly in 2005 he was part of the RWTH-Aachen's TC-STAR project for transcription of speech from European Parliament's Plenary Sessions. Between 2010-2016, he led a multi-institution consortium to develop ASR systems in Indian languages in the agriculture domain which was funded by MeITY. He is currently leading the ASR efforts

IIT Madras Sivakumar M Srinivasan, fondly called Anbudan Siva, is a Professor and Head of the Department of Applied Mechanics at IIT Madras. He holds a B.Tech (1985) and an M.S. (1987) both from IIT Madras and a PhD (1993) from the Louisiana State University for his thesis in the area of plasticity. He has been with IIT Madras as a faculty since 1994. He also served as Dean (Students) and Advisor, Guidance and Counseling. He has been on a mission to nurture holistic leaders of tomorrow who combine competence, cooperation and empathy as their strengths. He has brought in several initiatives at IIT Madras such as MITR (Mentoring for Inner TRansformation), Wellness Center; LTAP (Leisure Time Activities Program); popular curricular courses such as Happiness, habits and success, Discovering Creativity, Biomimicry, Fostering Enriching Relationships and Life skills; National Cultural Appreciation (similar to NSS and NCC); ECDC: Early Career Development Center; Coach in the Court concept; to name a few. less Lt Col Jayakumar Consultant and Guest Faculty,

IIT Madras Lt Col Jayakumar is a veteran of the Indian Army. He was an Instructor in Gunnery and a Certified Personality Assessment Professional from the Defence Institute of Psychological Research. He was a part of the Selection Committee of Services Selection Board from 1999 to 2003 as Technical Officer/ Psychologist in Bhopal. He took over the duties of Placement and Public Relations at IIT Madras in 2006 and superannuated in 2018. Since then, he is into coaching students in facing interviews, personality development, corporate training on leadership and teaching students of IIT Madras as a guest faculty. less Prasanna G Guest Faculty,

IIT Madras Prasanna is a guest faculty in IIT Madras. She has been coaching professionals, women, parents, and students for 12+ years. She helps people discover what they truly want in life, eliminate the barriers and blocks getting in their way, re-claim their true selves and live a fuller and deeper life. She graduated as a Core Energy & Energy Leadership Coach from the Institute of Professional Empowerment Coaching (iPEC), USA. Prior to this, she worked with TCS and Wipro for 12 years. She worked in various roles as a Programmer/ Developer, Technical Architect & Business Analyst, Project Manager, and Solution Design Consultant; for different verticals. She graduated with a B.Tech in Electronics & Communications from IIT Madras in 1995. less Shiva Subramaniam Guest Faculty,

IIT Madras Shiva Subramaniam is a life skills coach, consultant, and innovation evangelist. In his career spanning over three decades, he has worked with a multitude of organizations, teams, and individuals, helping them with new ways of thinking, exploring connections, expanding their vision and realizing their potential. He is a lawyer by training and was practising at the High Court in Chennai and also worked with TCS. He is now a guest faculty at IIT Madras and is the co-founder of the Biomimicry Compass. less Kartic Vaidyanathan Guest Faculty,

IIT Madras Kartic Vaidyanathan is the founder of Let's Play To Learn, an initiative that enables joyful learning through the power of play for corporates and educational institutions. The play-based solution offerings span industry segments, domains, and multiple levels of the organisation. He also conducts workshops for corporates and FDPs for educational institutions on tools and techniques for gamified interactive learning. He has been teaching multiple courses at IIT Madras for the last 3 years in the capacity of guest faculty. Prior to this, he had a 21-year corporate stint in IT Majors (Infosys/ Cognizant). He has authored the book "Power of Play in Audience Engagement." He graduated from IIT Madras in 1996 and completed his Exec MBA in IIM Bangalore in 2009. less Senthil A V Certified

Financial Planner

, Senthil A V started his career in a consulting firm and then moved to TCS, where he was responsible for implementing Activity Based Costing. He did his M. S. from BITS Pilani and Ph. D. in Commerce (Wealth Management) from the University of Madras. Senthil is a seasoned Wealth & IT professional specialising in mentoring, wealth management, solution shaping, extensive deal structuring & working with cross-functional teams. He was heading wealth and mentoring verticals at Metis Family Office from March 2017 to June 2019. less Prathap Haridoss Professor,

Department of Metallurgical and Materials Engineering,

IIT Madras Prathap Haridoss is currently the Dean (Academic Courses) and a Professor in the Department of Metallurgical and Materials Engineering at IIT Madras. He did his B.Tech in Metallurgical Engineering from IIT Madras and got his Ph. D. from the University of Wisconsin-Madison, USA. He worked as a Senior Scientist in Plug Power New York, before joining IIT Madras as a Faculty. His research interests include Fuel Cell and Carbon Nanomaterials. Prathap Haridoss was also one of the coordinators of NPTEL (National Program on Technology Enhanced Learning) and the IIT Madras B.S. Degree Program. less Visit website View all Degree Level courses Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

BSGN3002 Degree Level Course Financial Forensics An introduction to Finance and Accounting, The life cycle of a financial transaction, Areas where AI/ML is used in the Finance Industry, Importance of Model Explainability in the Regulated World, An introduction to solving real world finance problems – Credit Card Fraud Detection, Identity Fraud Detection, Anti Money Laundering Scenarios by Dr. Arun Kumar G Course ID: BSGN3002 Course Credits: 4 Course Type: Elective Pre-requisites:

None Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 INTRODUCTION TO ACCOUNTING AND FINANCE: Financial Statements | Uses relevance of financial statements | Decision making in the financial arena | Need for finance and accounting in a business world WEEK 2 FRAUD VULNERABILITIES AND FINANCE: Types of fraud | Why do they occur | Where do they occur | Detecting red flags WEEK 3 FORENSIC ACCOUNTING - 1: Intro to Forensic Accounting | Source of assignments and referrals for a forensic accountant | Role of the forensic accountant as an expert - identify any conflicts WEEK 4 FORENSIC ACCOUNTING - 2: Scope of forensic accounting | Process of forensic accounting - Analysis WEEK 5 BENFORD LAW AND IMPLEMENTATION: Benford Law | Using Benford Law in Excel to detect audit fraud WEEK 6 AGING ANALYSIS, PARETO AND OUTLIERS: Detecting fraud using Aging Analysis in Excel | Creating a Pareto Chart | Outlier identification WEEK 7 FINANCIAL TRANSACTION LIFECYCLE: Transaction Lifecycle | Where is AI/ML used in the present world? WEEK 8 ENTITY RESOLUTION: What is an entity in a transaction? | Entity resolution WEEK 9 ANOMALY DETECTION - 1: Supervised Anomaly Detection WEEK 10 ANOMALY DETECTION - 2: Unsupervised Anomaly Detection WEEK 11 ANOMALY DETECTION - 3: Time Based Anomaly Detection WEEK 12 Model Explainability | Financial Data Visualization using Tableau + Show all weeks Prescribed Books The following are the suggested books for the course: Robert N Anthony, David F Hawkins and Kenneth A Merchant, Accounting: Text and Cases Stephen H Penman, Financial Statement Analysis and Security Valuation, Tata McGraw Hill Company, Third Edition. Cormen, T. H., Leiserson, C. E., Rivest, R. L., & Stein, C. (2009). Introduction to algorithms. Mit Press. James, G., Witten, D., Hastie, T., & Tibshirani, R. (n.d.). An introduction to statistical learning: With applications in R. About the Instructors Dr. Arun Kumar G Professor,

Department of Management Studies(DOMS),

IIT Madras Prof. G Arun Kumar is a faculty in the Department of Management Studies at IIT Madras. His areas of interest are Finance and Corporate Governance issues. He was actively involved in "Evidence based impact assessment of development" and have worked on field based Impact assessment assignments in the peri-urban or rural setting across the country. Some of these assignments include development of micro enterprises, microfinance, migration & remittances, digital literacy, skill development, women empowerment & women led micro enterprises, etc.

BSHS1001 Foundational Level Course English I This course aims at achieving fluency and confidence in spoken and written English. This course will use insights from theories of learning and dominant methods of teaching language. by Rajesh Kumar , Karthika Sathyanathan Course ID: BSHS1001 Course Credits: 4 Course Type: Foundational Pre-requisites:

None What you'll learn VIEW COURSE VIDEOS Acquiring wide range of vocabulary and linguistic competence that is required for functional performance; Identifying patterns of basic sentence types and structural accuracy; Building elementary foundations for the knowledge related to conventions and use of language in society, particularly in speaking and listening skills; Developing the basic skills for creative reading and writing with precision. Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Sounds and Words (Vowel and Consonant sounds) WEEK 2 Parts of Speech WEEK 3 Sentences (Phrases and Idioms) WEEK 4 Speaking Skills (Spoken English Preliminaries) WEEK 5 Tenses and Agreement in English Sentences WEEK 6 Reading Skills (Skimming, Scanning and Comprehension) WEEK 7 Listening Skills WEEK 8 Aspiration, Word Stress and Syllabification WEEK 9 Speaking Skills (Presentation and Group Discussion) WEEK 10 Grammar (Common Errors in English) and Writing Skills WEEK 11 Writing Skills (Basics of Writing) WEEK 12 Writing Skills (Professional Writing) + Show all weeks Reference Documents / Books Addition Learning Support for English - 1 (Basic English) DOWNLOAD Prescribed Books The following are the suggested books for the course: Aarts, Bas (2011). Oxford Modern English Grammar, New York: Oxford University Press Murphy, Raymond (2012). English Grammar in Use, New York: Cambridge University Press. 4th Edition Krishnaswamy, Subashree and K. Srilata eds. (2007). Short Fiction from South India. Delhi: OUP. Dhanavel, S.P. (2010). English and soft skills (V-1). Chennai: Orient Blackswan. References: Oxford English Dictionary Croft, Sebastian (2018). How to Analyze People: The Ultimate Guide to Speed Reading People Through Proven Psychological Techniques, Body Language Analysis and Personality Types and Patterns (Available on Kindle) Malgudi Days: A collection of short-stories (RK Narayan) 365 Jataka Tales (Om Books International) 365 Panchtatra Stories (Adil Mukesh) 365 Tales from Indian Mythology (Om Books International) About the Instructors Rajesh Kumar Professor,

Department of Humanities and Social Sciences,

IIT Madras Rajesh Kumar is professor of linguistics in the Department of Humanities and Social Sciences at the Indian Institute of Technology Madras, Chennai. He obtained his PhD in linguistics from the University of Illinois at Urbana-Champaign. Prior to joining IIT Madras, he taught at IIT Kanpur, and IIT Patna in India and at the University of Texas at Austin in the USA. He has been a visiting faculty at the Tata Institute of Social Sciences in Mumbai in India. His book on Syntax of Negation and Licensing of Negative Polarity Items was published by Routledge in their prestigious series Outstanding Dissertations in Linguistics in 2006. He is associate editor of the journal Language and Language Teaching. He has been part of the language teaching program at all the institutions he has been affiliated with. The broad goal of his research is to uncover regularities underlying both the form (what language is) and sociolinguistic functions (what language does) of natural languages. less Visit website Other courses by the same instructor: BSHS1002 -

English II Karthika Sathyanathan Alumna,

Department of Humanities and Social Sciences,

IIT Madras Karthika has an MA in English Studies from IIT Madras. She has worked as a Language & Education Consultant with multiple government departments and non-government organisations. Currently she is working as project officer with IIT Madras. Her areas of interest include ELT, multilingualism, multiculturalism and second language learning. less Other courses by the same instructor: BSHS1002 -

English II

BSHS1002 Foundational Level Course English II Focus on achieving greater degree of fluency in functional and conversational English to understand subtle and detailed meaning in conversations and texts through short literary pieces and contextualized content. by Rajesh Kumar , Karthika Sathyanathan Course ID: BSHS1002 Course Credits: 4 Course Type: Foundational Pre-requisites: BSHS1001 - English I What you'll learn VIEW COURSE VIDEOS Integrating the basic skills of language into developing advanced skills of language proficiency to help compose clear and detailed writing on a range of subjects; Learning advanced level of vocabulary and socio-linguistic/ socio-pragmatic competence for advance reading and writing; Building nuanced structure for grammatical accuracy for fluency and creating confidence and appropriateness for expressing view-points clearly; Developing elementary foundations for comprehending and conveying underlying meaning in spoken discourse Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Patterns in Sentences WEEK 2 Patterns in Sentences (Continued) WEEK 3 Patterns in Sentences (Continued) WEEK 4 Listening Skills WEEK 5 Listening Skills (Continued) WEEK 6 Speaking Skills WEEK 7 Speaking Skills (Continued) WEEK 8 Reading Skills WEEK 9 Writing Skills WEEK 10 Writing Skills (Continued) WEEK 11 Social Skills WEEK 12 Social Skills (Continued) + Show all weeks Reference Documents / Books Addition Learning Support for English - 2 (Basic English) DOWNLOAD About the Instructors Rajesh Kumar Professor,

Department of Humanities and Social Sciences,

IIT Madras Rajesh Kumar is professor of linguistics in the Department of Humanities and Social Sciences at the Indian Institute of Technology Madras, Chennai. He obtained his PhD in linguistics from the University of Illinois at Urbana-Champaign. Prior to joining IIT Madras, he taught at IIT Kanpur, and IIT Patna in India and at the University of Texas at Austin in the USA. He has been a visiting faculty at the Tata Institute of Social Sciences in Mumbai in India. His book on Syntax of Negation and Licensing of Negative Polarity Items was published by Routledge in their prestigious series Outstanding Dissertations in Linguistics in 2006. He is associate editor of the journal Language and Language Teaching. He has been part of the language teaching program at all the institutions he has been affiliated with. The broad goal of his research is to uncover regularities underlying both the form (what language is) and sociolinguistic functions (what language does) of natural languages. less Visit website Other courses by the same instructor: BSHS1001 -

English I Karthika Sathyanathan Alumna,

Department of Humanities and Social Sciences,

IIT Madras Karthika has an MA in English Studies from IIT Madras. She has worked as a Language & Education Consultant with multiple government departments and non-government organisations. Currently she is working as project officer with IIT Madras. Her areas of interest include

ELT, multilingualism, multiculturalism and second language learning. less Other courses by the same instructor: BSHS1001 -

English I

BSMA1001 Foundational Level Course Mathematics for Data Science I This course introduces functions (straight lines, polynomials, exponentials and logarithms) and discrete mathematics (basics, graphs) with many examples. The students will be exposed to the idea of using abstract mathematical structures to represent concrete real life situations. by Neelesh Upadhye , Madhavan Mukund Course ID: BSMA1001 Course Credits: 4 Course Type: Foundational Pre-requisites:

None What you'll learn [VIEW COURSE VIDEOS](#) Recall the basics of sets, natural numbers, integers, rational numbers, and real numbers. Learn to use the coordinate system, and plot straight lines. Identify the properties and differences between linear, quadratic, polynomial, exponential, and logarithmic functions. Find roots, maxima and minima of polynomials using algorithmic methods. Learn to represent sets and relations between set elements as discrete graphs using nodes and edges. Formulate some common real-life problems on graphs and solve them. Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit [Academics page](#). WEEK 1 Set Theory - Number system, Sets and their operations, Relations and functions - Relations and their types, Functions and their types WEEK 2 Rectangular coordinate system, Straight Lines - Slope of a line, Parallel and perpendicular lines, Representations of a Line, General equations of a line, Straight-line fit WEEK 3 Quadratic Functions - Quadratic functions, Minima, maxima, vertex, and slope, Quadratic Equations WEEK 4 Algebra of Polynomials - Addition, subtraction, multiplication, and division, Algorithms, Graphs of Polynomials - X-intercepts, multiplicities, end behavior, and turning points, Graphing & polynomial creation WEEK 5 Functions - Horizontal and vertical line tests, Exponential functions, Composite functions, Inverse functions WEEK 6 Logarithmic Functions - Properties, Graphs, Exponential equations, Logarithmic equations WEEK 7 Sequence and Limits - Function of One variable - • Function of one variable • Graphs and Tangents • Limits for sequences • Limits for function of one variable • Limits and Continuity WEEK 8 Derivatives, Tangents and Critical points - • Differentiability and the derivative • Computing derivatives and L'Hôpital's rule • Derivatives, tangents and linear approximation • Critical points: local maxima and minima WEEK 9 Integral of a function of one variable - • Computing areas, Computing areas under a curve, The integral of a function of one variable • Derivatives and integrals for functions of one variable WEEK 10 Graph Theory - Representation of graphs, Breadth-first search, Depth-first search, Applications of BFS and DFS; Directed Acyclic Graphs - Complexity of BFS and DFS, Topological sorting WEEK 11 Longest path, Transitive closure, Matrix multiplication Graph theory Algorithms - Single-source shortest paths, Dijkstra's algorithm, Bellman-Ford algorithm, All-pairs shortest paths, Floyd-Warshall algorithm, Minimum cost spanning trees, Prim's algorithm, Kruskal's algorithm WEEK 12 Revision + Show all weeks [Reference Documents / Books](#) [Sets & Functions \(VOL 1\) DOWNLOAD](#) [Calculus \(VOL 2\) DOWNLOAD](#) [GRAPH THEORY \(VOL 3\) DOWNLOAD](#) [Prescribed Books](#) The following are the suggested books for the course: [Introductory Algebra: a real-world approach \(4th Edition\)](#) - by Ignacio Bello About the Instructors [Neelesh Upadhye](#) Associate Professor,

Department of Mathematics,

IIT Madras Experienced Associate Professor with a demonstrated history of working in the higher education industry. Skilled in Mathematical Modeling, R, Stochastic Modeling, and Statistical Modeling. Strong education professional with a Doctor of Philosophy (Ph.D.) focused in Mathematical Statistics and Probability from Indian Institute of Technology, Bombay. less Visit website [Madhavan Mukund](#) Director,

Chennai Mathematical Institute Madhavan Mukund studied at IIT Bombay (BTech) and Aarhus University (PhD). He has been a faculty member at Chennai Mathematical Institute since 1992. His main research area is formal verification. He has active research collaborations within and outside India and serves on international conference programme committees and editorial boards of journals. ... more He has served as President of both the Indian Association for Research in Computing Science (IARCS) (2011-2017) and the ACM India Council (2016-2018). He has been the National Coordinator of the Indian Computing Olympiad since 2002. He served as the Executive Director of the International Olympiad in Informatics from 2011-2014. In addition to the NPTEL MOOC programme, he has been involved in organizing IARCS Instructional Courses for college teachers. He is a member of ACM India's Education Committee. He has contributed lectures on algorithms to the Massively Empowered Classroom (MEC) project of Microsoft Research and the QEEE programme of MHRD. less Visit website Other courses by the same instructor: BSCS1001 -

Computational Thinking , BSCS2002 -

Programming, Data Structures and Algorithms using Python and BSCS2005 -

Programming Concepts using Java View all Foundational Level courses Contact

Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

BSMA1002 Foundational Level Course Statistics for Data Science I The students will be introduced to large datasets. Using this data, the students will be introduced to various insights one can glean from the data. Basic concepts of probability also will be introduced during the course leading to a discussion on Random variables. by Usha Mohan Course ID: BSMA1002 Course Credits: 4 Course Type: Foundational Pre-requisites:

None What you'll learn VIEW COURSE VIDEOS Create, download, manipulate, and analyse data sets. Frame questions that can be answered from data in terms of variables and cases. Describe data using numerical summaries and visual representations. Estimate chance by applying laws of probability. Translate real-world problems into probability models. Calculating expectation and variance of a random variable. Describe and apply the properties of the Binomial Distribution and Normal distribution. Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Introduction and type of data, Types of data, Descriptive and Inferential statistics, Scales of measurement WEEK 2 Describing categorical data Frequency distribution of categorical data, Best practices for graphing categorical data, Mode and median for categorical variable WEEK 3 Describing numerical data Frequency tables for numerical data, Measures of central tendency - Mean, median and mode, Quartiles and percentiles, Measures of dispersion - Range, variance, standard deviation and IQR, Five number summary WEEK 4 Association between two variables - Association between two categorical variables - Using relative frequencies in contingency tables, Association between two numerical variables - Scatterplot, covariance, Pearson correlation coefficient, Point bi-serial correlation coefficient WEEK 5 Basic principles of counting and factorial concepts - Addition rule of counting, Multiplication rule of counting, Factorials WEEK 6 Permutations and combinations WEEK 7 Probability Basic definitions of probability, Events, Properties of probability WEEK 8 Conditional probability - Multiplication rule, Independence, Law of total probability, Bayes' theorem WEEK 9 Random Variables - Random experiment, sample space and random variable, Discrete and continuous random variable, Probability mass function, Cumulative density function WEEK 10 Expectation and Variance - Expectation of a discrete random variable, Variance and standard deviation of a discrete random variable WEEK 11 Binomial and poisson random variables - Bernoulli trials, Independent and identically distributed random variable, Binomial random variable, Expectation and variance of binomial random variable, Poisson distribution WEEK 12 Introduction to

continuous random variables -

Area under the curve, Properties of pdf, Uniform distribution, Exponential distribution + Show all weeks
Reference Documents / Books Descriptive Statistics (VOL 1) DOWNLOAD Probability and Probability
Distributions (VOL 2) DOWNLOAD Prescribed Books The following are the suggested books for the
course: Introductory Statistics (10th Edition) - ISBN 9780321989178, by Neil A. Weiss published by
Pearson Introductory Statistics (4th Edition) - by Sheldon M. Ross About the Instructors Usha Mohan
Professor,

Department of Management Studies,

IIT Madras Usha Mohan holds a Ph.D. from Indian Statistical Institute. She has worked
as a researcher in ISB Hyderabad and Lecturer at University of Hyderabad prior to joining IIT Madras.
She offers courses in Data analytics, Operations research, and Supply chain management to under
graduate, post graduate and doctoral students. In addition, she conducts training in Optimization methods
and Data Analytics for industry professionals. Her research interests include developing quantitative
models in operations management and combinatorial optimization.

BSMA1003 Foundational Level Course Mathematics for Data Science II This course aims to introduce the
basic concepts of linear algebra, calculus and optimization with a focus towards the application area of
machine learning and data science. by Sarang S Sane Course ID: BSMA1003 Course Credits: 4 Course
Type: Foundational Pre-requisites: BSMA1001 - Mathematics for Data Science I What you'll learn VIEW
COURSE VIDEOS Manipulating matrices using matrix algebra. Performing elementary row operations.
Using Gaussian Elimination: Solving systems of linear equations. Find out whether a set of vectors are
linearly independent. Writing down a set of dependencies in case vectors are not linearly independent.
Finding subspaces along with their bases and ranks. Finding distances and angles using norms and inner
products. Obtaining orthonormal basis using the Gram-Schmidt process. Finding maxima and minima of
single variable functions using derivatives. Finding maxima and minima of multivariate functions using
vector calculus. Course structure & Assessments 11 weeks of coursework, weekly online assignments, 2
in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1

Vector and matrices -

Vectors;

Matrices;

Systems of Linear Equations;

Determinants (part 1);

Determinants (part 2) WEEK 2 Solving linear equations -

Determinants (part 3);

Cramer's Rule;

"Solutions to a system of linear equations

with an invertible coefficient matrix";

The echelon form;

Row reduction;

The Gaussian elimination method WEEK 3 Introduction to vector spaces -

Introduction to vector spaces;

Some properties of vector spaces;

Linear dependence;

Linear independence - Part ;

Linear independence - Part 2 WEEK 4 Basis and dimension -

What is a basis for a vector space?;

Finding bases for vector spaces;

What is the rank/dimension for a vector space;

Rank and dimension using Gaussian elimination WEEK 5 Rank and Nullity of a matrix;

Introduction to Linear transformation -

The null space of a matrix : finding nullity and a basis - Part 1;
 The null space of a matrix : finding nullity and a basis - Part 2;
 What is a linear mapping - Part 1;
 What is a linear mapping - Part 2;
 What is a linear transformation WEEK 6 Linear transformation, Kernel and Images -
 Linear transformations, ordered bases and matrices;
 Image and kernel of linear transformations;
 Examples of finding bases for the kernel and image of a linear transformation WEEK 7 Equivalent and
 Similar matrices;
 Introduction to inner products -
 Equivalence and similarity of matrices;
 Affine subspaces and affine mappings;
 Lengths and angles;
 Inner products and norms on a vector space WEEK 8 Orthogonality, Orthonormality;
 Gram-schmidt method -
 Orthogonality and linear independence;
 What is an orthonormal basis?
 Projections using inner products;
 The Gram-Schmidt process;
 Orthogonal transformations and rotations WEEK 9 Multivariable functions, Partial derivatives,
 Limit, continuity and directional derivatives -
 Multivariable functions : visualization;
 Partial derivatives;
 Directional derivatives;
 Limits for scalar-valued multivariable functions;
 Continuity for multivariable functions;
 Directional derivatives in terms of the gradient WEEK 10 Directional ascent and descent,
 Tangent (hyper) plane,
 Critical points -
 The directional of steepest ascent/descent;
 Tangents for scalar-valued multivariable functions;
 Finding the tangent hyper(plane);
 Critical points for multivariable functions WEEK 11 Higher order partial derivatives,
 Hessian Matrix and local extrema,
 Differentiability -
 Higher order partial derivatives and the Hessian matrix;
 The Hessian matrix and local extrema for $f(x,y)$;
 The Hessian matrix and local extrema for $f(x,y,z)$;
 Differentiability for Multivariable Functions;
 Review of Maths - 2 + Show all weeks Reference Documents / Books Linear Algebra DOWNLOAD About
 the Instructors Sarang S Sane Assistant Professor,

Department of Mathematics,

IIT Madras I completed my B.Stat. (Hons.) and M.Stat. from the Indian Statistical
 Institute, Kolkata in 2004 and my Ph.D. from TIFR, Mumbai in 2010. I was a postdoctoral fellow in TIFR, a
 visiting assistant professor in the University of Kansas and very briefly an INSPIRE faculty fellow in IISc,
 Bengaluru before I joined the mathematics department in IITM in 2015.

BSMA1004 Foundational Level Course Statistics for Data Science II This second course will develop on
 the first course on statistics and further delve into the main statistical problems and solution approaches
 by Andrew Thangaraj Course ID: BSMA1004 Course Credits: 4 Course Type: Foundational
 Pre-requisites: BSMA1002 - Statistics for Data Science I BSMA1001 - Mathematics for Data Science I

Co-requisites: BSMA1003 - Mathematics for Data Science II What you'll learn VIEW COURSE VIDEOS
Recalling statistical modeling, description of data. Applying Probability distributions and related concepts to the data sets Explaining the concept of estimation of parameters. Solving the problems related to point and interval estimation. Explaining the concept of Testing of hypothesis related to mean and variance
Analysing the data using simple regression models and setting up relevant hypothesis tests Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Multiple random variables - Two random variables, Multiple random variables and distributions WEEK 2 Multiple random variables - Independence, Functions of random variables - Visualization, functions of multiple random variables WEEK 3 Expectations Casino math, Expected value of a random variable, Scatter plots and spread, Variance and standard deviation, Covariance and correlation, Inequalities WEEK 4 Continuous random variables Discrete vs continuous, Weight data, Density functions, Expectations WEEK 5 Multiple continuous random variables - Height and weight data, Two continuous random variables, Averages of random variables - Colab illustration, Limit theorems, IPL data - histograms and approximate distributions, Jointly Gaussian random variables Probability models for data - Simple models, Models based on other distributions, Models with multiple random variables, dependency, Models for IPL powerplay, Models from data WEEK 6 Refresher week WEEK 7 Estimation and Inference I WEEK 8 Estimation and Inference II WEEK 9 Bayesian estimation WEEK 10 Hypothesis testing I WEEK 11 Hypothesis Testing II WEEK 12 Revision week + Show all weeks Reference Documents / Books Joint Discrete Distributions (VOL 1) DOWNLOAD Joint Continuous Distributions (VOL 2) DOWNLOAD Prescribed Books The following are the suggested books for the course: Probability and Statistics with Examples using R. Author: Siva Athreya, Deepayan Sarkar and Steve Tanner About the Instructors Andrew Thangaraj Professor

Electrical Engineering Department

IIT Madras Andrew Thangaraj received his B. Tech in Electrical Engineering from the Indian Institute of Technology (IIT) Madras in 1998 and Ph.D. in Electrical Engineering from the Georgia Institute of Technology, Atlanta, USA in 2003. ... more He was a post-doctoral researcher at the GTL-CNRS Telecom lab at Georgia Tech Lorraine, Metz, France from Aug 2003 till May 2004. Since 2004, he has been a faculty at the Department of Electrical Engineering, IIT Madras, where he is currently a professor. His research interests are in the broad areas of information theory, error-control coding and information-theoretic aspects of cryptography. From Jan 2012 till Jan 2018, he served as Editor for the IEEE Transactions on Communications. From July 2018, he is an Associate Editor for the IEEE Transactions on Information Theory. From Nov 2011, he has been one of the NPTEL coordinators for IIT Madras. At NPTEL, he has played a key role in the starting of online courses and certification. He is currently a National MOOCs coordinator for NPTEL under the SWAYAM project of the MHRD. Prof. Andrew is also one of the coordinators for the IIT Madras Online BSc Degree Program, which was launched in June, 2020. less Visit website BSMA2001 Degree Level Course Mathematical Thinking To introduce ideas of proofs and problem solving in mathematics and to help in the transition from learning basic mathematical methods to the learning of more advanced mathematical methods and ideas. by Amritanshu Prasad , Sankaran Viswanath Course ID: BSMA2001 Course Credits: 4 Course Type: Elective Pre-requisites:

None Course structure & Assessments 8 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 triangular numbers, Sigma Notation for Summation, Sequences, Peano's axioms for the natural numbers, Set Theory: the language of Mathematics, Hilbert Hotel, Bijections and Cardinality, The Natural Numbers, The Integers WEEK 2 A Trip to Cantorsville, Cantor's Diagonalization Argument, Towards the Real

September 2024 Batch | Applications Close: Sep 15, 2024 | Exam: Oct 27, 2024 APPLY NOW Home Academics BSMA3012 Degree Level Course Linear Statistical Models To introduce linear statistical models and their applications in estimation and testing. The course will illustrate concepts with specific examples, data sets and numerical exercises using statistical package R. by Siva Athreya Course ID: BSMA3012 Course Credits: 4 Course Type: Elective Pre-requisites:

None Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Review of Estimation, Hypothesis Testing WEEK 2 Review of working with R-package WEEK 3 Least square estimation, estimable linear functions WEEK 4 Normal equations WEEK 5 Best Linear Unbiased Estimates (BLUEs). WEEK 6 Gauss-Markov Theorem. WEEK 7 Degrees of freedom. Fundamental Theorems of Least Square. WEEK 8 Testing of linear hypotheses. WEEK 9 One-way and two-way classification models WEEK 10 ANOVA and ANCOVA. WEEK 11 Nested models. Multiple comparisons WEEK 12 Introduction to random effect models. + Show all weeks Prescribed Books The following are the suggested books for the course: Plane Answers to Complex Questions The Theory of Linear Models, Springer by R. Christensen. Linear Statistical Inference by C. R. Rao. About the Instructors Siva Athreya Professor,

International Centre for Theoretical Sciences - TIFR and Indian Statistical Institute, Bangalore Centre Siva Athreya received his Bachelor of Science (Honours) Mathematics from St. Stephen's College, New Delhi, India in 1991. After obtaining a Master of Statistics from Indian Statistical Institute, Kolkata, India in 1993 he obtained his PhD in Mathematics from the University of Washington, Seattle, U.S.A. in 1998. His research interests include: Stochastic Analysis (Stochastic Partial Differential Equations and Stochastic Differential Equations); Random walks among mobile traps; Random Graphs; Tree-valued Processes; Computational Epidemiology. He currently serves as Editor-in-Chief: Electronic Communications in Probability. less View all Degree Level courses Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

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None Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Introduction to R, Introduction to Monte Carlo, Pseudorandom Number Generation, Sampling Discrete Random Variables: Inverse Transform Method WEEK 2 Discrete: Accept-Reject Algorithm, Composition Method, Sampling Continuous Random Variables: Inverse Transform Method WEEK 3 Continuous: Accept-reject Algorithm with examples, Box-Muller method WEEK 4 Continuous: Ratio-of-Uniforms method, examples and code, miscellaneous methods in sampling, Sampling from multivariate distributions WEEK 5 Simple Importance Sampling: Examples, bias, variance, consistency, Optimal proposals, WEEK 6 Weighted importance sampling: Examples, Review of likelihood functions, MLE examples WEEK 7 Linear regression as MLE, Penalized regression, No-closed form MLEs, Review of Taylor Series Approximations WEEK 8 Newton's optimization algorithm: examples and code, Gradient Descent algorithm, applications to logistic regression with code WEEK 9 EM algorithm, application to Bridge Regression, EM algorithm, Introduction to Gaussian Mixture Model WEEK 10 EM algorithm for GMM, Cross-validation with examples WEEK 11 Bootstrapping: examples and code. Application to bridge regression, stochastic gradient descent WEEK 12 Applications of SGD with code. Simulated annealing: examples, codes, and challenges + Show all weeks Prescribed Books The following are the suggested books for the course: "Simulation" by Sheldon Ross, Elsevier, Fifth Edition "Monte Carlo Statistical Methods" by Christian Robert and George Casella, Springer, 2004. About the Instructors Dootika Vats Assistant Professor,

Department of Mathematics and Statistics,

IIT Kanpur Dootika Vats is an Assistant Professor in the Department of Mathematics and Statistics at the Indian Institute of Technology, Kanpur. Previously, she was an NSF Postdoctoral fellow with Prof. Gareth Roberts at the University of Warwick. Her PhD was from the University of Minnesota, Twin-Cities working with Prof. Galin Jones. less View all Degree Level courses Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

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Academics BSMS2001 Diploma Level Course Business Data Management A significant source of data

sets and problems for data scientists will come from the business domain. This course provides a basic

understanding of how businesses are organised and run from a data perspective. by Dr. G Venkatesh ,

Suresh Babu , Dr. Milind Gandhe Course ID: BSMS2001 Course Credits: 4 Course Type: Data Science

Pre-requisites:

None What you'll learn VIEW COURSE VIDEOS Understand the business context: consumption patterns, micro-economic concepts underlying demand and supply Analyse firm-level and

industry-level data Discover how businesses operate, and how they are actively managed using data dashboards Get a handle on the data that originates from business processes Identify the techniques used to represent and structure this data Gain skills on the use of worksheets to organise, interpret and present data Working with large data sets Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Consumption and demand: Micro & Macro economics: the role of data, production, consumption and exchange, consumption baskets, sources of consumer survey data WEEK 2 Micro-economic concepts: Utility: cardinal vs ordinal, indifference curves. Demand and supply curves, changes in demand and elasticity. production cost, cost curves. Make vs buy decisions, production quantity decisions WEEK 3 Firm level strategies and performance data: Objectives and types of pricing strategies, analysis of firm performance - key ratios. Analysis examples: Ultratech, Page Industries, Nestle, TCS WEEK 4 Analysing industry level data: Industry definition and classification codes, IIP and PMI, industry market structure and concentration indices, competitive positioning in an industry - Porter's five forces. Analysis examples: Cement industry, Textile industry, FMCG industry, IT industry WEEK 5 Case study 1 - Fabmart (E-Commerce): Introduction to E-Commerce, Fabmart case introduction, explanation of data set & questions to be answered, revenue pareto, volume pareto, scatter plot of sales and revenue, revenue trend WEEK 6 Fabmart case continued: Sales analysis, organisation of distribution centre, analysis of sales trends, average days of inventory, ledger, avoiding stockouts WEEK 7 Case study 2 - Ace Gears (Manufacturing): Introduction to the manufacturing sector, context of the automotive industry during the years 2019-2021, explanation of data set containing monthly information on sales, production, inventory and costing. Revenue trend analysis, portfolio management WEEK 8 Ace Gears case study continued: Regional sales analysis, sales agent planning, production scheduling, scrap analysis, unit level profitability analysis, raw material re-ordering and safety stock WEEK 9 Case study 3 - Tech Enterprises (IT): Introduction to HR as a function, Introduction to the Tech Enterprises, internal sourcing, ranking of internal candidates, job description, sourcing channels and their analysis, recruitment process and onboarding WEEK 10 Case study 4 - PayBuddy (Fin Tech): Introduction to Finance Industry and Fintech, payment processing and money flow, new credit product introduction, nudge economics, payment transaction and customer data set, identifying rules to target the appropriate customers WEEK 11 Paybuddy case continued: Introduction to A/B testing, analysis of the A/B testing data, credit risk evaluation, risk-return tradeoffs WEEK 12 Discussion on student acquired data sets. Wrap up (summary) of the case studies, course project work + Show all weeks About the Instructors Dr. G Venkatesh Professor of Practice,

Department of Humanities and Social Sciences,

IIT Madras Dr. Venkatesh is a Professor of Practice at IIT Madras, where he is involved with several projects in the field of education. He is also a Fellow and Director of Sasken Communication Technologies Ltd, a leading Indian R&D services provider, and a founder of Mylspot, an education technology startup that aims to bridge knowledge gaps of students through a mentored learning platform. ... more Dr Venkatesh is a graduate in electronics from IIT Madras, PhD in Computer Science from TIFR, Mumbai and was a faculty member of the Computer Science & Engineering Dept of IIT Bombay for 8 years where his research interests revolved around declarative languages and their application to the design of embedded systems. He moved to the industry when Sasken was being formed, where he led their technology activities for over two decades. He was a visiting/adjunct faculty at IIM Bangalore for 10 years and a Chair Professor in the department of EE at IIT Madras for 3 years. Dr. Venkatesh was elected as a fellow of the Indian National Academy of Engineers in 2006 and the IETE in 2012. He won the Technomenter award of the Indian Electronics and Semiconductor Association in 2013 and the Vasvik award for industrial research in 2015. Dr. Venkatesh serves on a number of government, industry and investor committees and boards in the areas of microelectronics, telecommunications and education. less Other courses by the same instructor: BSCS1001 -

Computational Thinking and BSMS2002 -
Business Analytics Suresh Babu Professor,

Department of Humanities and Social Sciences,

IIT Madras Suresh Babu has completed his M.S. in Development Economics and M.Phil. in Applied Economics before completing his Ph.D. from Jawaharlal Nehru University, New Delhi. He currently is a professor at the Department of Humanities and Social Sciences, and his key areas of research are in applied macroeconomics, trade & development and industrial economics. less Visit website Dr. Milind Gandhe Chief Programme Officer,

Machine Intelligence and Robotics (MINRO) COE,

IIIT Bangalore Milind is the Chief Program Officer at the Center of Excellence for Machine Intelligence and Robotics, IIIT Bangalore. Prior to joining IIITB, Milind has 26 years of experience in the corporate sector, first with Sasken Communication Technologies and most recently with Tata Elxsi as the head of the Systems Business Unit. Milind has lead projects in Semiconductor, Automotive, Communications and Smart Home verticals. ... more Milind has a PhD in Computer Science and Engineering from IIT Bombay. Before his PhD, Milind obtained a B.Tech and an M. Tech also from IIT Bombay. His thesis was on Abstract Interpretation of Functional Programming Languages. Milind also has a Diploma in Practicing Management from INSEAD, France. Milind's primary research interests are AI (Natural Language Processing, Mathematical Logic, Hardware acceleration for AI at the Edge) and Interaction between Society and Technology. less View all Diploma Level courses Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

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Academics BSMS2001P Diploma Level Course Business Data Management - Project BDM Capstone

Project is an independent research project where the student is expected to reach out to a business firm (either from organized sectors viz., well established businesses in manufacturing, IT, automobile sectors etc. which has excellent systems in place to handle and manage data or from an unorganized sectors like

Kirana stores, vegetable vendors etc. which do not maintain proper records), identify the issues or the

problem(s) they face, collect primary data pertaining to it, clean the data, analyze it, and provide novel/

valuable insights to the decision maker(s). by Dr. Ashwin J. Baliga , Dr. Aaditya Chandel , Dr. G

Venkatesh , Dr. Milind Gandhe Course ID: BSMS2001P Course Credits: 2 Course Type: Data Science

Pre-requisites:

None Co-requisites: BSMS2001 - Business Data Management Project Course

Overview In the proposal stage, the student is expected to provide information about the organization and its background, problem definition/ statement, the background of the problem, the problem-solving approach they wish to use with justification, the expected timelines for project completion and the probable outcomes of the project. In the midterm submission, students must provide a short video interaction clip with the business owner/ manager, tangible evidence like pictures, field notes etc., provide information on the meta data and descriptive statistics, conduct preliminary analysis, provide an interpretation of the results and findings. The final report submission is a complete report and involves in-depth explanation of the entire process from start to finish. The viva voce is conducted following acceptance of the final submission and for this, the student needs to make a presentation not exceeding 10 slides. What you'll learn How to reach out and collect primary data, identify the issues or the problem(s), clean the data. Explain and justify the reasoning behind using a particular approach, report them in a professional manner, by knitting one section to the next and how the novel insights benefits decision maker(s). Hands-on experience in dealing with real world problems and providing solutions. Reference Documents / Books Details of the BDM Project Course, Timelines & Submission Requirements [DOWNLOAD](#) About the Instructors Dr. Ashwin J. Baliga Assistant Professor,

IESEG School of Management Dr. Ashwin J. Baliga is an Assistant Professor of Sales at IESEG School of Management, Paris Campus, France and has a PhD in B2B Marketing from IIT Madras. He is the recipient of the "IIT Madras Institute Research Award" for the exemplary research work done and received " Sri N Kannan Prize " for the Best PhD Thesis in Marketing at the 59th Convocation IIT Madras. Ashwin has published in Journal of Business Research, Journal of Business & Industrial Marketing, International Journal of Mineral Processing and Harvard Business Publishing. His research interests are in B2B service failure and recovery, tech usage in sales, mental health, and well-being of B2B salespeople, B2B customer reacquisition, relationship reactivation, buyer- supplier relationships etc. less Dr. Aaditya Chandel Research Scientist,

IIT Madras Dr. Aaditya Chandel holds a PhD in Mechanical Engineering from IIT Madras and is currently working as a Research Scientist in IIT Madras. He has publications in Acta Mechanica and has an interest in the start-up eco system. His thesis investigated the effect of wall proximity on the wake of a rotating and translating sphere. He is the founder of QkRes Technologies and Research Services (<https://www.qkres.com/>), incubated in IIT Madras. less Dr. G Venkatesh Professor of Practice,

Department of Humanities and Social Sciences,

IIT Madras Dr. Venkatesh is a Professor of Practice at IIT Madras, where he is involved with several projects in the field of education. He is also a Fellow and Director of Sasken Communication Technologies Ltd, a leading Indian R&D services provider, and a founder of Mylspot, an education technology startup that aims to bridge knowledge gaps of students through a mentored learning platform. ... more Dr Venkatesh is a graduate in electronics from IIT Madras, PhD in Computer Science from TIFR, Mumbai and was a faculty member of the Computer Science & Engineering Dept of IIT Bombay for 8 years where his research interests revolved around declarative languages and their application to the design of embedded systems. He moved to the industry when Sasken was being formed, where he led their technology activities for over two decades. He was a visiting/adjunct faculty at IIM Bangalore for 10 years and a Chair Professor in the department of EE at IIT Madras for 3 years. Dr. Venkatesh was elected as a fellow of the Indian National Academy of Engineers in 2006 and the IETE in 2012. He won the Technomenter award of the Indian Electronics and Semiconductor Association in 2013 and the Vasvik

award for industrial research in 2015. Dr. Venkatesh serves on a number of government, industry and investor committees and boards in the areas of microelectronics, telecommunications and education. less Other courses by the same instructor: BSCS1001 -

Computational Thinking , BSMS2001 -

Business Data Management and BSMS2002 -

Business Analytics Dr. Milind Gandhe Chief Programme Officer,

Machine Intelligence and Robotics (MINRO) COE,

IIT Bangalore Milind is the Chief Program Officer at the Center of Excellence for Machine Intelligence and Robotics, IIT Bangalore. Prior to joining IITB, Milind has 26 years of experience in the corporate sector, first with Sasken Communication Technologies and most recently with Tata Elxsi as the head of the Systems Business Unit. Milind has lead projects in Semiconductor, Automotive, Communications and Smart Home verticals. ... more Milind has a PhD in Computer Science and Engineering from IIT Bombay. Before his PhD, Milind obtained a B.Tech and an M. Tech also from IIT Bombay. His thesis was on Abstract Interpretation of Functional Programming Languages. Milind also has a Diploma in Practicing Management from INSEAD, France. Milind's primary research interests are AI (Natural Language Processing, Mathematical Logic, Hardware acceleration for AI at the Edge) and Interaction between Society and Technology. less Other courses by the same instructor: BSMS2001 -

Business Data Management View all Diploma Level courses Contact Us

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Academics BSMS2002 Diploma Level Course Business Analytics The problems faced by decision

makers in today's business environments are extremely complex. Hence, the task of making good decisions is not easy. The answer is in building quantitative models, and this course is designed to help you understand the fundamentals of this critical, foundational, business skill. The business application of

statistical methods is the core focus of this course. In that sense, the course builds on the core course in the first year of the program. That basic course focused on the preliminaries of the area. This course

highlights a business application and then demonstrates an application of a statistical technique to solve

that scenario and arrive at the best decisions and insights. by Rahul R Marathe Course ID: BSMS2002

Course Credits: 4 Course Type: Data Science Pre-requisites: BSMS2001 - Business Data Management

What you'll learn VIEW COURSE VIDEOS At the end of this course, the students will be able to apply

various statistical techniques to solve various business problems. Extrapolate using various techniques

and with statistical robustness. Build data-centric business models. Course structure & Assessments 8

weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated

end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Data dashboarding Insights from data summary WEEK 2 Can summarizing the data provide insights? WEEK 3 Do people in different cities prefer different brand? WEEK 4 Predicting the stock returns – Regression basics WEEK 5 How do you pay a professor? – Regression diagnostics - Path variables WEEK 6 Can I cure cancer? – Logistic Regression - Connection with classification problem WEEK 7 What is the impact of repeatedly watching the same ad? Repeated measures ANOVA WEEK 8 When the data has a time axis: Time series modeling + Show all weeks Prescribed Books The following are the suggested books for the course: SF Robert E Stine and Dean Foster, Statistics for Business: Decision Making and Analysis, Pearson. NCT Paul Newbold, William L. Carlson and Betty Thorne, Statistics for Business and Economics, Sixth Edition, Pearson. ASW David R. Anderson, Dennis J. Sweeney and Thomas A. Williams, Statistics for Business and Economics, Ninth Edition, Cengage Learning. Keller Gerald Keller, Managerial Statistics, 9 Edition, Cengage Learning. LR Richard Levin and David Rubin, Statistics for Management, Seventh Edition, Pearson. About the Instructors Rahul R Marathe Professor,

Department of Management Studies,

IIT Madras Rahul R Marathe is a Associate Professor at IIT Madras in the Department of Management Studies. He obtained his Ph. D and M.S from Iowa State University in Industrial Engineering and Statistics, and his B.E in Production Engineering from Mumbai University. less Visit website View all Diploma Level courses Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

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Academics BSMS3001 Degree Level Course Design Thinking for Data-Driven App Development This

course helps you learn the basics of Design Thinking in an experiential way. This course aims at

empathy-led data-driven app development approach for data scientists. The learners will launch a fully

functioning app in a real app store at the end of the course. by Bala Ramadurai , Prathap Haridoss

Course ID: BSMS3001 Course Credits: 4 Course Type: Elective Pre-requisites:

None What you'll learn Recall the basics of Design Thinking Apply Agile method to developing software Design an App using the principles of Design Thinking Develop an App for Android Collaborate with other developers using git version control method Learn the basics of marketing and customer support through their website Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Introduction to Design Thinking – Course outline and projects, Intro to the Design of Everyday Things, Intro to Design Thinking in software apps, Project management WEEK 2 Empathize – P1 – Persona Creation, Customer Journey Mapping, Design Paradox, Demo on a real problem WEEK 3 Empathize – P1 – List of problems, How Might We questions, Demo on a real problem WEEK 4 Analyze – P1 – Multi-Why, Conflict of Interest, Demo on a real problem WEEK 5 Solve – P1 – Silent brainstorming, Inventive Principles, Concept creation, Demo on a real problem WEEK 6 Test – P1, Empathize – P2 Assumptions, Features, Field trials, Basics of Digital Marketing WEEK 7 Website Development, User Experience Design, Prototypes WEEK 8 Analyze – P2 WEEK 9 Solve – P2 WEEK 10 Test – P2, Empathize – P3 – Obtaining insights/ feedback from the customers or target users WEEK 11 Analyze – P3 WEEK 12 Test – P3, Launch of the App + Show all weeks About the Instructors Bala Ramadurai Consultant, Dr. Bala Ramadurai is an author, coach, consultant and professor. He has authored a book on Design Thinking called Karmic Design Thinking (<https://dt.balaramadurai.net>). ... more He has 3 patents to his credit and 10+ publications in international research journals. He co-founded TRIZ Innovation India (<https://trizindia.org>) and is an Adjunct Professor at Symbiosis Institute of Business Management, India (<https://www.sibmpune.edu.in>). He currently mentors an EdTech enterprise called Knoin Electronics (<https://knoin.org>) He is a professor at National Programme on Technology Enhanced Learning (<https://nptel.ac.in>). He has a PhD from Arizona State University, USA, and a B.Tech from IIT Madras, India. less Visit website Prathap Haridoss Professor,

Department of Metallurgical and Materials Engineering,

IIT Madras Prathap Haridoss is currently the Dean (Academic Courses) and a Professor in the Department of Metallurgical and Materials Engineering at IIT Madras. He did his B.Tech in Metallurgical Engineering from IIT Madras and got his Ph. D. from the University of Wisconsin-Madison, USA. He worked as a Senior Scientist in Plug Power New York, before joining IIT Madras as a Faculty. His research interests include Fuel Cell and Carbon Nanomaterials. Prathap Haridoss was also one of the coordinators of NPTEL (National Program on Technology Enhanced Learning) and the IIT Madras B.S. Degree Program. less Visit website View all Degree Level courses Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

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Academics BSMS3002 Degree Level Course Market Research To provide a basic understanding of research methodology and its implementation in different business domains, to understand the role, scope, process, cost, and value of marketing research, to match research techniques to marketing problems, to analyse data and translate them into actionable findings, to enable students to do hands-on

research to solve business problems. by Ashok Sankethi Course ID: BSMS3002 Course Credits: 4
Course Type: Elective Pre-requisites:

None What you'll learn VIEW COURSE VIDEOS Identify and distinguish marketing problems from symptoms Translate marketing problems into researchable questions Select appropriate research designs to answer your research questions Select suitable methods of data collection Analyze the data using appropriate statistical methods to give the results Interpret the results to help solve the marketing problems. Course structure & Assessments For details of standard course structure and assessments, visit Academics page. WEEK 1 Marketing Research, the Research Process and Problem Formulation: The Role of Research in Marketing and the Marketing Research Process, Defining the Marketing Research Problem and Developing an Approach WEEK 2 Research Design Formulation: Research Design, Exploratory Research Design, Descriptive Research Design, Causal Research Design and Test Markets WEEK 3 Designing Data Collection Methods and Forms: Surveys and Interviews, Measurement, Measurement Scales, Questionnaires, and Instruments WEEK 4 Different Market Research Applications, and the Industry Approach to each: Key marketing issues like new product development, STP, branding, etc. and the MR tools and techniques to address each WEEK 5 Data Analysis and Interpretation: Entering the Data in SPSS, Examining the Data and Univariate Data Analysis: Descriptive Statistics, Cross Tabulation, Graphical Display of Data, Chart Deception and Hypothesis Testing: Mean Differences, ANOVA, Multivariate Data Analysis: An Overview, Exploratory Factor Analysis, Cluster Analysis, Multiple Regression in SPSS + Show all weeks Prescribed Books The following are the suggested books for the course: Prescribed Textbooks:

Naresh K. Malhotra and Satyabhusan Dash., Marketing Research, An Applied Orientation, Pearson Education, 7th Edition, 2019.

William G. Zikmund, Barry J. Babin, Jon C. Carr, Atanu Adhikari and Mitch Griffin, Business Research Methods, A South Asian Perspective, Cengage Learning, 9th Edition, 2013. Reference Books:

Alan Bryman and Emma Bell, Business Research Methods 3rd Edition, Oxford Publication, 2011.

Hair, Anderson, Tatham and Black, Multivariate Data Analysis, Pearson Education.

Andy P. Field, Discovering Statistics using SPSS, SAGE, 5th Edition, 2000.

Gilbert A Churchill, Basic Marketing Research, 7th Edition, Fort Worth, Dryden Press, 1999. About the Instructors Ashok Sankethi Ashok R Sankethi is an MR veteran who set up Kaybase in 2005. He has over 25 years of experience in the industry, and worked in leading multinational research firms as well as in small set-ups before setting out on his own. He has developed and maintained a strong connection with academics over the years, he and his colleagues teach at leading business schools, and Ashok sits on the doctoral committees of several Ph. D scholars. Moreover, along with his colleague Poornima Bhaskaran, he has published a book called Kay's Book of MR – which is the first book of case studies from an industry perspective. This book is now being used by faculty at over 15 business schools in the country. less View all Degree Level courses Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

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-Understand how a rational consumer makes any choice.

-Learn the relationships between production, costs, and profits

-Learn different forms of markets and their key characteristics.

-Understand how governments regulate businesses.

-Learn the business model behind the success of Amazon, UBER, Alibaba, iPhone by Vimal Kumar

Course ID: BSMS3033 Course Credits: 4 Course Type: Elective Pre-requisites:

None Course structure & Assessments For details of standard course structure and assessments, visit Academics page. WEEK 1 Introduction WEEK 2 Demand, Supply, and markets WEEK 3 Elasticity and Empirical Methods for Demand Analysis WEEK 4 Consumer Behavior WEEK 5 Technology, Production, and Costs WEEK 6 Perfectly Competitive Market WEEK 7 Monopoly WEEK 8 Monopsony and Monopolistic Competition WEEK 9 Decisions under Risk and Uncertainty WEEK 10 Asymmetric Information WEEK 11 Government and Businesses WEEK 12 Platform Businesses + Show all weeks Prescribed Books The following are the suggested books for the course: Managerial Economics by Jeffery Perloff and James Brander Intermediate Microeconomics by Hal Varian Managerial Economics: A Problem Solving Approach by Luke Froeb, Brian McCannm, Mikhael Shor, and Michael Ward About the Instructors Vimal Kumar Associate Professor,

Department of Economic Science,

IIT Kanpur View all Degree Level courses Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

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Academics BSMS3034 Degree Level Course Foundations of Finance Course ID: BSMS3034 Course

Credits: 4 Course Type: Elective Pre-requisites:

None Course structure & Assessments For details of standard course structure and assessments, visit Academics page. WEEK 1 Introduction to Finance WEEK 2 Present Value, Annuities and Perpetuities WEEK 3 Capital Budgeting Rules, Time Varying Rates of Return, Uncertainty, Default

and Risk WEEK 4 Investment: Risk and Rewards, Choice Under Uncertainty WEEK 5 Portfolio Theory WEEK 6 Capital Asset Pricing Theory WEEK 7 Other Pricing Models: Factor Models, Arbitrage Pricing Theory WEEK 8 Market Efficiency: Market Imperfections, and Applications to Capital Budgeting Rules WEEK 9 Introduction to Derivative Securities and Basic Options Theory I WEEK 10 Introduction to Derivative Securities and Basic Options Theory II WEEK 11 Foreign Exchange Markets and International Financial System WEEK 12 Financial Crises + Show all weeks Prescribed Books The following are the suggested books for the course: Corporate Finance by Ivo Welch. Investment Science by David Luenberger. Oxford University Press. The Economics of Money, Banking, and Financial Markets Book by Frederic Mishkin.

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Academics BSMS4001 Degree Level Course Industry 4.0 To describe various facets of Industry 4.0, to

connect questions raised by Industry 4.0 with appropriate data science techniques, to develop data

science tools for Industry 4.0, and to build data-centric business models. by Rahul R Marathe Course ID:

BSMS4001 Course Credits: 4 Course Type: Elective Pre-requisites:

None Course structure & Assessments 12 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1 Introduction to Industry 4.0 – Evolution and history WEEK 2 Pillars of Industry 4.0 WEEK 3 Industry 4.0 – India context WEEK 4 Supplier selection as a classification problem WEEK 5 Manufacturing 4.0 WEEK 6 Prognosis WEEK 7 Quality 4.0 WEEK 8 Inventory Optimization WEEK 9 Dynamic Pricing WEEK 10 Logistics 4.0 WEEK 11 Future of Manufacturing Business Focus on new paradigm WEEK 12 Next decade of Industry 4.0 + Show all weeks About the Instructors Rahul R Marathe Professor,

Department of Management Studies,

IIT Madras Rahul R Marathe is a Associate Professor at IIT Madras in the Department of Management Studies. He obtained his Ph. D and M.S from Iowa State University in Industrial Engineering and Statistics, and his B.E in Production Engineering from Mumbai University. less Visit website Other courses by the same instructor: BSMS2002 -

Business Analytics View all Degree Level courses Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

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Academics BSMS4023 Degree Level Course Game Theory and Strategy - Learn how to think of social
and economic aspects of life via mathematical models.

- Learn how game theory is applied to think about problems in information economy. Course ID:

BSMS4023 Course Credits: 4 Course Type: Elective Pre-requisites:

None Course structure & Assessments For details of standard course structure and
assessments, visit Academics page. WEEK 1 Introduction and General Principles WEEK 2 Games with

Simultaneous Moves I WEEK 3 Games with Simultaneous Move II WEEK 4 Games with Sequential

Moves WEEK 5 Combining Sequential and Simultaneous Moves and Mixed Strategies WEEK 6

Evolutionary game Theory WEEK 7 Matching Problem, Gale-Shapley Algorithm WEEK 8 Voting,

Cascades, and Arrow's Impossibility Theorem WEEK 9 Cooperative Games, Shapley Values WEEK 10

Fair Division, Bankruptcy Problems WEEK 11 Auctions WEEK 12 Network Effects + Show all weeks

Prescribed Books The following are the suggested books for the course: Games of Strategy by Avinash
Dixit and Susan Skeath. W.W. Norton & Company

Insights into Game Theory: An Alternative Mathematical Experience by Ein-Ya Gura,

and Michael Maschler. Cambridge University Press. Networks, Crowds and Markets: Reasoning About a
Highly Connected World by

David Easley, and Jon Kleinberg. Cambridge University Press. View all Degree Level courses Contact Us

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Structure Course Registrations Assessments Exam Cities Fee Structure Foundational Level Courses

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Batch | Applications Close: Sep 15, 2024 | Exam: Oct 27, 2024 APPLY NOW Applications Open now for

September 2024 Batch | Applications Close: Sep 15, 2024 | Exam: Oct 27, 2024 APPLY NOW Home Academics BSSE2001 Diploma Level Course System Commands by Prof. Gandham Phanikumar Course ID: BSSE2001 Course Credits: 3 Course Type: Programming Pre-requisites:

None Course structure & Assessments 8 weeks of coursework, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam.

For details of standard course structure and assessments, visit Academics page. WEEK 1

Introduction to GNU/Linux OS.

Setting up and running Linux environment.

The command line environment.

Knowing hardware of your machine

Information - commands such as hwinfo, lshw, df, free etc.

Diagnostics - commands to fetch hardware information such as battery state, memory modules etc.,

Knowing the OS and software of your machine

Commands to get details about operating system, versions etc.

Packages - installed / available

Input / output redirection. WEEK 2 Introduction to packages and repositories.

Using 'apt' commands to manage packages.

File types and related commands.

Understanding file permissions and access modes.

Managing file permissions through symbolic and numeric mode.

Concept of environment variables. Important environment variables such as \$HOME, \$USER and \$PATH

WEEK 3 Managing shell variables.

Prompt strings.

Symbolic links and hard links, brief introduction to inode numbers.

Exploring the root file system and related commands.

Using shell shortcuts with commands.

Slicing output.

Managing programs currently running on the machine.

Shell access to a local / remote machine. WEEK 4 Redirection to script, variable and for logging purpose.

Using pipes.

Introduction to regex; using regex patterns and egrep.

Using egrep to extract useful information from files.

find command and its uses - patterns to pick specific files in a folder, using exec

Command line editors (nano, vi, emacs - syntax highlighting & prompting, configuring options)

Writing and running simple Bash scripts. WEEK 5 How are shell scripts interpreted?

Using variables in scripts.

Passing command line arguments to scripts, to create your own commands.

More shell programming.

Writing conditional statements using if /else / fi.

Introduction to loops.

Using functions

Configuring startup / periodic / recurring tasks WEEK 6 Text processing using AWK language.

Using awk to run statics on a data file.

Using regex within awk.

Awk as a programming language

Introduction to 'sed' – another text processing utility.

Line by line processing to replace a regex pattern with a string.

Use of place holders for matching regex patterns for use in replacing strings. WEEK 7 Introduction to

make utility; concept of target and dependency; actions performed by make; conditional compilation;

passing shell variables to make;

File packaging utilities such as compress, tar, zip, gzip, bzip2, xz.

Networking concepts

Introduction to IP addresses.

Concept of localhost. Intranet and public addresses.

Concept of ports and services that run on these ports.
Concept of DNS and Domain names.
Network diagnostics using tools and commands.
Scripting a tool for analysis of logs. WEEK 8 Introduction to RAID for handling hardware failure.
Introduction to version control
Git as a version control system:
Overview of Git workflow
Branches, repositories, forks, etc.
Creating and merging pull requests.
Personal access tokens.
Managing changes as local and remote.
Working demo of a public repository using Git
Approval workflow
How a team collaborates on the private repository in an organization.
Managing pull requests for the owner, raising issues and resolving them. + Show all weeks About the
Instructors Prof. Gandham Phanikumar Professor,

Metallurgical and Materials Engineering,

IIT Madras Prof. Gandham Phanikumar's doctoral work is on heat transfer, fluid flow and solute transfer during laser processing of dissimilar metals. After joining IIT Madras in 2005, he has been teaching a UG core course on transport phenomena for several years. His research continues to involve concepts of transport phenomena in materials processing. less Visit website View all Diploma Level courses Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

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Academics BSSE2002 Diploma Level Course Tools in Data Science This course will teach students to use popular tools for sourcing data, transforming it, building and optimizing models, communicating these as visual stories, and deploying them in production. by S Anand Course ID: BSSE2002 Course Credits: 3 Course Type: Data Science Pre-requisites:

None Co-requisites: BSCS2004 - Machine Learning Foundations Course structure & Assessments 8 modules over 12 weeks of coursework, online assignments for each module, 1 remote online exam, 2 take home projects, 1 in-person end term exam.

For details of standard course structure and assessments, visit Academics page. MODULE 1

Discover the data MODULE 2 Get the data MODULE 3 Prepare the data MODULE 4 Model the data MODULE 5 Modern tools to simplify deep learning models MODULE 6 Design your output MODULE 7 Narrate a story MODULE 8 Deploy the results + Show all weeks About the Instructors S Anand Anand is a co-founder of Gramener, a data science company. He leads a team that tells visual stories from data. He is recognized as one of India's top 10 scientists, and is a regular TEDx speaker. ... more Anand is a gold medallist from IIM Bangalore and an alumnus of IIT Madras, London Business School, IBM, Infosys Consulting, Lehman Brothers, and BCG. More importantly, he has hand-transcribed every Calvin & Hobbes strip ever, is addicted to Minecraft (thanks to his daughter), and dreams of watching every film on the IMDb Top 250 (except The Shining). less Visit website View all Diploma Level courses Contact Us support@study.iitm.ac.in 7850999966 IITM BS Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Please use ONLY the above methods for any queries regarding the program.

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Text from file: C:\Users\Harsh Singh\Downloads\study-iitm-website\www\ds\placements\academics.html Placements and Internships IITM BSc Home Students Recruiters Academics Contact us Home Students Recruiters Academics Contact us Curriculum IIT Madras offers the BSc Degree in Programming and Data Science with a unique model of learning combining online course delivery with in-person evaluation making it a first of its kind in the world.

Students will be admitted to the program through a unique qualifier process.

A student will have to complete 31 courses (116 Credits) to get a BSc in Programming and Data Science from IIT Madras. Want to know more about the IITM BSc Program? Click here Courses A learner has to complete three levels (Foundation, Diploma, Degree) to get a BSc Degree in Programming and Data Science from IIT Madras. The courses offered in different levels are given below. Foundational Level Foundational in Data Science and Programming English 1 Math 1 Statistics 1 Computational Thinking English 2 Math 2 Statistics 2 Python Learn More Diploma Level Diploma in Programming Database Management Systems Programming, Data Structures & Algorithms using Python Modern Application Development 1 Modern Application Development 2 Programming Concepts Using Java System Commands Diploma in Data Science Machine Learning Foundations Machine Learning Technique Machine Learning Practice Business Data Management Business Analytics Tools in Data Science Learn More Degree Level BSc Degree in Data Science and Programming Core 1 - Operating Systems & Computer Architecture Core 2 - Software Testing & Software Engineering Core 3 - AI: Search Methods for Problem Solving & Deep Learning Design Thinking Speech Technology Deep Learning in Practice Thematic Ideas in Data Science Special topics in Machine Learning Computer Vision Learn More Detailed description of courses can be found here . CGPA calculation Students are evaluated at the end of every term (4 months) based on their performance in in-centre quizzes, online proctored programming exams, end term exam as well as viva (in some courses). Program follows Cumulative Grade Point Average (CGPA) system.

CGPA is on a scale of 0 to 10. Each course carries a certain number of credit ranging from 1 to 4. Letter grades and CGPA are awarded to learners based on the following criteria : For the CGPA, a similar formula is used where the sum $\sum C_i$ is the sum of the credits of all the courses taken in all the terms successfully completed up to that point in time. If a course was repeated for any reason, the best grade obtained will be considered. Contact Us IITM BSc Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Phone: 7850-999966 (Mon-Fri 9am-6pm) Email: iic@onlinedegree.iitm.ac.in Resources IITM BSc Online Degree - Official Website Partner with us! Overview Presentation Placement & Internship Brochure our directions © Copyright IIT Madras . All Rights Reserved

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Balaraju Kondaveeti Head, Industry Interaction Cell balaraju@onlinedegree.iitm.ac.in Prof. Balaji Shrinivasan Placement Advisor, IITM BSc Degree balaji@onlinedegree.iitm.ac.in Abhishek Vinodh Student Placement co-ordinator placo@student.onlinedegree.iitm.ac.in Student Representatives Anabil Kanungoe 21f1003580@student.onlinedegree.iitm.ac.in Harshit Katiyar 21f1006135@student.onlinedegree.iitm.ac.in C S Sruthi 21f1006510@student.onlinedegree.iitm.ac.in Jigyasa 21f1001644@student.onlinedegree.iitm.ac.in Nivetha B 21f1000424@student.onlinedegree.iitm.ac.in Sowmya R 21f1006666@student.onlinedegree.iitm.ac.in Meghana Anand 21f1004629@student.onlinedegree.iitm.ac.in Anam Shad 21f1006523@student.onlinedegree.iitm.ac.in Amogh Agrawal 21f1002266@student.onlinedegree.iitm.ac.in Aryaman Singh 21f1004465@student.onlinedegree.iitm.ac.in Kaveya Sivaprakasam 21f1006594@student.onlinedegree.iitm.ac.in Gourav Katha 21f1000778@student.onlinedegree.iitm.ac.in
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Placements and Internships IITM BSc Home Students Recruiters Academics Contact us Home Students Recruiters Academics Contact us Welcome to Placements and Internships IIT Madras BSc Degree in Programming and Data Science World's first Hybrid Degree from Top Technical Institute in India IIT Madras has been ranked the No.1 Engineering Institute in the country for the past 5 years Awarded No. 1 in Innovative Education IIT Madras has been recognized as the Most Innovative Educational Institute in India by Atal Innovation Rankings, consistently for the last 3 years. Industry Interaction Cell IITM BSc Degree IIC (Industry Interaction Cell) is the Training and Placement cell of IITM BSc Degree Program.

We aim to provide the best opportunities to our students with industry relevant skills and right attitude. [Recruiters] For partnership details, please visit Recruiters' page [Students] For upcoming training sessions and past recorded sessions, visit Students' page Why recruit from IIT Madras BSc ? Institute of Eminence IIT Madras is known both nationally and

internationally for excellence in technical education, basic and applied research, innovation, entrepreneurship and industrial consultancy.

Coordinating the largest MOOCs Platform in India IITM began the NPTEL program, the country's first online content portal as an inter-IIT consortium project in 2003 and npTEL.ac.in is one of the largest online course portals in the world. In 2014, NPTEL, IITM started online certification courses - the country's

Largest

Massive Open Online Courses (MOOCs) platform. Students Our students cohort is unique, comprising of

both students and working professionals. Learners go through a rigorous course work from IIT Madras. Faculty Faculty of international repute offering industry relevant curriculum to the BSc students. 655 Learners 2300+ Hours of video learning 101 Working Professionals 1700+ Hours of hands on learning Program Highlights The academic rigour is on par with the on-campus students. Courses are offered online with maximum flexibility. In-person quizzes and end term exams. Our students are available for internships from May 2022. Our students will be available for placements from September 2022. Download brochure for more information. To know more about our program structure, visit Academics Page Director's Message IIT Madras started this unique BSc program to provide access to IIT quality education

to the learners across the country. Data Science is a growing field and the demand for skilled resources in the market is very high. IIT Madras has a rich history of providing high-quality education and this program is designed to underline the fact that IIT is within the reach of everyone. This BSc program is meticulously drafted and is aligned with the goals of the National Educational Policy. We are planning to make IIT Madras a 'Vishwa-guru (Global Teacher)' through innovative approaches

to

enhance the quality of education. In order to encourage the students from financially disadvantaged backgrounds to pursue this program, scholarships are being provided. Prof. V. Kamakoti Director, IIT Madras Testimonials from Industry Experts Mr. Sandeep Alur Director - Microsoft Technology Centre, India 'Programs like these, which are so near and real to reality in the outside world , makes one ready faster for the outside world.' Watch Video Dr. Kingshuk Banerjee Partner - Cognitive Computing and Analytics, IBM Services 'What IIT Madras brings extra to this program is the Industry-Academia Partnership and not an Ivory Tower experience.' Watch Video Mr. Varadharaj V.P - Talent Acquisition, Infosys 'There are tremendous opportunities for Data Scientists and people who go through this program will have significant addition of value coming out of their capabilities and competencies.' Watch Video Dr. Manish Gupta Director - Google Research India 'I am really happy to see this program which will help us create a new generation of Data Scientists coming from diverse backgrounds because a lot of meaningful things that we could do in the future will come from a deep understanding of computing and the problem space (domain expertise).' Watch Video Dr. Shankar Venugopal V.P - Mahindra & Mahindra 'A lot of disruptions in the Automotive industry in terms of technology as well as business models has created a need for engineers to upskill this program has come at the right time. I see great opportunity in data and we are very eager to create those roles and hire a lot of these young engineers.' Watch Video Contact Us IITM BSc Degree Office, 3rd Floor, ICSR Building, IIT Madras, Chennai - 600036 Phone: 7850-999966 (Mon-Fri 9am-6pm) Email: iic@onlinedegree.iitm.ac.in Resources IITM BSc Online Degree - Official Website Partner with us! Overview Presentation Placement & Internship Brochure our directions © Copyright IIT Madras . All Rights Reserved

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 Placements and Internships IITM BSc Home Students Recruiters Academics Contact us Home Students Recruiters Academics Contact us Welcome Recruiters IIT Madras invites Industry Partners for its BSc in Programming and Data Science program - India's very first UG program offered through a hybrid mode of delivery. Connect with us by writing to iic@onlinedegree.iitm.ac.in or fill this form to contact us. Download the brochure to know more about our course and students. Recruitment Process The Training and Placement team at IIT Madras will be showcasing students with suitable skills and right attitude needed to achieve the organization's goals. Our team will provide all the needed support with the end-to-end recruitment process. Get started by scheduling a call with us or contact us. Recruitment FAQs What time of year does the recruitment process take place? The recruitment process takes place throughout the calendar year. What information must be essentially provided by the company for internships /

placements? The information that students typically look for in a corporate presentation is: Company profile Role & Job description Locations - Remote / on-site Stipend / Salary details Duration of Job / Hours of work What are the various ways for recruiting students? Students can be recruited for: 3 to 6 month's internship Full time placement Can we conduct recruitment processes through online mode or offline mode? We prefer the online recruitment process as it will be easy for the students to attend the interview. We have students spread across the country, online interviews will be effective and will surely attract active participation from the students. Should the company take care of the entire process? No, Our BSc degree team will be coordinating with the students and the company until the internship / job offer is released. For your other queries to be answered, Contact Us Skills Acquired As the course progresses in diploma level, learners get to learn the following skills

with hands on practice as well. Ranging from strong fundamentals in Python programming,

one gets to embark on a journey of various programming and Data Science courses. Student Highlights Following are some of the projects done by our learners in the diploma courses of Business Data Management and Modern Application Development. Loading, Please wait Partner with Us Following are the various ways in which companies and organizations can partner, contribute and benefit : For more information, please visit our partnership page. Contact Us IITM BSc Degree Office, 3rd Floor, ICSR

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Exam: Jul 07th, 2024 APPLY NOW Home About IITM About IIT Madras Indian Institute of Technology

Madras is one of the foremost institutes of national importance for higher

technical education and research. In 1956, the German Government offered technical

assistance in establishing an institute of higher education in

engineering in India. The first Indo-German agreement in Bonn, West Germany for the establishment of the Indian

Institute of Technology at Madras was signed in 1959. The Institute was formally inaugurated in 1959 by Prof. Humayun Kabir, Union Minister for Scientific Research and Cultural Affairs. The IIT system has twenty three Institutes of Technology. The first of these to be

instituted are at Kharagpur (estb. 1951), Mumbai (estb. 1958), Chennai (estb. 1959), Kanpur (estb. 1959), Delhi

(estb. 1961), Guwahati (estb. 1994) and Roorkee (estb. 1847, joined IITs in 2001). The Institute has sixteen academic departments and several advanced research centres in various disciplines of

engineering and pure sciences. A faculty of international repute, a brilliant student community, excellent

technical & supporting staff and an effective administration have all contributed to the pre-eminent status of

IIT Madras. The campus is located in the city of Chennai, previously known as Madras. Chennai is the state

capital of Tamil Nadu, a southern state in India. We have been ranked number 1 Engineering Institute for the past 6 years and we have been ranked number 1 Overall

for the past 2 years by NIRF. IITM's Experience in Online Education IITM is well-equipped to provide online programs, which has been proven with its experience in the NPTEL and BS

in Data Science programs. National Program on Technology Enhanced Learning (NPTEL) Furthermore, IITM began the NPTEL program, the country's first online content portal as an inter-IIT consortium

project in 2003 and npTEL.ac.in is one of the largest online course repository in the world for engineering content. In 2014, NPTEL started

offering courses for certification and currently more than 1300 courses are offered for certification per year,

with more than 40 lakh enrollments and 8 lakh students registering for exams. NPTEL also manages the national MOOCs portal - swayam.gov.in as well as the network of more than 5300 SWAYAM local chapter colleges. IIT Madras' BS in Data Science and Applications Based on the experience gained from NPTEL, IIT Madras launched the 4 year BS degree program in Data Science and Applications study.iitm.ac.in/ds. This program has a non-JEE qualifier based entry into the program and is open to learners from all streams and

backgrounds, requiring nothing more than English and Maths at std X and completion of std XII. More than 16000

students study in the program, which is now in its third year of offering. The program can be paced by the learner who can select the number of courses they wish to register every term

and there are multiple exits such as the Foundation level certificate, Diploma in programming, Diploma in data

Science, BSc in programming and Data Science and finally the BS degree. Based on the number of credits accrued,

the exits are available. Students in the program also are provided with opportunities to interact by means of the groups and houses into

which they are divided and actively participate in the techno-sports-cultural festival called Paradox that is

held on IITM campus in the month of May. Many students are actively pursuing internships and some have even been recruited by companies already. The

success of this program is what spurred the team to design and launch the second BS degree in Electronic

Systems. Relevant Links www.iitm.ac.in/ReachIITM/ReachIITM/iitmadrass Faculty Co-ordinators BS in Electronic Systems Dr Sankaran Aniruddhan Dr Sankaran Aniruddhan is Associate Professor in the VLSI group of the department of Electrical Engineering

at Indian Institute of Technology Madras. He obtained his B. Tech. degree in

Electrical Engineering from IIT

Madras in 2000, and Ph.D. degree from the University of Washington, Seattle in 2006. Between 2006 and 2011, he worked in the RF-Analog group at Qualcomm Inc., San Diego where he designed integrated circuits for

Cellular RF applications. His research primarily focuses on CMOS RF Integrated Circuits for Wireless

Communications. Visit website Dr Bobby George Dr. Bobby George received the M. Tech. and Ph. D. degrees in Electrical Engineering from IIT Madras. He is a

Professor in the Department of Electrical Engineering at IIT Madras. His research areas include Sensor

Interface Electronics, Electric and Magnetic field Based Sensors and their Applications, Sensor Systems for

Water Quality and Quantity Monitoring, and Biomedical Instrumentation. He also serves as Associate Editor

for IEEE Sensors Journal, IEEE Transactions on Instrumentation and Measurement, and IEEE Transactions on Industrial Electronics

Overall Structure The program comprises three levels and a learner has to successfully complete all three levels to get the BS Degree

from IIT Madras. There is flexibility to exit at any level. Depending on the courses completed and credits earned, the learner can

receive a Foundation Certificate from IITM CODE (Centre for Outreach and Digital Education) or Diploma from IIT

Madras or BS Degree in Electronic Systems from IIT Madras. Courses and Credits in Each Level: Foundation Level: 44 credits | 9 theory + 1 lab course Diploma Level: 42 credits | 8 theory + 2 lab course BS Degree Level: 56 credits | 12 courses + Apprenticeship (optional) Semester system Two semesters per year which includes 12 weeks of coursework (video lectures and assignments), 2 in-person invigilated Quizzes and End Semester Exams . Depending on the course,

assessments may include programming exams, mini projects, vivas, take home assignments, etc. Credits required to be earned to exit with: Foundation Certificate in Electronic Systems : 44 credits Diploma in Electronic Systems : 86 credits BS Degree in Electronic Systems : 142 credits Completion time for the BS degree: 4 - 8 years Time period is based on the learner's preferred pace and performance in assessments. Expected

learner engagement will be approximately 10 hours/course/week . Fees: Pay only for courses you register in each semester! Refer Fee Structure . Online Courses & Assignments: Duration of each course: 12 weeks - Each week comprises 2-3 hours of videos, practice questions, text transcripts, and graded assignments - everything made available online. Quizzes and Exams: In-person invigilated quizzes and exams for all courses. Additional assessments as per the grading

pattern defined for each course. Lab Exercises: Some of the courses of the programme are accompanied by lab sessions. The lab sessions will be conducted at IIT Madras Campus every semester. Some lab sessions may be done online or can be handled through kits

that will be suggested and can be purchased by students. Course Registrations In each semester, a learner may register for a maximum of four theory courses depending on the time they can

dedicate to the program. A student doing this program full time is recommended to take 4 per semester while working

professionals and students pursuing any other academic program can take 2 or 3 courses. Assessments There are 3 types of assessments for each course: Weekly Assignments which are online monthly in-person Quizzes in-person End Term Exam Some of the courses are accompanied by lab sessions to be done at home with the use of electronic kits as

suggested. It is mandatory that students travel to IIT Madras campus to demonstrate the

lab experiments

specified. In addition, assessments may include programming exams, mini projects, vivas, take home assignments, etc. Exam Cities The Invigilated Quizzes and End Semester exams are conducted in a number of cities spread across India. Exams are also conducted in centres in some countries such as UAE, Bahrain, Kuwait, Oman, Singapore and Sri

Lanka if there are enough students in these places. Learners based out of other countries will be allowed to

take up remote proctored exams. Additional Exam Fee will apply for all learners opting to write exams

outside India. The map shows our current Exam Cities List. View List If you reside outside India and cannot find a centre in your city / country, please write to

ge-es@study.iitm.ac.in for assistance. Exam Cities List Bahrain Manama Kuwait Salmiya Oman Muscat Singapore Singapore Sri Lanka Colombo Jaffna UAE Dubai Hamdan (AUH) Sharjah Andaman And Nicobar Islands Port Blair Andhra Pradesh Anantapur Bhimavaram Guntur Kadapa Kurnool Rajahmundry Tirupathi Vijayawada Vishakhapatnam Arunachal Pradesh Naharlagun Assam Dibrugarh Guwahati Silchar Tezpur Bihar Patna Bhagalpur Gaya Muzaffarpur Darbhanga Chhattisgarh Raipur Delhi Delhi Goa Panaji Gujarat Ahmedabad Anand Rajkot Surat Vadodara Haryana Faridabad Gurgaon Kurukshetra Himachal Pradesh Hamirpur Shimla Jammu and Kashmir Jammu Srinagar Jharkhand Dhanbad Jamshedpur Ranchi Karnataka Belgaum Bengaluru Dharwad Gulbarga Mangalore Mysore Kerala Calicut Ernakulam Kollam Kottayam Palakkad Thrissur Trivandrum Madhya Pradesh Bhopal Gwalior Indore Jabalpur Maharashtra Amravati Aurangabad Jalgaon Kolhapur Mumbai Nagpur Nanded Nashik Pune Solapur Manipur Imphal Meghalaya Shillong Mizoram Aizawl Nagaland Dimapur Odisha Bhubaneswar Rourkela Sambalpur Puducherry Puducherry Punjab Chandigarh Jalandhar Ludhiana Amritsar Rajasthan Jaipur Jodhpur Kota Udaipur Sikkim Bardang Tamil Nadu Chennai-Avadi Chennai-South Coimbatore Erode Kanchipuram Madurai Salem Thanjavur Tiruchirappalli Tirunelveli Vellore Telangana Hyderabad Warangal Tripura Agartala Uttar Pradesh Agra Allahabad Ghaziabad Gorakhpur Greater Noida Kanpur Lucknow Meerut Varanasi Uttarakhand Dehradun Haldwani Roorkee West Bengal Aasansol Adisaptagram Durgapur Kolkata Siliguri Close Fee Structure (Tentative, to be finalised) Level Fee per credit Number of credits Fees to be paid at each level (For general category students)* Total fees to Earn the Foundation, Diploma & BS degree Foundation Rs. 1000 8 Rs. 8,000 Rs. 80,000 Rs. 2000 36 Rs. 72,000 Diploma Rs. 4000 42 Rs. 1,68,000 Rs. 2,48,000 BS in Electronic Systems Rs. 6000 56 Rs. 3,36,000 Rs. 5,84,000 *Fee waiver is not be applicable for the International students. Fee waivers depend on category of learner and family income. Category of student Institution fee advance SC or ST or PwD with >40% disability certificate 50% EWS or OBC-NCL category with annual family income between 1-5 LPA 50% SC or ST and PwD with >40% disability certificate 75% SC or ST or PwD with >40% disability certificate or EWS or OBC-NCL category AND annual family income

less than 1 LPA 75% For candidates who are outside India and studying in the program: For candidates writing exams overseas,

there will be facilitation fee for exams in addition to the above. The fee will be revisited periodically and

revised if necessary. The term family income for the purpose of availing fee waivers includes the income of the candidate, the

income of his/her parents and spouse, also the income of his/her siblings and children below the age of 18

years. Family income certificate is not required while applying for the Degree program, but will be required to

avail fee weiver when joining the program. Download Family Income Certificate format OBC-NCL / EWS certificate, if applicable, need to be obtained in following format while applying: Download OBC-NCL Certificate format Download EWS Certificate format Foundation Level These courses have been chosen to ensure that the learner who passes these successfully is well prepared to proceed to

the Diploma level courses. Requirements for registration Without JEE: The learner should apply for and clear the Qualifier Exam. With JEE: A student who has qualified for JEE Advanced 2023 is automatically eligible for admission and

can register for courses in the foundation level of the BS program. Exit Learners have

the following two options when they successfully complete all 10 Foundation level courses: Exit: The learner may exit with a Foundational Certificate from Centre

for Outreach and Digital Education (CODE), IIT Madras. Proceed to next level : The learner can join the Diploma Level . 10 courses 44 credits 1 - 3 years 10 hrs/course/week 80,000* *Refer Fee Structure Courses Foundation level comprises the following: Course Name Credits Code Prerequisites Corequisites English I 4 HS1101 None None Math for Electronics I 4 MA1101 None None Electronic Systems Thinking and Circuits 4 EE1101 None None Electronic Systems Thinking and Circuits Lab 1 EE1104 None None Introduction to C Programming 2+3 CS1101 None None English II 4 HS1102 HS1101 None Introduction to the Linux Shell 5 CS1102 None CS1101 Digital Systems 4 EE1102 EE1101 None Electrical and Electronic Circuits 4 EE1103 MA1101 & EE1101 None Electronics Laboratory 3 EE1105 None EE1103 Embedded C Programming 4+2 CS2101 CS1102 Lab Diploma Level The Diploma level comprises 10 courses (after the Foundation level). Students should complete 20 courses (which includes the

10 Foundation level courses) and earn 86 credits in total to get the Diploma. Requirements for registration Only those students who complete courses of the first two semesters will be permitted to proceed with registration

of courses in the Diploma level. Exit Learners have the following options based on the courses completed in this level: Option 1: If a learner has completed all the courses and labs in Foundation

level and Diploma, they can proceed to the B.S Degree Level. Option 2: They may exit with a Diploma in Electronic Systems from IIT

Madras. 10 courses 42 credits 1 - 3 years 10 hrs/course/week 1,68,000* *Refer Fee Structure Courses Diploma level comprises the following: Course Name Credits Code Prerequisites Corequisites Math for Electronics II 4 MA2101 MA1101 None Signals and Systems 4+1 EE2101 EE1103 None Analog Electronic Systems 4 EE2102 EE2101 MA2101 Analog Electronics Lab 3 EE2104 None EE2102 Python programming 5 CS2102 None None Digital System Design 4+2 EE2103 EE1102 None Digital Signal Processing 4+1 EE3101 EE2101 None Embedded Linux on System on Programmable Chips 2+2 EE3102 CS2101 & EE2103 None Sensors and Applications 3 EE3103 EE2102 None Sensors Lab 3 EE3104 None EE3103 BS Degree Level The BS level comprises 12 courses and one optional Apprenticeship. Students should earn a total of 142 credits through

all levels to get the BS Degree. Requirements for registration Only those students who complete courses of 1st FOUR Semesters will be permitted to register for courses in

Degree level. Exit Once the learner successfully completes 142 credits and the course requirements, they will be awarded a BS

Degree in Electronic Systems from IIT Madras. 12 courses 56 credits 1 - 3 years 10 hrs/course/week 3,36,000* *Refer Fee Structure Courses Degree level comprises the following: Course Name Credits Code Prerequisites Corequisites Elective I 4 - - - Electromagnetic Fields and Transmission Lines 4 EE3105 MA2101 None Electronic Product Design 4 EE3107 EE3103 & EE3105 None Control Engineering 4 EE3106 EE2101 None Elective II 4 - - - Elective III 4 - - - Elective IV 4 - - - Open Elective 4 - - - Open Elective 4 - - - Open Elective 4 - - - Open Elective 4 - - - Apprenticeship (optional) 8 - - - Humanities Elective 4 - - - Sample Certificates BS Degree in Electronic Systems Diploma in Electronic Systems Foundation in Electronic Systems Honour Code

Mandatory Requirements to Enroll and Learn Access to good internet connection as well as a laptop/desktop device will be a key requirement

to learn effectively from our courses. For a complete list of software and hardware requirements, please

refer to this document - Mandatory

System Specifications . Learner should be able to travel to assigned exam centres for quizzes and exams, each term.

Check the list of exam

cities where our exam centres are currently located. Kit: Some of the courses are accompanied by lab sessions to be done at home with the use of

electronic kits as suggested. The cost of the kit will be communicated and updated in the student handbook. It is mandatory that students travel to IIT Madras campus to demonstrate the lab experiments specified and complete the lab exams in person at the campus. These are planned currently in the months of May-July and November-January and can change based on other constraints. The tentative duration for the in person component at IIT Madras is expected to be one week every semester. Hostel accommodation is not guaranteed and students must make their own travel and accommodation arrangements for the same. The charges for this must be borne by the student. Eligibility to Apply Anyone who has passed Class 12 or equivalent with Physics and Mathematics can apply irrespective of age. View list of accepted class 12 equivalents. School students who have appeared for their Class 11 final exams can apply. Those who qualify can join the program after passing Class 12. The committee approved that students who have passed Maths and Physics separately through NIOS or any other equivalent organization be permitted to apply to the BS in Electronic Systems program, having fulfilled the minimum eligibility requirement. Accepted Class 12 equivalents 1. A Diploma recognised by AICTE or a state board of technical education of at least 3 year duration. 2. Any Public School / Board / University examination in India or in any foreign country recognised as equivalent to the 10+2 system by the Association of Indian Universities (AIU). 3. Final examination of the two-year course of the Joint Services Wing of the National Defence Academy. 4. General Certificate Education (GCE) examination (London / Cambridge / Sri Lanka) at the Advanced (A) level. 5. High School Certificate Examination of the Cambridge University or International Baccalaureate Diploma of the International Baccalaureate Office, Geneva. 6. Higher Secondary Certificate vocational examination. 7. Intermediate or two-year Pre-University examination conducted by a recognised Board / University. 8. Senior Secondary School Examination conducted by the National Institute of Open Schooling with a minimum of five subjects. Close Application Process Applications for the batch starting January 2024 is now open. Apply Now Anyone who is eligible may start applying by filling in a simple application form and paying the application fee. Category of applicant Application fee General Category / OBC / EWS Applicant 6000 application fee SC / ST / PwD ($\geq 40\%$ disability) Applicant 3000 application fee SC / ST Applicant who is ALSO PwD ($\geq 40\%$ disability) 1500 application fee An additional exam facilitation fee will apply for

learners opting to write the Qualifier Exam
 in an Exam Centre
 outside India. Application will be considered only when, after payment, applicant also fills
 in further details
 and submits required documents for verification. Applications without details & documents,
 even if paid, will not be considered
 valid. Admission to the Foundation Level Regular entry: All eligible candidates, irrespective
 of their backgrounds, can earn
 admission to the
 Foundation Level by successfully completing the qualifier process. See details below
 JEE-based entry: A student who has qualified for JEE Advanced 2023 is automatically
 eligible for
 admission and can register for courses in the foundation level of the BS program. See
 details below Regular Entry All regular entry applicants must go through the Qualifier Process to earn
 admission to the
 Foundation Level. Qualifier Preparation: The qualifier process includes four weeks of
 coursework based on
 lecture videos,
 assignments, and live sessions of the four foundational level courses - English I, Math for
 Electronics I,
 Electronic Systems Thinking and Circuits, and Introduction to C Programming - that will be
 provided through our
 online portal. Every week an assignment must be submitted for grading in each course.
 Qualifier Exam: At the end of the 4 weeks, a qualifier exam will be conducted for
 eligible candidates
 based on the content covered in the 4 weeks of study. Eligibility to appear for the qualifier
 exam (regular entry): In each course, the average of the best 2 out of the first 3 assignment scores will be
 calculated. Only those
 who get the minimum required average assignment scores in all four courses (as given
 below) will
 be allowed to
 appear for the Qualifier Exam. Minimum Average Assignment Score required in each
 course General Learner 40% SC / ST / PwD with 40% disability 30% PwD with 40% disability & SC / ST
 30% OBC-NCL / EWS 35% Note: Relaxations in pass criteria indicated for various categories of learners
 is applicable
 ONLY for the
 qualifier process. There will be no relaxations in terms of grades / pass criteria once
 registered into the
 program. Qualifier Exam and Passing Criteria (regular entry): Only learners who are
 eligible to appear for the qualifier exam will receive the hall
 ticket for it. The in-person Qualifier Exam at the end of 4 weeks of coursework is of 4 hours
 duration and
 covers all 4
 courses. To pass the Qualifier Exam , the learner has to get a minimum Average Qualifier
 Exam
 Score and a minimum Qualifier Exam Score in each course individually . Refer table:
 Min. Req. Qualifier Exam Score in each course Min. Req. Average Qualifier Exam Score General Learner
 40% 50% SC / ST / PwD with 40% disability 30% 40% PwD with 40% disability & SC / ST 30% 40%
 OBC-NCL / EWS 35% 45% Note: Relaxations in pass criteria indicated for various categories of learners
 is applicable
 ONLY for the
 qualifier process. There will be no relaxations in terms of grades / pass criteria once
 registered into the
 program. Only those who pass the Qualifier Exam will be eligible to register for the
 Foundation Level

courses. Validity of the Qualifier Exam result: For candidates who have already cleared class 12 board exams, the qualifier marks will be valid for the two semesters that come after the qualifier exam date (the continuing semester and the next one) for the learner to register to the Foundation level. For students who attempt the qualifier exam while in school, doing their std XII, the qualifier marks will be valid for four semesters to continue with the foundation level. Though everyone who passes the Qualifier Exam will be allowed to register for Foundation Level, there will be limitations on the number of courses a learner will be allowed to register for in their first term based on the Average Qualifier Exam Score (M).

Average Qualifier Exam Score (M)	Number of courses allowed to register for
Minimum required $\leq M < 50\%$	up to 2 courses
$50\% \leq M < 70\%$	up to 3 courses
$M \geq 70\%$	up to 4 courses

Re-attempt Qualifier Exam (regular entry) Learners who were eligible to appear for the qualifier exam, but did not clear the qualifier exam or were absent for it, will be eligible to re-attempt the qualifier exam in the same term (refer important dates) without having to repeat the assignments. Anyone who is eligible may apply by filling in the re-attempt application form that opens up immediately after the qualifier results are announced and paying the re-attempt fee.

Category	Re-attempt fee
General Category / OBC-NCL / EWS Applicant	2000
SC / ST Category / PwD ($\geq 40\%$ disability)	1000
Applicant who is ALSO PwD ($\geq 40\%$ disability)	500

For candidates who have not passed the first attempt and reattempt within the same semester, the best of the two scores in each subject of the qualifier exam will be considered for deciding the result of the Qualifier exam. If an applicant was not eligible to receive the hall ticket for the qualifier exam in the first attempt:

- They can only attempt in the next semester and have to apply as a fresh candidate, paying the full fees as per the fee norms applicable (and in case of candidates outside India, an additional exam facilitation fee to be paid)
- They will have to redo the four weeks of course work and weekly graded assignments and become eligible to get the hall ticket for the qualifier exam

JEE-based Entry Candidates who have qualified to attempt JEE Advanced in the current year are deemed to have directly qualified and can register for courses in the Foundation level and start the program. Such students will first register to the program paying the registration fees of Rs 6000/- with suitable waivers for students in the category of SC/ST/PwD with $>40\%$ disability and then once the documents are verified and their registration is approved, they will proceed to pay the fees for courses they choose to register for. The registration of students, applying through this category, who do not appear for Quiz 1 AND Quiz 2 in the first semester will stand canceled.

International Students Are you a learner outside India interested to join this program? This program is open to learners from all around the globe. You can study from IIT Madras and earn the BS in Electronic Systems irrespective of the country you are from. IIT Madras is setting up

modalities to conduct in-person exams in as many countries as possible.

Currently, we

conduct in-person exams in the following cities outside India: UAE - Dubai, Sharjah, Abu Dhabi Sri Lanka - Colombo, Jaffna Bahrain -

Manama Kuwait

- Salmiya Oman - Muscat Students residing in these countries must write exams in the designated exam centres. Students

have to appear

for in-person exams roughly once a month. Learners residing in any other country, apart from those shown above, can also enroll for this

program and

appear for remote proctored exams. If you have any queries, please write to

ge-es@study.iitm.ac.in and our team

will get in touch with you and guide you on the next steps. Please note that all lab courses are to be done in person at IIT Madras campus atleast twice a

year and you will

have to travel for this. Required Documents to apply 1. Passport size photograph (JPEG / JPG format) 50KB-150KB 2. Signature (JPEG / JPEG format) 4KB-150KB 3. Photo ID Card Scan - Aadhar Card / PAN Card / Passport / Voter ID / Driving License /

other

Government ID with photo (JPEG / JPG / PDF format) - 50KB to 2MB file size. 4. Category Certificate - only for applicants who select SC / ST / OBC-NCL* / EWS (JPEG / JPG / PDF format) - 50KB to 2MB file size. 5. PwD Certificate - only for applicants with 40% or more disability (JPEG / JPG / PDF format) - 50KB to 2MB file size. 6. Proof of applicant having been permanently disabled OR

parent having been permanently

disabled / killed during war or peacetime operations while serving as a defence / paramilitary personnel. - if

applicable (JPEG / JPG / PDF format) - 50KB to 2MB file size. 7. Only for those applying to join via JEE-based entry: Scoresheet / admit card / registration receipt

as proof of eligibility to write JEE Advanced (PDF format) - 50KB to 2MB file size.

*Note that BC / OBC certificate is not the same as OBC-NCL (Other Backward Caste - Non Creamy Layer)

certificate. Only applicants belonging to OBC caste as listed in Central Government's www.ncbc.nic.in

website and also belonging to Non Creamy Layer may apply in the "OBC-NCL"

category.

Other BC / OBC

applicants must apply in the "General" category. Download OBC-NCL Certificate format Download EWS Certificate format Okay Honour Code

Text from file: C:\Users\Harsh Singh\Downloads\study-iitm-website\www\es\faq.html

Frequently Asked Questions - IIT Madras Degree Program English | | | | | | | | | | A
Structure Course Registrations Assessments Exam Cities Fee Structure Foundation Level Diploma Level
BS Degree Level Sample Certificates Academic Calender Admissions Important Dates Mandatory
Requirements Eligibility to Apply Application Process Admission to the Foundation Level 1. Regular Entry
2. JEE-based Entry International Students Testimonials FAQ About IITM About IIT Madras Faculty
Co-ordinators Contact Us SIGN IN Applications open now for May 2024 Batch. Application Close: May
28th, 2024 | Exam: Jul 07th, 2024 APPLY NOW Applications open now for May 2024 Batch. Application
Close: May 26th, 2024 | Exam: Jul 07th,

2024 APPLY NOW Home FAQ Frequently Asked Questions all General Academics
Application Admission Fees Foundation Level Does IIT Madras offer BS in Electronic Systems
on-campus? Does IIT Madras offer BS in Electronic Systems on-campus? No. IIT Madras

does not offer BS in Electronic Systems on-campus. This is a non-campus program only. Will those enrolled to this program have access to IIT Madras campus facilities? Will those enrolled to this program have access to IIT Madras campus facilities? Due to limitations of campus facilities and students being spread out geographically, learners enrolled in the program will not have access to IITM campus facilities. What is the language of instruction for these courses? Are they available in other regional languages? What is the language of instruction for these courses? Are they available in other regional languages? All our program courses are taught in English. Hence, we expect a minimum proficiency in English language to participate in the program. How long will it take to complete the online degree program if I am working? How long will it take to complete the online degree program if I am working? This BS degree is a 4 year program. On an average, we anticipate that a learner studying part time will finish the degree in 4 to 8 years. Check Academics page to better understand the program structure. What are the technological requirements for this program? What are the technological requirements for this program? Access to good internet connection as well as a laptop / desktop device are necessary. Familiarity with Google tools would be an advantage. Students will have to procure lab kits and work on them, the details of which will be communicated soon. Will the classes be taught live? Will there be any interaction? Will the classes be taught live? Will there be any interaction? No. Students will have to study through pre-recorded video lessons which will be made available on our portal. One or two live sessions per course will be conducted to clear doubts and interact with the course instructor and course support team. What is the overall structure of the program? What are Levels? What is the overall structure of the program? What are Levels? The program is split into three levels that have to be done strictly in sequence: 1: Foundational Level (9 courses + 1 Lab) - 44 Credits 2: Diploma Level (8 Courses + 2 Labs) - (44+ 42) = 86 Credits 3: Degree Level (12 courses) + Apprenticeship (Optional) - (44+42+56) = 142 Credits Check Overall Structure in Academics page. How much time do I need to spend on a course per week? How much time do I need to spend on a course per week? The expected effort is about 8-10 hours per week per course. How many courses can I complete in a year? How many courses can I complete in a year? There are two semesters in a year. Learners will be allowed to register for a maximum of four theory courses in a semester depending on their preferred pace of learning. Note that registration for any course requires that the prerequisite courses for this should be completed. How / where do I ask questions or doubts related to the course content of the program? How / where do I ask questions or doubts related to the course content of the program? Each course page will have a discussion forum where learners can raise their course-related questions and interact with the course instructor or course support team. For all questions not related to the course, you may write to support-es@study.iitm.ac.in Are there any communication groups on WhatsApp, Telegram etc for the IITM BS Degree Program? Are there any communication groups on WhatsApp, Telegram etc for the IITM BS Degree Program? There are NO official WhatsApp or Telegram groups. We currently answer all questions / doubts via support email

/ calls. We will use whatsapp from our side to send you messages and reminders. I ran into an error or issue in the application form. What do I do? I ran into an error or issue in the application form. What do I do? Please send us your registered email ID and a screenshot of the error / issue with relevant

description to support-es@study.iitm.ac.in If the error is after payment has been made, please forward the confirmation email from Razorpay along with email ID, application number and screenshot with description. Is there an attendance policy for this program? Is there an attendance policy for this program? There is no daily attendance, but once you register for the courses, submission of weekly assignment is taken as an attendance indicator. Minimum required scores in weekly assignments of a course will determine if a learner will be allowed to write the end term exam for that course or not. Can I take my exams from home? Can I take my exams from home? No. Every semester will have two quizzes and an end semester exam for each course. All quizzes and end semesters exams will be in-person, invigilated exams at designated centres across the country. You need to

travel to the exam centre and take these exams. Check Exam Cities in Academics Page. What is a quiz? What is a quiz? A quiz is similar or equivalent to a monthly test in schools and colleges. Marks obtained in

quizzes count towards the total score obtained in the course. All quizzes will be in-person, invigilated exams

at designated centres across the country. Are the exam dates flexible? Are the exam dates flexible? No, the exam dates are not flexible. The quiz and end semesters exam dates are fixed for all learners taking the same course in a semester. We try our best to schedule all exams during the weekends

though it may not be possible for every exam. What if I want to request for a city not listed in the current list of exam cities? What if I want to request for a city not listed in the current list of exam cities? If the city of your choice is not in our current exam cities list, please send an email to support-es@study.iitm.ac.in. We will consider your request, but there is no guarantee that we

will add it. Will there be multiple exam centres within an exam city? How many? Will there be multiple exam centres within an exam city? How many? There may be more than one exam centre in any exam city. The count depends on the number of learners in each

city and availability of centres on given date with our exam partner. When will the Semester start? What is the timeline? When will the Semester start? What is the timeline? The semester will start after the Qualifier process. Those who are successful in the Qualifier

Exam can join the program by registering for the Foundational level courses in September 2023. Can I pursue only a Diploma instead of Degree? Can I pursue only a Diploma instead of Degree? You can exit with Diploma in Electronic Systems. However, please note that there is no direct entry to Diploma.

You will have to do Foundation level courses also, before taking up Diploma. What is the eligibility criteria to apply for the Degree Program? What is the eligibility criteria to apply for the Degree Program? Check Eligibility section in Admissions page for the latest update of the eligibility criteria. Is the program available to students currently in class 11th standard? Is the program available to students

currently in class 11th standard? School students who have appeared for their Class 11 final exams can apply and go through the

qualifier phase

but will not be allowed to register for courses of the program until they clear class 12 (or equivalent). Note

that a Qualifier Exam result is valid only for 2 semester (about 1 year) right after the exam.

I took a break year after class 12 to prepare for JEE / NEET. Can I Apply for the Program? I took a break year after class 12 to prepare for JEE / NEET. Can I Apply for the Program? Yes, you can apply for the program if you have cleared class 12 or equivalent with Physics and

Mathematics. I had dropped out of degree over two decades ago. Would I be eligible to apply? I had dropped out of degree over two decades ago. Would I be eligible to apply? Yes. If you cleared class 12 or equivalent in 2023 or earlier with Mathematics and Physics, you

can apply. There

is no requirement to have completed a degree program. How and where can I apply for the program? How and where can I apply for

the program? Anyone who is eligible may apply by visiting our website

<https://study.iitm.ac.in/es/> and

clicking "APPLY NOW"

and filling in the application form, paying the application fee and uploading required documents. We recommend that you go through the Academics page and Admissions page to better understand the

program and the

admission process before applying. What is the qualifier process? What is the qualifier process? All applicants will have to go through a Qualifier Process, wherein they will get access to 4 weeks of content

of the four foundational level courses. Applicants must go through this qualifier content and submit assignment.

Eligible applicants are given the hall ticket to the qualifier exam. which is conducted on 6th August 2023 Will everyone who goes through the qualifier process be allowed to write the qualifier exam?

What is the passing

criteria? Will everyone who goes through the qualifier process be allowed to write the qualifier exam?

What is the passing

criteria? No. Only the learners who get the minimum required marks in the online assignments during the

qualifier process

of 4 weeks will allowed to attend the qualifier exam. Only those learners allowed to write the

qualifier exam

shall be provided with hall tickets. Refer to Qualifier Process and the section below it to learn about the minimum required marks in the qualifier assignments

and minimum

required marks to pass / clear the qualifier exam. How long is the qualifier exam result valid for? Can I join the program at a later semester if I

clear the

qualifier exam now? How long is the qualifier exam result valid for? Can I join the program at a later semester if I

clear the

qualifier exam now? The Qualifier Exam result is valid for a period of 2 semester (or 1 year). How many times a year will there be admissions? Will it be only once a year? How

many times a year will there be admissions? Will it be only once a year? Currently it is 2 application cycles a year. What are the documents / files required to apply for the qualifier process of the program?

What are the documents / files required to apply for the qualifier process of the program? The list of required documents is available on the Application Process section of the admissions page. Can the

credits from this online degree program be transferred to learner's college or university (like on the NPTEL platform)? Can the credits from this online degree program be transferred to learner's college or university (like on the NPTEL platform)? IITM's BS Degree in Electronic System is a stand alone program. Credits cannot be transferred. Will IIT Madras provide the course material for the program in hard copy through courier? Will IIT Madras provide the course material for the program in hard copy through courier? No, the course content will be provided only in online mode so you can watch them anytime, anywhere. There will be no hard copy provided. Depending on the course, learners may be recommended reference books / material that they may buy separately. What OBC-NCL / EWS certificates should we submit while applying or registering for courses? What OBC-NCL / EWS certificates should we submit while applying or registering for courses? Student has to submit valid certificates while applying / registering. These will be verified by our team. An approved certificate will be valid for two semester. Certificates that are outdated will not be accepted. After applying, can I get a refund of application fee if I can't write the qualifier exam or if I fail the qualifier exam? After applying, can I get a refund of application fee if I can't write the qualifier exam or if I fail the qualifier exam? No. There will be no refund of application fee once paid. After registering for a course in a semester, can I carry over the fees to the next semester if I am not able to complete the course? After registering for a course in a semester, can I carry over the fees to the next semester if I am not able to complete the course? No. A course registration is valid only for one semester. If a learner is not able to clear a course in a semester, they will be considered as having failed the course and will need to register for the course again at a later semester along with the required fee. What is the Fee structure? Should we submit the entire fees at once or in installments? What is the Fee structure? Should we submit the entire fees at once or in installments? The overall program fees need not be paid at one stretch. The fees will be collected in each semester based on the number of courses you register for the respective semester. So, if you register for 2 courses in a semester, you have to pay the fees only for those 2 courses. For more details, please refer to the Fee Structure in Academics Page. What is the mode of payment? What is the mode of payment? Fees can be paid only through online mode. Fees through DD will not be accepted. Note that payment cannot be made using a Debit Card. You can pay using any Credit Card, Netbanking (all Indian Banks), Wallet, UPI (Google Pay, BHIM, etc.). Will I get any confirmation on successful payment of fee? Will I get any confirmation on successful payment of fee? Yes. After successful completion of payment, you will receive a confirmation email from Razorpay. If my payment fails, how many days will it take to the money back in my bank account? If my payment fails, how many days will it take to the money back in my bank account? In case

of failed payments, it will take 3 to 4 weeks for the money to be credited back in your bank account. Can I edit my application form after submitting it? Can I edit my application form after submitting it? Your application form will be considered as submitted only upon making the application fee payment. Until then, you may edit the contents of your application form. After the application fee has been paid, you will not be allowed to edit the application form. In case your uploaded document(s) gets "returned / rejected" during verification, you will be given a chance to re-upload a valid document within a stipulated deadline. My application status says "Verification Under Process". How long will it take for my application to be verified? My application status says "Verification Under Process". How long will it take for my application to be verified? Verification of documents may take upto 3 weeks. Please be patient. We will keep you updated about your application status by email and on the dashboard. How to avoid getting my application "returned / rejected"? How to avoid getting my application "returned / rejected"? After you submit your application, we verify the same before changing the status of uploaded document(s) to "accepted" or "returned / rejected". Be careful when filling the application form and double check the information you enter. We verify the files / documents you have uploaded (photograph, signature, ID card, SC / ST / OBC-NCL / EWS / PwD document if applicable). If any of the files / documents uploaded is unclear or broken or found to be wrong or incorrect, your application may be "returned / rejected". In case your uploaded document(s) gets "returned / rejected" during verification, you will be given a chance to re-upload a valid document within a stipulated deadline. Being honest and careful while filling the application form and uploading correct documents in the correct formats will help get your application "accepted". Check Application Process for required documents, document formats and sizes. Can I select only one city as my Exam City instead of selecting two preferences? Can I select only one city as my Exam City instead of selecting two preferences? No. You will need to pick two different preferences for exam cities in the order of your preference. Your exam centre shall be allotted in any one of the two exam cities picked depending on availability. We recommend that you familiarize with the currently available Exam City options to be able to pick your preferred exam cities. Can I change my exam cities for the qualifier exam after having paid and submitted my application? Can I change my exam cities for the qualifier exam after having paid and submitted my application? You will be allowed to change your exam city for any exam till 4 weeks before the exam date. Will the Exam City preferences I select for the Qualifier Exam in the application form be

fixed

for all the

later exams? Will the Exam City preferences I select for the Qualifier Exam in the

application form be fixed

for all the

later exams? No. The Exam city preferences selected in the application form is for the

Qualifier Exam only.

You will have the

option of picking a different set of Exam City options for each quiz and the final exam. Will

I get a scholarship / loan for this programme? Will I get a scholarship / loan for this programme? We are

trying to see if this is possible. Please watch out for announcements regarding

scholarships / loans. Is there any concession for SC / ST / OBC-NCL / EWS / PwD

candidates in terms of scores? Is there any concession for SC / ST / OBC-NCL / EWS / PwD candidates

in terms of scores? SC / ST / OBC-NCL / EWS / PwD candidates will have concession in minimum scores required during

the qualifier

process to enter the program. Check out Fee Structure in Academics page. Note that there

will be no such concessions after entering the program. (OBC

candidates not

belonging to the OBC-NCL category cannot avail any concession) Is there any fee waiver

for SC / ST / OBC-NCL / EWS / PwD candidates or candidates with lower

family income? Is there any fee waiver for SC / ST / OBC-NCL / EWS / PwD candidates or

candidates with lower

family income? Only SC / ST / PwD candidates may avail fee waivers in the application

stage. After clearing the

qualifier

process and exam, candidates belonging to any category (General / OBC / EWS / SC / ST

/ PwD) may

avail fee

waivers in course fees based on family income. Check Fee Structure in Academics page

for details. What does "family income" in the fee structure mean? What does "family income" in the fee

structure mean? The term family income for the purpose of availing fee waivers includes the income of the

candidate, the income

of his/her parents and spouse, also the income of his/her siblings and children below the

age of

18 years. After clearing the Qualifier Exam, all learners who wish to avail fee waivers

based on Family

Income are

required to submit Family Income Certificate in the format provided in the Fee Structure

section. Note that the Family Income Certificates are valid only for one year and will need to

be submitted

afresh each year to continue availing fee waiver based on Family Income through the

program. I belong to the general category and I want to avail fee waiver since my family

income is below

5 lakhs per

annum. Why do I need to submit EWS + Family Income Certificate to avail the waiver? I

belong to the general category and I want to avail fee waiver since my family income is below

5 lakhs per

annum. Why do I need to submit EWS + Family Income Certificate to avail the waiver?

Economically Weaker Section (EWS) in India, as defined by the Govt. of India, is a sub-category

of people

belonging to the General category with an annual family income less than 8 lakhs per

annum and

who do not

belong to any category such as SC/ST/OBC. Course fee waivers from IIT Madras are available for general category learners with family income less than 5 lakhs per annum. As per the policy of IIT Madras, and as part of our documentation process to ensure that we give fee waiver benefits to the deserving learners, we require general category learners with family income less than 5 lakhs per annum to submit both EWS certificate and Family Income certificate. EWS and Family Income certificates will need to be obtained in the format mentioned in the Fee Structure section in Academics page. Will students who enter the program have internship / recruitment opportunities provided by IIT Madras? Will students who enter the program have internship / recruitment opportunities provided by IIT Madras? We will try to make internship / recruitment opportunities available to learners; we will notify learners when the opportunities arise. How does IIT Madras plan to provide placements for lakhs of applicants? How does IIT Madras plan to provide placements for lakhs of applicants? A large number of learners apply and participate in the qualifier process. After clearing the qualifier process, learners will need to clear foundational level courses, diploma level courses and then the degree level courses to finally get a BS degree from IIT Madras. That's a total of 142 course credits. When a student is able to successfully clear these courses and fulfill all the academic requirements, we are confident that the students will be employable. Do I get placement opportunities after I complete the BS Degree? Do I get placement opportunities after I complete the BS Degree? The demand for skilled individuals in Electronic Systems is high. Through our program, we do our best to equip our learners with required subject expertise. We are also planning to give soft skills training as part of the program. It is all about enabling IITM BS graduates with the right job opportunities. IIT Madras will actively reach out to the recruiters in the context of placement opportunities for the graduates of the BS Degree Program. What is the registration process for the Foundational Level? What is the registration process for the Foundational Level? Once you clear the Qualifier Exam, you will be allowed to access the Course Registration Form from your dashboard upon logging in. In the Course Registration Form, you will need to fill in the required details, upload necessary documents and pay the course fee to register for the first semester of your Foundational Level. You may choose to register for one or more Foundational Level courses with the upper

limit of

four courses. Note that there will be an added Exam Fee applicable for learners opting to write their quizzes

and end semester

exams outside India. What are the documents / files that are required to be uploaded while registering for the

Foundational Level? What are the documents / files that are required to be uploaded while registering for the

Foundational Level? It is mandatory to upload 12th or equivalent mark sheet. In addition, any one of these documents

while

registering for Foundational Level are required: - Degree Certificate OR - Certificate of the highest level of education What are the documents needed to avail fee waiver at Foundational Level and later? What are the documents needed to avail fee waiver at Foundational Level and later? Please refer to the Fee Structure section in the Academics page to see which fee waiver may be applicable to you and the relevant

documents /

certificates that will need to be submitted. I have already submitted my category certificate while applying for the Qualifier Process. Do I

need to submit

them again while registering for the Foundational Level? I have already submitted my category certificate while applying for the Qualifier Process. Do I

need to submit

them again while registering for the Foundational Level? No, not required to submit again. However, the EWS / OBC-NCL certificate need to be submitted

again if the

previously submitted certificate is not valid until the end of the current financial year. I can't afford to pay the entire Foundational Level fees at one shot and I do not come under any

fee waiver

category too, can I pay the fees in 2 or 3 installments? I can't afford to pay the entire Foundational Level fees at one shot and I do not come under any

fee waiver

category too, can I pay the fees in 2 or 3 installments? Please be informed that you will not be paying the entire Program fee or Foundational Level fee at one stretch.

The actual fees you will be paying will be in proportion to the number of courses you register

for in every

semester. So, if you register for 2 courses in the July 2023 semester, you have to pay the course fees only for

those 2 courses. In the Fee Structure section, select your goal to be able to see a detailed PDF with breakdown of course fee over

each semester. Can I change my email ID in the Foundational Level? Will we get any official student email ID? Can I change my email ID in the Foundational Level? Will we get any official student email ID? The personal email ID you applied for the program with cannot be changed. This email ID is used

to access the

whole Qualifier Process and the Foundational Level Course Registration Form. Once an applicant passes the qualifier exam and registers to courses, they will be assigned a

roll number and a

corresponding official IIT Madras BS Degree student email ID. After that, all further communication and course

access will be through the official student email ID. Will I be given a new portal to access courses at Foundational Level? Will I be given a new portal to access courses at Foundational Level? No, the current portal will be used for all the Levels. You will be given a new official IITM BS

Degree student email ID to access the portal. Will I be issued an ID card? Will I be issued an ID card? An ID card in electronic format will be provided, subject to conditions on use of the ID card. Can I take a break of 1 or 2 year(s) after completing the Foundational Level? Can I take a break of 1 or 2 year(s) after completing the Foundational Level? The BS Degree has to be completed within a maximum period of 8 years. While a 1 or 2 year break between Levels is allowed, we recommend that you time the length of your breaks depending on whether you want to pursue a Diploma or Degree, and how many courses you are able to take up in a Semester. I am unable to attend the Qualifier Exam but received hall ticket / I didn't clear the Qualifier Exam. What will be the procedure to re-apply? Do I need to pay application fee again? I am unable to attend the Qualifier Exam but received hall ticket / I didn't clear the Qualifier Exam. What will be the procedure to re-apply? Do I need to pay application fee again? You can re-apply again for the immediate next Qualifier exam in the same term at half the original fee paid by you. Your previous assignment scores will be considered and you will be directly eligible to write the Qualifier Exam-attempt 2 without having to submit assignments again. I applied for the Qualifier process but I didn't obtain the minimum required average assignment scores to be eligible to take the Qualifier Exam, and hence didn't receive any hall ticket for the same.

What will be the procedure to re-apply? I applied for the Qualifier process but I didn't obtain the minimum required average assignment scores to be eligible to take the Qualifier Exam, and hence didn't receive any hall ticket for the same.

What will be the procedure to re-apply? You have to re-apply as a new applicant with payment of full application fee. What is the eligibility to write the End Semester Exam for a course? What is the eligibility to write the End Semester Exam for a course? To be eligible to write the End Semester Exam for a course, it is mandatory for the learner to

(i) obtain an Average Assignment Score $\geq 40/100$ AND (ii) appear for at least one out of the two proctored in-person Quizzes. Every course might have additional eligibility conditions to write the end-sem exam and obtain the course grade. Please check the grading document for details on this. Learners who are not eligible to write a specific course's End Semester Exam will not be issued hall ticket for the same. They will have to repeat the entire course including assignments and quizzes in a later Semester. Is it mandatory to take the proctored in-person Quizzes? Is it mandatory to take the proctored in-person Quizzes? It is mandatory to attempt at least one of the proctored in-person quizzes in a Semester to be eligible to appear for the End Semester Exams. The quizzes contribute to the final course score and the course grade and

hence it is recommended that students attempt both quizzes and all other assessments in the course. Will Qualifier phase assignment scores be included while calculating the eligibility for the End Semester? Will Qualifier phase assignment scores be included while calculating the eligibility for the End Semester? For the courses you register for in the same semester immediately after clearing your Qualifier Exam, yes, your Qualifier phase assignment scores will be included while calculating eligibility for the End Semester Exam. For courses that you register for in a later Semester, you will be required to repeat the assignments in the course again. Will my Qualifier Exam Score be considered in the subsequent Semester? Will my Qualifier Exam Score be considered in the subsequent Semester? The Qualifier Exam Score will be counted as Quiz 1 Score for the courses registered in the SAME Semester immediately after the Qualifier exam. They will not be used in any other subsequent semester. What will happen if I am absent for an End Semester Exam? What will happen if I am absent for an End Semester Exam? Learner has two options: 1. Register for the course in the subsequent semester with the option of taking the End Semester Exam alone and by paying a reduced fee. 2. Repeat the entire course (including assignments and quizzes) by paying the full course fee. What is the procedure to add / drop a course? What is the procedure to add / drop a course? Once the registration window closes in any Semester, adding courses will not be allowed. Dropping a course will be allowed within 4 weeks of the Semester start. Is it possible to repeat a course for improving grades? Is it possible to repeat a course for improving grades? Though it is not recommended, a learner may choose to repeat a course for improving grades any number of times. The course fee for repeating a course will be twice the regular course fee and the learner will have to submit the online graded weekly assignments, appear for the Quiz(zes) and End Semester Exam. The highest score among all attempts of a course will be used for calculating the CGPA. How can I change the exam city within India? How can I change the exam city within India? Each exam has a deadline before which change of exam city is allowed. Option to change the exam city will be available till each deadline in the student Dashboard, in the "Exam Cities and Hall Tickets" page. Is it mandatory to travel to IIT Madras for the Lab courses? Is it mandatory to travel to IIT Madras for the Lab courses? Yes. It is mandatory that students travel to IIT Madras campus to demonstrate the lab experiments specified and complete the lab exams in person at the campus. During my lab session can I get any accommodation available inside the campus? During my lab session can I get any accommodation available inside the campus? No. You have to make your own arrangements for accommodation during lab sessions and any other logistics will not be borne by IIT Madras. The program team will try and see if this is possible but there is no confirmation that accommodation will be provided. Can I pursue Masters degree after this program? Can I pursue Masters degree after this program? Yes. You can do Masters degree after successfully

completing BS in Electronic Systems Is this degree accepted for other universities/ outside india? Is this degree accepted for other universities/ outside india? Our Diploma and Degree are official Diploma and Degree of IIT Madras. What type of Job will I get after doing this Foundation/Diploma/ Degree Level? What type of Job will I get after doing this Foundation/Diploma/ Degree Level? Some of the major career options available to students taking this program may include the following job positions in industries such as Automotive, Semiconductor, Defence and so on: Electronic System Designer Embedded System Developer Electronic Hardware Specialist System Testing Engineer

If I have passed the JEE Main, Can I get a direct entry opportunity to the Foundation level without appearing Qualifier? If I have passed the JEE Main, Can I get a direct entry opportunity to the Foundation level without appearing Qualifier? Candidates who have qualified to attempt JEE Advanced in the current year 2023 are deemed to have directly qualified to the BS-ES program and can register for a maximum of four courses in the Foundation level and start the program. I am a student of BS in Data Science. Can I join BS ES program also? I am a student of BS in Data Science. Can I join BS ES program also? Currently the BS Electronic Systems program exam dates align with the BS Data Science program. Hence it will not be possible to do both programs together. Program updates, if any, will be communicated and updated on our website. I have not done 12th Class. But I have done 3-year Diploma. Can I join? I have not done 12th Class. But I have done 3-year Diploma. Can I join? Yes. You can join as long as you have studied Physics and Maths in your 3-year Diploma Can we apply for Diploma in ES alone rather than applying for the degree? Can we apply for Diploma in ES alone rather than applying for the degree? No. There is no option to register for diploma alone. However, you have multiple exit options which allows you to exit with diploma Is there any lateral entry for the Diploma students? Is there any lateral entry for the Diploma students? There is no lateral entry for Diploma Do I have to go to coaching center to prepare for Qualifier Exam? Do I have to go to coaching center to prepare for Qualifier Exam? No. You don't have to go to coaching center. You can do self-study. It is based on 4-weeks of content that we provide. Can I do M.Tech through gate after completion of BS degree ? Can I do M.Tech through gate after completion of BS degree ? You can do M.Tech, however, you will have to check the eligibility criteria mentioned in that University/ Institution you are applying to. Is this degree valid to appear UPSC and SSC or any other Government Exams? Is this degree valid to appear UPSC and SSC or any other Government Exams? Every University sets its own requirements. UPSC and other exams such as State exams decide what degrees they recognize. From the side of IIT Madras we are happy to write to these organizations and entities and inform them that this BS degree from IIT Madras is a valid four-year degree that can be considered. Is this degree UGC recognized? Is this degree UGC recognized? IITs are institutes created under an Act of Parliament, the IIT Act. This act provides all rights to IITs to confer degrees. IITs do not come under UGC, and no degree of IIT needs additional approval or recognition by UGC. Any degree granted by an IIT is recognized as a legal degree. Can I do two degrees

(1 Offline and 1 Online)

simultaneously? Can I do two degrees (1 Offline and 1 Online) simultaneously? Yes, students can do this program (BS in Electronic Systems) along with another degree program. Will there be any projects also in BS in Electronic Systems program (like we have in BS in Data

Science)? Will there be any projects also in BS in Electronic Systems program (like we have in BS in Data

Science)? For some courses there might be mini projects depending on the course. Will we get marksheet for foundation Course/Diploma Courses/BS Degree courses in Electronic

System ? Will we get marksheet for foundation Course/Diploma Courses/BS Degree courses in Electronic

System ? Semester wise progress card and Grade card will be provided Which mode of Learning (Part Time/Full Time/Online/Distance) will written on Marksheet ? Which mode of Learning (Part Time/Full Time/Online/Distance) will written on Marksheet ? Mode such as distance, online, etc will not be mentioned in Marksheet. What is Apprenticeship in Degree Level? What is Apprenticeship in Degree

Level? Doing an apprenticeship is optional. The program provides the students in the BS level of the

program to pursue an apprenticeship with companies and research projects and earn credits in this level. Can I do an MBA Degree after taking up this course? Can I do an MBA Degree after taking up this course? Generally any graduate can apply for an MBA, but you will have to check the eligibility criteria mentioned by

the Institution or University in which you are going to apply. Why is there no 3 years exit with a BSC degree in this course similar to Data Science? Why is there no 3 years exit with a BSC degree in this course similar to Data Science? In order acquire certain skills and knowledge required to be a graduate in the field of

Electronic Systems, certain courses must be studied and it requires 4-years to study them. Hence we do not have 3

year exit. What is the procedure to change exam city from UAE to India / India to UAE? What is the procedure to change exam city from UAE to India / India to UAE? Please send an email to support-es@study.iitm.ac.in and

ge-es@study.iitm.ac.in What will be asked in the qualifier exam? What will be asked in the qualifier exam? The Qualifier exam will include questions related to four weeks of content of the four

foundational level courses - English I, Math for Electronics I, Introduction to C Programming and Electronics System Thinking and

Circuits. Does IIT Madras offer BS in Electronic Systems on-campus? Does IIT Madras offer BS in Electronic Systems

on-campus? No. IIT Madras does not offer BS in Electronic Systems on-campus. This is a non-campus program

only. Will those enrolled to this program have access to IIT Madras campus facilities? Will those enrolled to this program have access to IIT Madras campus facilities?

Due to limitations of campus facilities and students being spread out geographically, learners enrolled in the

program will not have access to IITM campus facilities. What is the language of instruction for these courses? Are they available in other regional

languages? What is the language of instruction for these courses? Are they available in other regional

languages? All our program courses are taught in English. Hence, we expect a minimum proficiency in English

language to participate in the program. How long will it take to complete the online degree program if I am working? How long will it take to complete the online degree program if I am working? This BS degree is a 4 year program. On an average, we anticipate that a learner studying part

time will finish the degree in 4 to 8 years. Check Academics page to better understand the program structure. What are the technological requirements for this program? What are the technological requirements for this program? Access to good internet connection as well as a laptop / desktop device are necessary.

Familiarity with Google tools would be an advantage. Students will have to procure lab kits and work on them, the details of which will be communicated soon. Will the classes be taught live? Will there be any interaction? Will the classes be taught live? Will there be any interaction? No. Students will have to study through pre-recorded video lessons which will be made available on our portal. One or two live sessions per course will be conducted to clear doubts and interact with the course instructor and course support team. Are there any communication groups on WhatsApp, Telegram etc for the IITM BS Degree Program? Are there any communication groups on WhatsApp, Telegram etc for the IITM BS Degree Program? There are NO official WhatsApp or Telegram groups. We currently answer all questions / doubts via support email / calls. We will use whatsapp from our side to send you messages and reminders. Is there an attendance policy for this program? Is there an attendance policy for this program? There is no daily attendance, but once you register for the courses, submission of weekly assignment is taken as an attendance indicator. Minimum required scores in weekly assignments of a course will determine if a learner will be allowed to write the end term exam for that course or not. Can I take my exams from home? Can I take my exams from home? No. Every semester will have two quizzes and an end semester exam for each course. All quizzes and end semesters exams will be in-person, invigilated exams at designated centres across the country. You need to travel to the exam centre and take these exams. Check Exam Cities in Academics Page. Will students who enter the program have internship / recruitment opportunities provided by IIT Madras? Will students who enter the program have internship / recruitment opportunities provided by IIT Madras? We will try to make internship / recruitment opportunities available to learners; we will notify learners when the opportunities arise. How does IIT Madras plan to provide placements for lakhs of applicants? How does IIT Madras plan to provide placements for lakhs of applicants? A large number of learners apply and participate in the qualifier process. After clearing the qualifier process, learners will need to clear foundational level courses, diploma level courses and then the degree level courses to finally get a BS degree from IIT Madras. That's a total of 142 course credits. When a student is able to successfully clear these courses and fulfill all the academic requirements, we are confident that the students will be employable. Do I get placement opportunities after I complete the BS Degree? Do I get placement opportunities after I complete the BS Degree? The demand for skilled individuals in Electronic Systems is high. Through our

program, we do our best to equip our learners with required subject expertise. We are also planning to give soft skills training as part of the program. It is all about enabling IITM BS graduates with the right job opportunities. IIT Madras will actively reach out to the recruiters in the context of placement opportunities for the graduates of the BS Degree Program. Can I pursue Masters degree after this program? Can I pursue Masters degree after this program? Yes. You can do Masters degree after successfully completing BS in Electronic Systems Is this degree accepted for other universities/ outside india? Is this degree accepted for other universities/ outside india? Our Diploma and Degree are official Diploma and Degree of IIT Madras. What type of Job will I get after doing this Foundation/Diploma/ Degree Level? What type of Job will I get after doing this Foundation/Diploma/ Degree Level? Some of the major career options available to students taking this program may include the following job positions in industries such as Automotive, Semiconductor, Defence and so on: Electronic System Designer Embedded System Developer Electronic Hardware Specialist System Testing Engineer Can I do M.Tech through gate after completion of BS degree ? You can do M.Tech, however, you will have to check the eligibility criteria mentioned in that University/ Institution you are applying to. Is this degree valid to appear UPSC and SSC or any other Government Exams? Is this degree valid to appear UPSC and SSC or any other Government Exams? Every University sets its own requirements. UPSC and other exams such as State exams decide what degrees they recognize. From the side of IIT Madras we are happy to write to these organizations and entities and inform them that this BS degree from IIT Madras is a valid four-year degree that can be considered. Is this degree UGC recognized? Is this degree UGC recognized? IITs are institutes created under an Act of Parliament, the IIT Act. This act provides all rights to IITs to confer degrees. IITs do not come under UGC, and no degree of IIT needs additional approval or recognition by UGC. Any degree granted by an IIT is recognized as a legal degree. Can I do two degrees (1 Offline and 1 Online) simultaneously? Can I do two degrees (1 Offline and 1 Online) simultaneously? Yes, students can do this program (BS in Electronic Systems) along with another degree program. Will we get marksheets for foundation Course/Diploma Courses/BS Degree courses in Electronic System ? Will we get marksheets for foundation Course/Diploma Courses/BS Degree courses in Electronic System ? Semester wise progress card and Grade card will be provided Which mode of Learning (Part Time/Full Time/Online/Distance) will be written on Marksheet ? Which mode of Learning (Part Time/Full Time/Online/Distance) will be written on Marksheet ? Mode such as distance, online, etc will not be mentioned in Marksheet. Can I do an MBA Degree after taking up this course? Can I do an MBA Degree after taking up this course? Generally any graduate can apply for an MBA, but you will have to check the eligibility criteria mentioned by

the Institution or University in which you are going to apply. Why is there no 3 years exit with a BSC degree in this course similar to

Data Science? Why is there no 3 years exit with a BSC degree in this course similar to Data Science? In order acquire certain skills and knowledge required to be a graduate in the field of Electronic Systems, certain courses must be studied and it requires 4-years to study them. Hence we do not have 3

year exit. What is the overall structure of the program? What are Levels? What is the overall structure of the program? What are

Levels? The program is split into three levels that have to be done strictly in sequence: 1: Foundational Level (9 courses + 1 Lab) - 44 Credits 2: Diploma Level (8 Courses + 2 Labs) - (44+ 42) = 86 Credits 3: Degree Level (12 courses) + Apprenticeship (Optional) - (44+42+56) = 142 Credits Check Overall Structure in Academics page. How much time do I need to spend on a course per week? How much time do I need to spend on a course per week? The expected effort is about 8-10 hours per week per course. How many courses can I complete in a year? How many courses can I complete in a year? There are two semesters in a year. Learners will be allowed to register for a maximum of four

theory courses in a semester depending on their preferred pace of learning. Note that registration for any course

requires that the prerequisite courses for this should be completed. How / where do I ask questions or doubts related to the course content of

the program? How / where do I ask questions or doubts related to the course content of the program? Each course page will have a discussion forum where learners can raise their course-related

questions and interact with the course instructor or course support team. For all questions not related to the course, you may write to support-es@study.iitm.ac.in What is a quiz? What is a quiz? A quiz is similar or equivalent to a monthly test in schools and colleges. Marks obtained in

quizzes count towards the total score obtained in the course. All quizzes will be in-person, invigilated exams

at designated centres across the country. Are the exam dates flexible? Are the exam dates flexible? No, the exam dates are not flexible. The quiz and end semesters exam dates are fixed for all learners taking the

same course in a semester. We try our best to schedule all exams during the weekends though it

may not be possible for every exam. When will the Semester start? What is the timeline? When will the Semester start? What is the timeline? The semester will start after the Qualifier process. Those who are successful in the Qualifier

Exam can join the program by registering for the Foundational level courses in September 2023. Can I pursue only a Diploma instead of Degree? Can I pursue only a Diploma instead of Degree? You can exit with Diploma in Electronic Systems. However, please note that there is no direct entry to Diploma.

You will have to do Foundation level courses also, before taking up Diploma. Can the credits from this online degree program be transferred to learner's college or university (like on the

NPTEL platform)? Can the credits from this online degree program be transferred to learner's college or

university (like on the NPTEL platform)? IITM's BS Degree in Electronic System is a stand alone program. Credits cannot be transferred. Will IIT Madras provide the course material for the program in hard copy

through courier? Will IIT Madras provide the course material for the program in hard copy through courier? No, the course content will be provided only in online mode so you can watch them anytime, anywhere. There will be no hard copy provided. Depending on the course, learners may be recommended reference books / material that they may buy separately. Is it mandatory to travel to IIT Madras for the Lab courses? Is it mandatory to travel to IIT Madras for the Lab courses? Yes. It is mandatory that students travel to IIT Madras campus to demonstrate the lab experiments specified and complete the lab exams in person at the campus. During my lab session can I get any accommodation available inside the campus? During my lab session can I get any accommodation available inside the campus? No. You have to make your own arrangements for accommodation during lab sessions and any other logistics will not be borne by IIT Madras. The program team will try and see if this is possible but there is no confirmation that accommodation will be provided. Will there be any projects also in BS in Electronic Systems program (like we have in BS in Data Science)? Will there be any projects also in BS in Electronic Systems program (like we have in BS in Data Science)? For some courses there might be mini projects depending on the course. What is Apprenticeship in Degree Level? What is Apprenticeship in Degree Level? Doing an apprenticeship is optional. The program provides the students in the BS level of the program to pursue an apprenticeship with companies and research projects and earn credits in this level. I ran into an error or issue in the application form. What do I do? I ran into an error or issue in the application form. What do I do? Please send us your registered email ID and a screenshot of the error / issue with relevant description to support-es@study.iitm.ac.in If the error is after payment has been made, please forward the confirmation email from Razorpay along with email ID, application number and screenshot with description. What if I want to request for a city not listed in the current list of exam cities? What if I want to request for a city not listed in the current list of exam cities? If the city of your choice is not in our current exam cities list, please send an email to support-es@study.iitm.ac.in. We will consider your request, but there is no guarantee that we will add it. Will there be multiple exam centres within an exam city? How many? Will there be multiple exam centres within an exam city? How many? There may be more than one exam centre in any exam city. The count depends on the number of learners in each city and availability of centres on given date with our exam partner. What OBC-NCL / EWS certificates should we submit while applying or registering for courses? What OBC-NCL / EWS certificates should we submit while applying or registering for courses? Student has to submit valid certificates while applying / registering. These will be verified by our team. An approved certificate will be valid for two semester. Certificates that are outdated will not be accepted. After applying, can I get a refund of application fee if I can't write the qualifier exam or if

I fail the
qualifier exam? After applying, can I get a refund of application fee if I can't write the
qualifier exam or if
I fail the
qualifier exam? No. There will be no refund of application fee once paid. Can I edit my
application form after submitting it? Can I edit my application form after submitting it? Your application
form will be considered as submitted only upon making the application fee
payment. Until then,
you may edit the contents of your application form. After the application fee has been paid,
you
will not be
allowed to edit the application form. In case your uploaded document(s) gets "returned /
rejected" during verification, you will be
given a chance to
re-upload a valid document within a stipulated deadline. My application status says
"Verification Under Process". How long will it take for my
application to be
verified? My application status says "Verification Under Process". How long will it take for
my
application to be
verified? Verification of documents may take upto 3 weeks. Please be patient. We will
keep you updated
about your
application status by email and on the dashboard. How to avoid getting my application
"returned / rejected"? How to avoid getting my application "returned /
rejected"? After you submit your application, we verify the same before changing the
status of uploaded
document(s) to
"accepted" or "returned / rejected". Be careful when filling the application form and double
check the information you enter. We
verify the files /
documents you have uploaded (photograph, signature, ID card, SC / ST / OBC-NCL /
EWS / PwD
document if
applicable). If any of the files / documents uploaded is unclear or broken or found to be
wrong
or incorrect,
your application may be "returned / rejected". In case your uploaded document(s) gets
"returned / rejected" during verification, you will be
given a chance to
re-upload a valid document within a stipulated deadline. Being honest and careful while
filling the application form and uploading correct documents in
the correct
formats will help get your application "accepted". Check Application Process for required
documents, document formats and sizes. Can I select only one city as my Exam City instead of selecting
two
preferences? Can I select only one city as my Exam City instead of selecting two
preferences? No. You will need to pick two different preferences for exam cities in the order of your
preference. Your exam
centre shall be allotted in any one of the two exam cities picked depending on availability.
We
recommend that
you familiarize with the currently available Exam City options to be able to pick your
preferred exam cities. Can I change my exam cities for the qualifier exam after having paid and submitted
my

application? Can I change my exam cities for the qualifier exam after having paid and submitted my

application? You will be allowed to change your exam city for any exam till 4 weeks before the exam date. Will the Exam City preferences I select for the Qualifier Exam in the application form be fixed

for all the later exams? Will the Exam City preferences I select for the Qualifier Exam in the application form be fixed

for all the later exams? No. The Exam city preferences selected in the application form is for the Qualifier Exam only.

You will have the option of picking a different set of Exam City options for each quiz and the final exam. I am a student of BS in Data Science. Can I join BS ES program also? I am a student of BS in Data Science. Can I join BS ES program also? Currently the BS Electronic Systems program exam dates align with the BS Data Science program.

Hence it will not be possible to do both programs together. Program updates, if any, will be communicated and updated on our website. I have not done 12th Class. But I have done 3-year Diploma. Can I join? I have not done 12th Class. But I have done 3-year Diploma. Can I join? Yes. You can join as long as you have studied Physics and Maths in your 3-year Diploma Can we apply for Diploma in ES alone rather than applying for the degree? Can we apply for Diploma in ES alone rather than applying for the degree? No. There is no option to register for diploma alone. However, you have multiple exit options which allows you

to exit with diploma What is the procedure to change exam city from UAE to India / India to UAE? What is the procedure to change exam city from UAE to India / India to UAE? Please send an email to support-es@study.iitm.ac.in and

ge-es@study.iitm.ac.in What is the eligibility criteria to apply for the Degree Program? What is the eligibility criteria to apply for the Degree

Program? Check Eligibility section in Admissions page for the latest update of the eligibility criteria. Is the program available to students currently in class 11th standard? Is the program available to students currently in class 11th standard? School students who have appeared for their Class 11 final exams can apply and go through the

qualifier phase but will not be allowed to register for courses of the program until they clear class 12 (or equivalent). Note

that a Qualifier Exam result is valid only for 2 semester (about 1 year) right after the exam. I took a break year after class 12 to prepare for JEE / NEET. Can I Apply for the Program? I took a break year after class 12 to prepare for JEE / NEET. Can I Apply for the Program? Yes, you can apply for the program if you have cleared class 12 or equivalent with Physics and

Mathematics. I had dropped out of degree over two decades ago. Would I be eligible to apply? I had dropped out of degree over two decades ago. Would I be eligible to apply?

Yes. If you cleared class 12 or equivalent in 2023 or earlier with Mathematics and Physics, you can apply. There

is no requirement to have completed a degree program. How and where can I apply for the program? How and where can I apply for the program? Anyone who is eligible may apply by visiting our website <https://study.iitm.ac.in/es/> and

clicking "APPLY NOW" and filling in the application form, paying the application fee and uploading required documents. We recommend that you go through the Academics page and Admissions page to better understand the

program and the admission process before applying. What is the qualifier process? What is the qualifier process? All applicants will have to go through a Qualifier Process, wherein they will get access to 4 weeks of content

of the four foundational level courses. Applicants must go through this qualifier content and submit assignment.

Eligible applicants are given the hall ticket to the qualifier exam. which is conducted on 6th August 2023 Will everyone who goes through the qualifier process be allowed to write the qualifier exam?

What is the passing criteria? Will everyone who goes through the qualifier process be allowed to write the qualifier exam?

What is the passing criteria? No. Only the learners who get the minimum required marks in the online assignments during the qualifier process of 4 weeks will allowed to attend the qualifier exam. Only those learners allowed to write the

qualifier exam shall be provided with hall tickets. Refer to Qualifier Process and the section below it to learn about the minimum required marks in the qualifier assignments and minimum

required marks to pass / clear the qualifier exam. How long is the qualifier exam result valid for? Can I join the program at a later semester if I

clear the qualifier exam now? How long is the qualifier exam result valid for? Can I join the program at a later semester if I clear the

qualifier exam now? The Qualifier Exam result is valid for a period of 2 semester (or 1 year). How many times a year will there be admissions? Will it be only once a year? How many times a year will there be admissions? Will it be only once a year? Currently it is 2 application cycles a year. What are the documents / files required to apply for the qualifier process of the program?

What are the documents / files required to apply for the qualifier process of the program? The list of required documents is available on the Application Process section of the admissions page. After registering for a course in a semester, can I carry over the fees to the next semester if

I am not able to complete the course? After registering for a course in a semester, can I carry over the fees to the next semester if

I am not able to complete the course? No. A course registration is valid only for one semester. If a learner is not able to clear a

course in a semester, they will be considered as having failed the course and will need to register for the

course again at a later semester along with the required fee. I am unable to attend the Qualifier Exam but received hall ticket / I didn't clear the Qualifier

Exam. What will be the procedure to re-apply? Do I need to pay application fee again? I am unable to attend the Qualifier Exam but received hall ticket / I didn't clear the Qualifier

Exam. What will be the procedure to re-apply? Do I need to pay application fee again? You can re-apply again for the immediate next Qualifier exam in the same term at half the original fee paid by

you. Your previous assignment scores will be considered and you will be directly eligible to write the Qualifier

Exam-attempt 2 without having to submit assignments again. I applied for the Qualifer process but I didn't obtain the minimum required average assignment scores to be

eligible to take the Qualifier Exam, and hence didn't receive any hall ticket for the same.

What will be the procedure to re-apply? I applied for the Qualifier process but I didn't obtain the minimum required average assignment scores to be eligible to take the Qualifier Exam, and hence didn't receive any hall ticket for the same.

What will be the procedure to re-apply? You have to re-apply as a new applicant with payment of full application fee. If I have passed the JEE Main, Can I get a direct entry opportunity to the Foundation level without appearing Qualifier? If I have passed the JEE Main, Can I get a direct entry opportunity to the Foundation level without appearing Qualifier? Candidates who have qualified to attempt JEE Advanced in the current year 2023 are deemed to have directly qualified to the BS-ES program and can register for a maximum of four courses in the Foundation level and start the program. Is there any lateral entry for the Diploma students? Is there any lateral entry for the Diploma students? There is no lateral entry for Diploma Do I have to go to coaching center to prepare for Qualifier Exam? Do I have to go to coaching center to prepare for Qualifier Exam? No. You don't have to go to coaching center. You can do self-study. It is based on 4-weeks of content that we provide. What will be asked in the qualifier exam? What will be asked in the qualifier exam? The Qualifier exam will include questions related to four weeks of content of the four foundational level courses - English I, Math for Electronics I, Introduction to C Programming and Electronics System Thinking and Circuits. What is the Fee structure? Should we submit the entire fees at once or in installments? What is the Fee structure? Should we submit the entire fees at once or in installments? The overall program fees need not be paid at one stretch. The fees will be collected in each semester based on the number of courses you register for the respective semester. So, if you register for 2 courses in a semester, you have to pay the fees only for those 2 courses. For more details, please refer to the Fee Structure in Academics Page. What is the mode of payment? What is the mode of payment? Fees can be paid only through online mode. Fees through DD will not be accepted. Note that payment cannot be made using a Debit Card. You can pay using any Credit Card, Netbanking (all Indian Banks), Wallet, UPI (Google Pay, BHIM, etc.). Will I get any confirmation on successful payment of fee? Will I get any confirmation on successful payment of fee? Yes. After successful completion of payment, you will receive a confirmation email from Razorpay. If my payment fails, how many days will it take to the money back in my bank account? If my payment fails, how many days will it take to the money back in my bank account? In case of failed payments, it will take 3 to 4 weeks for the money to be credited back in your bank account. Will I get a scholarship / loan for this programme? Will I get a scholarship / loan for this programme? We are trying to see if this is possible. Please watch out for announcements regarding scholarships / loans. Is there any concession for SC / ST / OBC-NCL / EWS / PwD

candidates in terms of scores? Is there any concession for SC / ST / OBC-NCL / EWS / PwD candidates in terms of scores? SC / ST / OBC-NCL / EWS / PwD candidates will have concession in minimum scores required during the qualifier process to enter the program. Check out Fee Structure in Academics page. Note that there will be no such concessions after entering the program. (OBC candidates not belonging to the OBC-NCL category cannot avail any concession) Is there any fee waiver for SC / ST / OBC-NCL / EWS / PwD candidates or candidates with lower family income? Is there any fee waiver for SC / ST / OBC-NCL / EWS / PwD candidates or candidates with lower family income? Only SC / ST / PwD candidates may avail fee waivers in the application stage. After clearing the qualifier process and exam, candidates belonging to any category (General / OBC / EWS / SC / ST / PwD) may avail fee waivers in course fees based on family income. Check Fee Structure in Academics page for details. What does "family income" in the fee structure mean? What does "family income" in the fee structure mean? The term family income for the purpose of availing fee waivers includes the income of the candidate, the income of his/her parents and spouse, also the income of his/her siblings and children below the age of 18 years. After clearing the Qualifier Exam, all learners who wish to avail fee waivers based on Family Income are required to submit Family Income Certificate in the format provided in the Fee Structure section. Note that the Family Income Certificates are valid only for one year and will need to be submitted afresh each year to continue availing fee waiver based on Family Income through the program. I belong to the general category and I want to avail fee waiver since my family income is below 5 lakhs per annum. Why do I need to submit EWS + Family Income Certificate to avail the waiver? I belong to the general category and I want to avail fee waiver since my family income is below 5 lakhs per annum. Why do I need to submit EWS + Family Income Certificate to avail the waiver? Economically Weaker Section (EWS) in India, as defined by the Govt. of India, is a sub-category of people belonging to the General category with an annual family income less than 8 lakhs per annum and who do not belong to any category such as SC/ST/OBC. Course fee waivers from IIT Madras are available for general category learners with family income less than 5 lakhs per annum. As per the policy of IIT Madras, and as part of our documentation process to ensure that we give fee waiver benefits to the deserving learners, we require general category learners with family income less than 5 lakhs per annum to submit both EWS certificate and Family

Income certificate. EWS and Family Income certificates will need to be obtained in the format mentioned in the Fee Structure section in Academics page. What is the registration process for the Foundational Level? What is the registration process for the Foundational Level? Once you clear the Qualifier Exam, you will be allowed to access the Course Registration Form from your dashboard upon logging in. In the Course Registration Form, you will need to fill in the required details, upload necessary documents and pay the course fee to register for the first semester of your Foundational Level. You may choose to register for one or more Foundational Level courses with the upper limit of four courses. Note that there will be an added Exam Fee applicable for learners opting to write their quizzes and end semester exams outside India. What are the documents / files that are required to be uploaded while registering for the Foundational Level? What are the documents / files that are required to be uploaded while registering for the Foundational Level? It is mandatory to upload 12th or equivalent mark sheet. In addition, any one of these documents while registering for Foundational Level are required: - Degree Certificate OR - Certificate of the highest level of education What are the documents needed to avail fee waiver at Foundational Level and later? What are the documents needed to avail fee waiver at Foundational Level and later? Please refer to the Fee Structure section in the Academics page to see which fee waiver may be applicable to you and the relevant documents / certificates that will need to be submitted. I have already submitted my category certificate while applying for the Qualifier Process. Do I need to submit them again while registering for the Foundational Level? I have already submitted my category certificate while applying for the Qualifier Process. Do I need to submit them again while registering for the Foundational Level? No, not required to submit again. However, the EWS / OBC-NCL certificate need to be submitted again if the previously submitted certificate is not valid until the end of the current financial year. I can't afford to pay the entire Foundational Level fees at one shot and I do not come under any fee waiver category too, can I pay the fees in 2 or 3 installments? I can't afford to pay the entire Foundational Level fees at one shot and I do not come under any fee waiver category too, can I pay the fees in 2 or 3 installments? Please be informed that you will not be paying the entire Program fee or Foundational Level fee at one stretch. The actual fees you will be paying will be in proportion to the number of courses you register for in every semester. So, if you register for 2 courses in the July 2023 semester, you have to pay the course fees only for those 2 courses. In the Fee Structure section, select your goal to be able to see a detailed PDF with breakdown of course fee over

each semester. Can I change my email ID in the Foundational Level? Will we get any official student email ID? Can I change my email ID in the Foundational Level? Will we get any official student email ID? The personal email ID you applied for the program with cannot be changed. This email ID is used

to access the whole Qualifier Process and the Foundational Level Course Registration Form. Once an applicant passes the qualifier exam and registers to courses, they will be assigned a roll number and a corresponding official IIT Madras BS Degree student email ID. After that, all further communication and course access will be through the official student email ID. Will I be given a new portal to access courses at Foundational Level? Will I be given a new portal to access courses at Foundational Level? No, the current portal will be used for all the Levels. You will be given a new official IITM BS

Degree student email ID to access the portal. Will I be issued an ID card? Will I be issued an ID card? An ID card in electronic format will be provided, subject to conditions on use of the ID card. Can I take a break of 1 or 2 year(s) after completing the Foundational

Level? Can I take a break of 1 or 2 year(s) after completing the Foundational Level? The BS Degree has to be completed within a maximum period of 8 years. While a 1 or 2 year break between Levels is allowed, we recommend that you time the length of your breaks

depending on whether you want to pursue a Diploma or Degree, and how many courses you are able

to take up in a Semester. What is the eligibility to write the End Semester Exam for a course? What is the eligibility to write the End Semester Exam for a course? To be eligible to write the End Semester Exam for a course, it is mandatory for the learner to

(i) obtain an Average Assignment Score $\geq 40/100$ AND (ii) appear for at least one out of the two proctored

in-person Quizzes. Every course might have additional eligibility conditions to write the end-sem exam and obtain the course grade.

Please check the grading document for details on this. Learners who are not eligible to write a specific course's End Semester Exam will not be issued hall ticket for

the same. They will have to repeat the entire course including assignments and quizzes in a

later Semester. Is it mandatory to take the proctored in-person Quizzes? Is it mandatory to take the proctored in-person Quizzes? It is mandatory to attempt at least one of the proctored in-person quizzes in a Semester to be

eligible to appear for the End Semester Exams. The quizzes contribute to the final course score and the

course grade and hence it is recommended that students attempt both quizzes and all other assessments in the

course. Will Qualifier phase assignment scores be included while calculating the eligibility for the End

Semester? Will Qualifier phase assignment scores be included while calculating the eligibility for the End

Semester? For the courses you register for in the same semester immediately after clearing your Qualifier

Exam, yes, your Qualifier phase assignment scores will be included while calculating eligibility for the End

Semester Exam. For courses that you register for in a later Semester, you will be required to repeat the assignments in the course again. Will my Qualifier Exam Score be considered in the subsequent Semester? Will my Qualifier Exam Score be considered in the subsequent Semester? The Qualifier Exam Score will be counted as Quiz 1 Score for the courses registered in the SAME Semester immediately after the Qualifier exam. They will not be used in any other subsequent semester. What will happen if I am absent for an End Semester Exam? What will happen if I am absent for an End Semester Exam? Learner has two options: 1. Register for the course in the subsequent semester with the option of taking the End Semester Exam alone and by paying a reduced fee. 2. Repeat the entire course (including assignments and quizzes) by paying the full course fee. What is the procedure to add / drop a course? What is the procedure to add / drop a course? Once the registration window closes in any Semester, adding courses will not be allowed. Dropping a course will be allowed within 4 weeks of the Semester start. Is it possible to repeat a course for improving grades? Is it possible to repeat a course for improving grades? Though it is not recommended, a learner may choose to repeat a course for improving grades any number of times. The course fee for repeating a course will be twice the regular course fee and the learner will have to submit the online graded weekly assignments, appear for the Quiz(zes) and End Semester Exam. The highest score among all attempts of a course will be used for calculating the CGPA. How can I change the exam city within India? How can I change the exam city within India? Each exam has a deadline before which change of exam city is allowed. Option to change the exam city will be available till each deadline in the student Dashboard, in the "Exam Cities and Hall Tickets" page. honour code

Honour Code Effective Date: 15/06/2020 In order to participate in IIT Madras online degree programme, you must agree to the Honor Code given below and any

additional terms specific to a course or program. This Honor Code, and any additional terms, will be posted on our website -

onlinedegree.iitm.ac.in. Honour Code Pledge By registering in an IIT Madras Online Degree programme, I agree that I will: • Complete all tests and assignments on my own, unless collaboration on an assignment is explicitly permitted. • Maintain only one user account, unless IIT Madras has approved the use of a separate user account in connection with an

employer-sponsored or university-sponsored program. • Not let anyone else use my username and/or password. • Not engage in any activity that would dishonestly improve my results, or improve or hurt the results of others. • Not engage in any activity that will cause grief or harm to the online degree websites/portals or study materials,

including activities like hacking or accessing restricted materials. • Not post answers to problems that are being used to assess learner performance either inside the course forums or in any other website. • Not resubmit or submit work (in identical or similar form) for multiple assignments without prior explicit approval. • Not submit false or altered or fabricated admission documents including signatures or certificates of

enrollment or standing, registration forms, and medical certifications. Violations If you are found in violation of the Terms of Service or Honor Code, you may be subject to one or more of the following actions: • Receiving a zero or no credit for an assignment; • Having any certificate/degree earned in the course or programme withheld or revoked; • Being unenrolled from a

course or programme; or • Termination of your use of the IIT Madras ONLINE DEGREE Site. • Additional actions may be taken at the sole discretion of IIT Madras. • No refunds will be issued in the case of any corrective action for such violations. Honor Code violations will be determined at the sole discretion of IIT Madras. You will be notified if a determination has been made that you have violated this Honor Code and you will be informed of the corresponding action that will be taken as a result of the violation. Changing the Honour Code Please note that we review and may make changes to this Honor Code from time to time. Any changes to this Honor Code will be effective immediately upon posting on onlinedegree.iitm.ac.in page, with an updated effective date. By accessing the IIT Madras ONLINE DEGREE Site after any changes have been made, you signify your agreement on a prospective basis to the modified Honor Code and any changes contained therein. Be sure to return to this page periodically to ensure familiarity with the most current version of this Honor Code. Honour Code

India's top technical institute, welcomes you to the Four-year Bachelor of Science (BS) Degree in Electronic Systems . Study from anywhere, at your own pace. Eligibility Anyone who has completed class 12 with Physics and Maths can apply irrespective of age, role or geographical location. Coursework Content, tutorials, doubt clearing sessions & assignments will be online, while quizzes, exams and labs will be conducted in-person. Lab courses will be

in-person at IIT Madras campus. Flexibility Learn from anywhere, at your convenience. Option is available to choose the number of courses per semester. The BS degree will be awarded once 142 credits are

earned. Skills The graduates of this programme will have strong fundamentals and industry-ready skills. Content taught by experienced IIT Madras faculty and industry experts. The program content can be accessed by learners from anywhere. The emphasis is on electronics, embedded programming, digital systems, and control engineering. The students will be able to apply the acquired engineering principles and knowledge to implement and improve systems and processes for applications.

DEGREE PROGRAM B.S. in Electronic Systems In this program, students will have the unique opportunity to develop industry-ready skills to design and build Electronic and embedded Systems.

ELIGIBILITY APPLY NOW DIPLOMA PROGRAM Diploma in Electronic Systems The Diploma is intended for anyone looking to grow their careers in the electronic systems industry or who wants to learn more in the field of electronic systems. Apply for and join the Degree Program (BS in Electronic Systems) and exit after completing the Diploma Level courses with a Diploma in Electronic Systems. Note: There is no direct entry to diploma. Everyone has to go through the qualifier process and join Foundation level first. Student Life Join a supportive, diverse, vibrant community of students and scholars who share your passion. Our reputation for excellence attracts some of the best minds in the

world. Alongside the academic activities, students can have fun and develop interests through clubs and extracurricular activities that help them build on social skills and

career goals while enjoying a great social life. Timeline Qualifier Application: Open Now (for May 2024 term) Qualifier Application closes: May 26th, 2024 Qualifier Week 1 Starts: May 31st, 2024 Qualifier Exam: July 7th, 2024 IIT Madras has a rich history of providing high-quality education and this program is designed to underline the fact that IIT is within the reach of everyone. The

BS program is meticulously drafted and is aligned with the goals of the National Educational Policy. With the growing prominence of electronics in the current world scenario, education of electronics fundamentals at scale becomes crucial both for research & development and capacity building to meet the industry demand. Keeping

this in mind, IIT Madras offers this BS course which we expect to help meet the need of our nation and aspirations of the student. We are planning to make IIT

Madras a 'Vishwa-guru (Global Teacher)' through innovative approaches to enhance the quality of education. In order to support the students from financially

disadvantaged backgrounds to pursue this program, scholarships are being provided. Prof. V. Kamakoti, Director, IIT Madras Who can join? Anyone who has passed Class 12 (or

equivalent) in any year with Physics and Mathematics can apply. School students who have appeared for their Class 11 final exams (with Physics and Mathematics as their subjects of study) can apply. Those who qualify can join the

program after passing Class 12. Check out Eligibility . What is being offered? BS Degree in Electronic Systems Option to exit earlier with a Foundation Level Certificate or Diploma Are these official Diploma and Degree of IIT Madras? Yes. IITM senate approves and offers the Diploma(s) and Degree(s). Degree holders become alumni of IIT Madras. What is the Qualifier Process? Four weeks of courses and assignments to be completed. Those who get minimum required scores in weekly assignments in the four weeks will get to write the Qualifier Exam based on the four weeks of content. Those who get minimum required scores in the Qualifier Exam continue with the program. Others are encouraged to reappear for the qualifier exam. What is the Structure of the Program? The program is split into three levels: 1: Foundational Level (44 credits) 2: Diploma Level (42 credits) 3: BS Degree level (56 credits) Total: 142 credits for BS Degree For more detailed information about the program, courses and fee structure, check out the ACADEMICS PAGE World Class Faculty Learn from carefully designed courses taught by experienced IIT Madras faculty and other industry experts. Flexible Our program is flexible with exit points for learners from different backgrounds with different aspirations. Course Support Each course will have discussion forums with an active academic team to help in clearing doubts. Why learn BS Electronic Systems? As we know, electronic systems are at the heart of almost all modern engineering systems. By acquiring the fundamentals and skills one will be in a position to serve the Automotive, Consumer Electronics, Space, Mobile, Medical Electronics, Defense industry as an electronic or embedded system design and development engineer. There is a huge growing demand in this domain.

CS1101 Foundation Level Introduction to C Programming by Prof. Nitin Chandrachoodan Course ID: CS1101 Course Credits: 2+3 Course Type: Foundation Pre-requisites: None What you'll learn VIEW COURSE VIDEOS This course is intended as a practical introduction to C programming for electrical engineers. The focus is on gaining experience with writing and debugging programs. At the end of this course, a student should be able to: write, compile and run programs in C use debugging tools to find and correct errors in programs use various constructs in C and the standard library of C to implement basic data structures and algorithms understand the need for an OS and how programs interact with the system Course structure & Assessments 5 credit course, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam & OPPE(s). For details of standard course structure and assessments, visit Academics page. WEEK 1 Write, compile, run programs in C, in a Linux environment; debugging tools WEEK 2 Variables, built-in datatypes, operators; Control flow - conditionals, loops WEEK 3 Modularity and functions; variable scope WEEK 4 Input/Output; Files WEEK 5 Pointers, memory, arrays, strings WEEK 6 Multi-dimensional arrays, dynamic memory allocation; issues - memory leaks, management WEEK 7 Standard library and common extensions (math, time etc.) WEEK 8 Implementation concepts: compilation and execution process; heap/stack; runtime and OS interface The course will involve a significant programming component for each step. The evaluation will include live demonstration of coding in instructor-led sessions. + Show all weeks Prescribed Books The following are the suggested books for the course: "The C programming language", Kernighan and Ritchie Online references About the Instructors Prof. Nitin Chandrachoodan Professor, Department of Electrical Engineering, IIT Madras Nitin Chandrachoodan received his BTech (electronics and communication engineering) from IIT Madras in 1996, and PhD from the University of Maryland at College Park in 2002, in the area of high-level synthesis techniques for mapping DSP algorithms to architectures. He has been with the department of electrical engineering at IIT Madras since 2004, where he is currently an professor. ... more His research interests include digital systems design and design automation tools and techniques, as well as design of embedded systems with a special focus on assistive technologies. He has taught graduate courses on digital integrated circuit design and on mapping algorithms to architectures, and a UG course on data structures and algorithms, as well as a laboratory course on digital design using FPGAs. He is an associate editor of the Springer Journal of Signal Processing Systems.

CS1102 Foundation Level Introduction to the Linux Shell by Prof. Gandham Phanikumar Course ID: CS1102 Course Credits: 4+1 Course Type: Foundation Pre-requisites: None Co-requisites: CS1101 -

Introduction to C Programming What you'll learn The course is intended to introduce concepts of Linux-based operating environments. Students should develop familiarity with software tools and concepts required for managing software projects of different types. Course structure & Assessments 5 credit course, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam. For details of standard course structure and assessments, visit Academics page. WEEK 1 Linux OS; kernel vs distribution; command line interaction vs graphical interfaces WEEK 2 Software management; package installation and updating; users, permissions, administration WEEK 3 Shell scripting; variables, IO redirection, pipes, background jobs WEEK 4 Text processing; file handling; interaction with other scripting languages WEEK 5 Software projects and compilation; make and dependency management WEEK 6 Version control; git; web interfaces WEEK 7 Basic networking; DNS; servers, daemons; remote access - secure shell

The course will have extensive practical exercises including instructor-led sessions and coding with instructors. + Show all weeks Prescribed Books The following are the suggested books for the course: "Introduction to Linux - A Hands On Guide", M. Garrels, The Linux Documentation Project "An introduction to Computer Networks", P. Dordal Curated online reference material About the Instructors Prof. Gandham Phanikumar Professor, Metallurgical and Materials Engineering, IIT Madras Prof. Gandham Phanikumar doctoral work is on heat transfer, fluid flow and solute transfer during laser processing of dissimilar metals. After joining IIT Madras in 2005, he has been teaching a UG core course on transport phenomena for several years. His research continues to involve concepts of transport phenomena in materials processing.

CS2101 Foundation Level Embedded C Programming by Prof. Nitin Chandrachoodan Course ID: CS2101 Course Credits: 4+2 Course Type: Foundation Pre-requisites: CS1102 - Introduction to the Linux Shell What you'll learn This course addresses the use of microcontrollers (uCs) to implement embedded systems. At the end of this course, a student should be able to:

identify and distinguish types of uCs, their uses, and make design selection decisions write, compile, execute, and debug programs on generic uCs understand interfacing of peripherals and construction of basic embedded systems involving uCs and external peripheral circuits Course structure & Assessments 6 credit course, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam. For details of standard course structure and assessments, visit Academics page. WEEK 1 Types of microcontrollers; programmability, memory, compute capacity, functionality, interfacing WEEK 2 Memory maps; peripheral interfacing; register mapping WEEK 3 Typical data structures and programming styles for embedded systems WEEK 4 General purpose IO, low speed interfaces WEEK 5 Bus interfaces: UART, SPI, I2C; introduction Modbus, CANbus WEEK 6 Human-Computer Interaction; keyboard, mouse, touchscreen WEEK 7 High performance IO; buffering, DMA; USB, ethernet, networking WEEK 8 Real-time operating systems; latency constraints; scheduling; FreeRTOS, Linux concepts WEEK 9 Video interfaces WEEK 10 System-level design, integration; SoC concepts + Show all weeks Prescribed Books The following are the suggested books for the course: Class Notes The C Programming Language, Kernighan and Ritchie Curated online reference material About the Instructors Prof. Nitin Chandrachoodan Professor, Department of Electrical Engineering, IIT Madras Nitin Chandrachoodan received his BTech (electronics and communication engineering) from IIT Madras in 1996, and PhD from the University of Maryland at College Park in 2002, in the area of high-level synthesis techniques for mapping DSP algorithms to architectures. He has been with the department of electrical engineering at IIT Madras since 2004, where he is currently an professor. ... more His research interests include digital systems design and design automation tools and techniques, as well as design of embedded systems with a special focus on assistive technologies. He has taught graduate courses on digital integrated circuit design and on mapping algorithms to architectures, and a UG course on data structures and algorithms, as well as a laboratory course on digital design using FPGAs. He is an associate editor of the Springer Journal of Signal Processing Systems. less Visit website Other courses by the same instructor: - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective and - Open Elective View all Foundation Level courses honour code

CS2102 Diploma Level Python programming Course ID: CS2102 Course Credits: 5 Course Type: Diploma Pre-requisites: None What you'll learn Using basic programming concepts such as variables,

expressions, loops, conditionals and functions in Python Creating, manipulating, and using more Python specific features such as lists, tuples, and dictionaries Familiarising with and using common Python libraries such as random, math, datetime, scipy, matplotlib, Pandas etc Analysing real life activities and casting them as programming problems Applying programming concepts to analyse and solve diverse problems Writing Readable code and debugging it Building small applications using python Course structure & Assessments 5 credit course, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam & OPPE(s). For details of standard course structure and assessments, visit Academics page. WEEK 1 Introduction to algorithms WEEK 2 Conditionals WEEK 3 Conditionals (Continued) WEEK 4 Iterations and Ranges WEEK 5 Iterations and Ranges (Continued) WEEK 6 Basic Collections in Python WEEK 7 Basic Collections in Python (Continued) WEEK 8 Basic Collections in Python (Continued) WEEK 9 File Operations WEEK 10 File Operations (Continued) WEEK 11 Module system in python WEEK 12 Basic Pandas and Numpy processing of data + Show all weeks Prescribed Books The following are the suggested books for the course: Title: Python for Everybody. Author: Charles R. Severance. Publisher: Shroff Publishers. ISBN: 9789352136278 (The PDF of this book is currently available freely at http://do1.dr-chuck.com/pythonlearn/EN_us/pythonlearn.pdf) View all Diploma Level courses honour code

EE1101 Foundation Level Electronic Systems Thinking and Circuits The course is intended to provide an insight into electronics systems that are commonly encountered in daily life centered around sense-compute-communicate. The course will begin with a tear down of a laptop and/ or a mobile phone and looking at the various components. The standout component on the board is the battery which naturally leads to an introduction to voltage and finite energy sources. The course will then go on to identify a couple of ICs on the board like the processor, the RF components all connected to the same power source, each drawing its own current which can be used to motivate the idea of KCL. Basic network analysis will be covered as part of the theory to go hand in hand with these topics. Simple experiments will be conducted on a breadboard to demonstrate the theory where applicable. The idea of a microprocessor and memory will be explained with the help of analogies in an abstract manner. by Prof. Sankaran Aniruddhan , Prof. Bobby George , Prof. Janakiraman Viraraghavan Course ID: EE1101 Course Credits: 4 Course Type: Foundation Pre-requisites: None What you'll learn VIEW COURSE VIDEOS Perform basic network analysis and analyse circuits using KCL, KVL, Thevenin's theorem, Norton's theorem, Simplifying resistor and capacitor networks Perform time domain analysis of first order RC networks Explain the idea of microprocessor and a memory Explain the idea of a program stored in a memory Course structure & Assessments 4 credit course, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam. For details of standard course structure and assessments, visit Academics page. WEEK 1 Introduction,Miniaturization of electronic packaging,Mobile teardown,How small can a mobile phone get?,The battery,The charger,Back of the envelope calculations,The resistor,The Theory. WEEK 2 Introduction to "Voltage",Introduction to "Current" and Ohms Law,Series and parallel connection of voltage and current sources,I-V characteristics of Resistors, voltage and current sources,Nodal Analysis and KCL,Mesh Analysis and KVL,Measurement of simple resistive circuit,Series and parallel connection of resistors,Introduction to capacitors, Introduction to inductors,Capacitance and Inductance measurement WEEK 3 Dial, Talk and Hear,The Microphone,Motor and Generator,The Sinusoid,Energy of time varying signals,Harmonics,Electricity consumption at home WEEK 4 Problem Solving - Getting Started,Problem Solving - Lower and upper bounds ,Problem Solving - More Complex Problems,Problem Solving - Resistive Ladder,Problem Solving - Wheatstone's bridge,Problem Solving - Resistive Cube WEEK 5 Analog Mixer,Resistive Analog Mixer,Analog Mixer : Simulation,Superposition principle,Analog Mixer using superposition,Linear electrical components,Series and parallel resistive networks,Numerical examples on superposition WEEK 6 The Non-Inverting Amplifier,The Inverting Amplifier,Power Conventions ,The RC Step Response - Experiment,The RC Step Response - Theory WEEK 7 Low Pass Filter - Experiment,Low Pass Filter - Theory,High Pass Filter - Analysis,High Pass Filter - Experiment,Band Pass Filter -Design,Band Pass Filter -Experiment,First order analysis: Limitations WEEK 8 Problem Solving - Resistive Analog Mixer

,Problem Solving - Resistive Analog Mixer using superposition,Problem Solving - Superposition - Voltage sources,Problem Solving - Homogeneity Principle,Problem Solving - Power absorbed by circuit elements ,Problem Solving- Superposition - Current / Voltage sources -1,Problem Solving- Superposition - Current / Voltage sources - 2 WEEK 9 Analog vs Digital Audio Representations,Time Quantization,Amplitude Quantization,Sample and Hold Circuit,Flash ADC,Charge Sharing,Switched Capacitors,Capacitive Mixer WEEK 10 Laptop Teardown, Binary Number System, Decimal to Binary Number Conversion, Calculating Wave File Size, Analog vs Digital Computing, Digital Compute Blocks, Lab Instructions - 1 WEEK 11 Wired Communication - The Experiment,Wired Communication - Inductive Ringing,Wired Communication - Summary,Wireless Communication - The Radio,Wireless Communication - Modulation Techniques,Wireless Communication - Amplitude Modulation,Wireless Communication - Frequency Modulation,Wireless Communication - The Antenna WEEK 12 Problem Solving - LPF Energy,Problem Solving - Current Source and Capacitors,Problem Solving - Current Source, Capacitors, and Resistors,Problem Solving - Switched Capacitors,Problem Solving - Voltage source and Capacitor,Problem Solving - Voltage source, Current source, and Capacitor,Problem Solving - Current sources and Capacitor,,Course Summary + Show all weeks Prescribed Books The following are the suggested books for the course: William Hayt, Jack Kemerly, and Steven Durbin. Engineering Circuit Analysis. 8th ed. McGraw Hill Education Pvt. Ltd: Mc Graw Hill Education; August 2013.

a. Chapters 1-5

b. Chapters 7-8 Digital Logic and Computer Design, M. Mano, 2004

a. Chapter 1 Horowitz P Hill W. The Art of Electronics. 2nd ed. Cambridge England: Cambridge University Press; 1989.

Note: Laboratory manual will be provided for the SPICE Lab. About the Instructors Prof. Sankaran Aniruddhan Associate Professor, Department of Electrical Engineering, IIT Madras Dr Sankaran Aniruddhan is Associate Professor in the VLSI group of the department of Electrical Engineering at Indian Institute of Technology Madras. He obtained his B. Tech. degree in Electrical Engineering from IIT Madras in 2000, and Ph.D. degree from the University of Washington, Seattle in 2006. Between 2006 and 2011, he worked in the RF-Analog group at Qualcomm Inc., San Diego where he designed integrated circuits for Cellular RF applications. His research primarily focuses on CMOS RF Integrated Circuits for Wireless Communications. less Visit website Other courses by the same instructor: - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective and - Open Elective Prof. Bobby George Professor, Department of Electrical Engineering, IIT Madras Dr. Bobby George received the M. Tech. and Ph. D. degrees in Electrical Engineering from IIT Madras. He is a Professor in the Department of Electrical Engineering at IIT Madras. His research areas include Sensor Interface Electronics, Electric and Magnetic field Based Sensors and their Applications, Sensor Systems for Water Quality and Quantity Monitoring, and Biomedical Instrumentation. He also serves as Associate Editor for IEEE Sensors Journal, IEEE Transactions on Instrumentation and Measurement, and IEEE Transactions on Industrial Electronics. less Visit website Other courses by the same instructor: - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective and - Open Elective Prof. Janakiraman Viraraghavan Assistant Professor, Department of Electrical Engineering, IIT Madras Prof. Janakiraman Viraraghavan is an Assistant Professor at the Department of Electrical Engineering, IIT Madras and is part of the Integrated Circuits and Systems (iCS) group. His research interests include porting machine-learning algorithms on to hardware and statistical analysis in VLSI. He also has a keen interest in Microprocessors and Programming in general. less Visit website Other courses by the same instructor: - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective and - Open Elective View all Foundation Level courses honour code

EE1102 Foundation Level Digital Systems by Prof. Janakiraman Viraraghavan Course ID: EE1102 Course Credits: 4 Course Type: Foundation Pre-requisites: CS1101 - Introduction to C Programming What you'll learn VIEW COURSE VIDEOS The course is intended as an introduction to digital logic and systems. At the end of the course, students should be able to:

understand and explain digital systems composed of basic combinational and sequential elements
understand issues with timing and the performance analysis of circuits understand the use of finite state
machine based controllers and their use in design of complex circuits understand the basic operation of a
microprocessor in terms of a datapath and programmable control, along with memory interfacing Course
structure & Assessments 4 credit course, weekly online assignments, 2 in-person invigilated quizzes, 1
in-person invigilated end term exam. For details of standard course structure and assessments, visit
Academics page. WEEK 1 Digital systems, Boolean algebra, logic gates; truth tables and basic theorems
WEEK 2 Number systems; binary, hexadecimal WEEK 3 Hardware description languages; structural and
behavioural design WEEK 4 Combinational design; HDL based modular design WEEK 5 Sequential
elements; state and timing; timing parameters and analysis; WEEK 6 Finite state machines; sequence
detectors and generators; control signal generation WEEK 7 Datapath and Control; simple
microprocessor architecture; programmable systems WEEK 8 Basic instruction sets; assembly
programming WEEK 9 HDL synthesis; implementing on FPGA + Show all weeks Prescribed Books The
following are the suggested books for the course: Digital Logic and Computer Design, M. Mano, 2004
Digital Design and Computer Architecture, Harris and Harris, MK 2013 About the Instructors Prof.
Janakiraman Viraraghavan Assistant Professor, Department of Electrical Engineering, IIT Madras Prof.
Janakiraman Viraraghavan is an Assistant Professor at the Department of Electrical Engineering, IIT
Madras and is part of the Integrated Circuits and Systems (iCS) group. His research interests include
porting machine-learning algorithms on to hardware and statistical analysis in VLSI. He also has a keen
interest in Microprocessors and Programming in general. less Visit website Other courses by the same
instructor: EE1101 - Electronic Systems Thinking and Circuits , - Open Elective , - Open Elective , - Open
Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective and -
Open Elective View all Foundation Level courses honour code

EE1103 Foundation Level Electrical and Electronic Circuits by Prof. Sankaran Aniruddhan , Prof. Bobby
George Course ID: EE1103 Course Credits: 4 Course Type: Foundation Pre-requisites: EE1101 -
Electronic Systems Thinking and Circuits What you'll learn VIEW COURSE VIDEOS At the end of this
course, the student should be able to understand and analyse Linear Circuits in the time and frequency
domain. 2- and 3-terminal nonlinear devices will be introduced. Course structure & Assessments 4 credit
course, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term
exam. For details of standard course structure and assessments, visit Academics page. WEEK 1 Review
of: R, C, L, M, independent and dependent sources, Nodal and Mesh Analysis, Thevenin and Norton
equivalent; Transient analysis of electrical networks WEEK 2 DC and AC, phasors, complex impedance
and admittance WEEK 3 Laplace/frequency domain WEEK 4 frequency response, Bode plots, poles and
zeros WEEK 5 RLC circuits, Quality factor WEEK 6 Complex power, 3-phase systems WEEK 7 Linear
two port networks and network theorems WEEK 8 Non-linear elements - diodes and transistors + Show
all weeks Prescribed Books The following are the suggested books for the course: Engineering Circuit
Analysis, Hayt, Kemmerly and Durbin, 8th Edition, 2013 MICROELECTRONIC CIRCUITS: THEORY AND
APPLICATIONS, Sedra, Smith and Chandorkar, 7th Edition, 2017 About the Instructors Prof. Sankaran
Aniruddhan Associate Professor, Department of Electrical Engineering, IIT Madras Dr Sankaran
Aniruddhan is Associate Professor in the VLSI group of the department of Electrical Engineering at Indian
Institute of Technology Madras. He obtained his B. Tech. degree in Electrical Engineering from IIT
Madras in 2000, and Ph.D. degree from the University of Washington, Seattle in 2006. Between 2006 and
2011, he worked in the RF-Analog group at Qualcomm Inc., San Diego where he designed integrated
circuits for Cellular RF applications. His research primarily focuses on CMOS RF Integrated Circuits for
Wireless Communications. less Visit website Other courses by the same instructor: EE1101 - Electronic
Systems Thinking and Circuits , - Open Elective , - Open Elective , - Open Elective , - Open Elective , -
Open Elective , - Open Elective , - Open Elective , - Open Elective and - Open Elective Prof. Bobby George
Professor, Department of Electrical Engineering, IIT Madras Dr. Bobby George received the M. Tech.
and Ph. D. degrees in Electrical Engineering from IIT Madras. He is a Professor in the Department of
Electrical Engineering at IIT Madras. His research areas include Sensor Interface Electronics, Electric and
Magnetic field Based Sensors and their Applications, Sensor Systems for Water Quality and Quantity
Monitoring, and Biomedical Instrumentation. He also serves as Associate Editor for IEEE Sensors
Journal, IEEE Transactions on Instrumentation and Measurement, and IEEE Transactions on Industrial
Electronics. less Visit website Other courses by the same instructor: EE1101 - Electronic Systems

Thinking and Circuits , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective and - Open Elective View all Foundation Level courses honour code

EE1104 Foundation Level Electronic Systems Thinking and Circuits Lab The course is intended to provide an insight into electronics systems that are commonly encountered in daily life centered around sense-compute-communicate. The course will begin with a tear down of a laptop and/ or a mobile phone and looking at the various components. The standout component on the board is the battery which naturally leads to an introduction to voltage and finite energy sources. The course will then go on to identify a couple of ICs on the board like the processor, the RF components all connected to the same power source, each drawing its own current which can be used to motivate the idea of KCL. Basic network analysis will be covered as part of the theory to go hand in hand with these topics. Simple experiments will be conducted on a breadboard to demonstrate the theory where applicable. The idea of a microprocessor and memory will be explained with the help of analogies in an abstract manner. by Prof. Sankaran Aniruddhan , Prof. Bobby George , Prof. Janakiraman Viraraghavan Course ID: EE1104 Course Credits: 1 Course Type: Laboratory Pre-requisites: None What you'll learn Perform basic network analysis and analyse circuits using KCL, KVL, Thevenin's theorem, Norton's theorem, Simplifying resistor and capacitor networks Perform time domain analysis of first order RC networks Explain the idea of microprocessor and a memory Explain the idea of a program stored in a memory Course structure & Assessments 4 credit course, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam. For details of standard course structure and assessments, visit Academics page. WEEK 1 Introduction, Miniaturization of electronic packaging, Mobile teardown, How small can a mobile phone get?, The battery, The charger, Back of the envelope calculations, The resistor, The Theory. WEEK 2 Introduction to "Voltage", Introduction to "Current" and Ohms Law, Series and parallel connection of voltage and current sources, I-V characteristics of Resistors, voltage and current sources, Nodal Analysis and KCL, Mesh Analysis and KVL, Measurement of simple resistive circuit, Series and parallel connection of resistors, Introduction to capacitors, Introduction to inductors, Capacitance and Inductance measurement WEEK 3 Dial, Talk and Hear, The Microphone, Motor and Generator, The Sinusoid, Energy of time varying signals, Harmonics, Electricity consumption at home WEEK 4 Problem Solving - Getting Started, Problem Solving - Lower and upper bounds , Problem Solving - More Complex Problems, Problem Solving - Resistive Ladder, Problem Solving - Wheatstone's bridge, Problem Solving - Resistive Cube WEEK 5 Analog Mixer, Resistive Analog Mixer, Analog Mixer : Simulation, Superposition principle, Analog Mixer using superposition, Linear electrical components, Series and parallel resistive networks, Numerical examples on superposition WEEK 6 The Non-Inverting Amplifier, The Inverting Amplifier, Power Conventions , The RC Step Response - Experiment, The RC Step Response - Theory WEEK 7 Low Pass Filter - Experiment, Low Pass Filter - Theory, High Pass Filter - Analysis, High Pass Filter - Experiment, Band Pass Filter -Design, Band Pass Filter -Experiment, First order analysis: Limitations WEEK 8 Problem Solving - Resistive Analog Mixer

, Problem Solving - Resistive Analog Mixer using superposition, Problem Solving - Superposition - Voltage sources, Problem Solving - Homogeneity Principle, Problem Solving - Power absorbed by circuit elements , Problem Solving- Superposition - Current / Voltage sources -1, Problem Solving- Superposition - Current / Voltage sources - 2 WEEK 9 Analog vs Digital Audio Representations, Time Quantization, Amplitude Quantization, Sample and Hold Circuit, Flash ADC, Charge Sharing, Switched Capacitors, Capacitive Mixer WEEK 10 Laptop Teardown, Binary Number System, Decimal to Binary Number Conversion, Calculating Wave File Size, Analog vs Digital Computing, Digital Compute Blocks, Lab Instructions - 1 WEEK 11 Wired Communication - The Experiment, Wired Communication - Inductive Ringing, Wired Communication - Summary, Wireless Communication - The Radio, Wireless Communication - Modulation Techniques, Wireless Communication - Amplitude

Modulation, Wireless Communication - Frequency Modulation, Wireless Communication - The Antenna
WEEK 12 Problem Solving - LPF Energy, Problem Solving - Current Source and Capacitors, Problem
Solving - Current Source, Capacitors, and Resistors, Problem Solving - Switched Capacitors, Problem
Solving - Voltage source and Capacitor, Problem Solving - Voltage source, Current source, and
Capacitor, Problem Solving - Current sources and Capacitor,, Course Summary + Show all weeks
Prescribed Books The following are the suggested books for the course: William Hayt, Jack Kemerly, and
Steven Durbin. Engineering Circuit Analysis. 8th ed. McGraw Hill Education Pvt. Ltd: Mc Graw Hill
Education; August 2013.

a. Chapters 1-5

b. Chapters 7-8 Digital Logic and Computer Design, M. Mano, 2004

a. Chapter 1 Horowitz P Hill W. The Art of Electronics. 2nd ed. Cambridge England: Cambridge University
Press; 1989.

Note: Laboratory manual will be provided for the SPICE Lab. About the Instructors Prof. Sankaran
Aniruddhan Associate Professor, Department of Electrical Engineering, IIT Madras Dr Sankaran
Aniruddhan is Associate Professor in the VLSI group of the department of Electrical Engineering at Indian
Institute of Technology Madras. He obtained his B. Tech. degree in Electrical Engineering from IIT
Madras in 2000, and Ph.D. degree from the University of Washington, Seattle in 2006. Between 2006 and
2011, he worked in the RF-Analog group at Qualcomm Inc., San Diego where he designed integrated
circuits for Cellular RF applications. His research primarily focuses on CMOS RF Integrated Circuits for
Wireless Communications. less Visit website Other courses by the same instructor: EE1101 - Electronic
Systems Thinking and Circuits , - Open Elective , - Open Elective , - Open Elective , - Open Elective , -
Open Elective , - Open Elective , - Open Elective , - Open Elective and - Open Elective Prof. Bobby George
Professor, Department of Electrical Engineering, IIT Madras Dr. Bobby George received the M. Tech.
and Ph. D. degrees in Electrical Engineering from IIT Madras. He is a Professor in the Department of
Electrical Engineering at IIT Madras. His research areas include Sensor Interface Electronics, Electric and
Magnetic field Based Sensors and their Applications, Sensor Systems for Water Quality and Quantity
Monitoring, and Biomedical Instrumentation. He also serves as Associate Editor for IEEE Sensors
Journal, IEEE Transactions on Instrumentation and Measurement, and IEEE Transactions on Industrial
Electronics. less Visit website Other courses by the same instructor: EE1101 - Electronic Systems
Thinking and Circuits , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open
Elective , - Open Elective , - Open Elective , - Open Elective and - Open Elective Prof. Janakiraman
Viraraghavan Assistant Professor, Department of Electrical Engineering, IIT Madras Prof. Janakiraman
Viraraghavan is an Assistant Professor at the Department of Electrical Engineering, IIT Madras and is part
of the Integrated Circuits and Systems (iCS) group. His research interests include porting
machine-learning algorithms on to hardware and statistical analysis in VLSI. He also has a keen interest
in Microprocessors and Programming in general. less Visit website Other courses by the same instructor:
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Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective and - Open Elective
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EE1105 Foundation Level Electronics Laboratory by Prof. Sankaran Aniruddhan , Prof. Bobby George ,
Prof. Janakiraman Viraraghavan Course ID: EE1105 Course Credits: 3 Course Type: Laboratory
Pre-requisites: None Co-requisites: EE1103, EE1102 - Electrical and Electronic Circuits EE1103, EE1102
- Digital Systems What you'll learn Learning various fundamental concepts of electrical and electronic
circuits. Learning Outcomes: By the end of this course, students should be able to understand the basic
concepts of analog and digital circuits and applying the same in real world applications. Course
structure & Assessments 3 credit laboratory course For details of standard course structure and
assessments, visit Academics page. WEEK 1 Two-port networks WEEK 2 Resonant networks, frequency
response WEEK 3 Time-domain response of first order systems WEEK 4 Nonlinear device
characterization WEEK 5 Logic gates WEEK 6 Functional circuits WEEK 7 Datapath and control circuits
WEEK 8 Sequential circuits + Show all weeks Prescribed Books The following are the suggested books
for the course: Laboratory manual will be provided. About the Instructors Prof. Sankaran Aniruddhan
Associate Professor, Department of Electrical Engineering, IIT Madras Dr Sankaran Aniruddhan is
Associate Professor in the VLSI group of the department of Electrical Engineering at Indian Institute of
Technology Madras. He obtained his B. Tech. degree in Electrical Engineering from IIT Madras in 2000,

and Ph.D. degree from the University of Washington, Seattle in 2006. Between 2006 and 2011, he worked in the RF-Analog group at Qualcomm Inc., San Diego where he designed integrated circuits for Cellular RF applications. His research primarily focuses on CMOS RF Integrated Circuits for Wireless Communications. less Visit website Other courses by the same instructor: EE1101 - Electronic Systems Thinking and Circuits , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective and - Open Elective Prof. Bobby George Professor, Department of Electrical Engineering, IIT Madras Dr. Bobby George received the M. Tech. and Ph. D. degrees in Electrical Engineering from IIT Madras. He is a Professor in the Department of Electrical Engineering at IIT Madras. His research areas include Sensor Interface Electronics, Electric and Magnetic field Based Sensors and their Applications, Sensor Systems for Water Quality and Quantity Monitoring, and Biomedical Instrumentation. He also serves as Associate Editor for IEEE Sensors Journal, IEEE Transactions on Instrumentation and Measurement, and IEEE Transactions on Industrial Electronics. less Visit website Other courses by the same instructor: EE1101 - Electronic Systems Thinking and Circuits , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective and - Open Elective Prof. Janakiraman Viraraghavan Assistant Professor, Department of Electrical Engineering, IIT Madras Prof. Janakiraman Viraraghavan is an Assistant Professor at the Department of Electrical Engineering, IIT Madras and is part of the Integrated Circuits and Systems (iCS) group. His research interests include porting machine-learning algorithms on to hardware and statistical analysis in VLSI. He also has a keen interest in Microprocessors and Programming in general. less Visit website Other courses by the same instructor: EE1101 - Electronic Systems Thinking and Circuits , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective and - Open Elective View all Foundation Level courses honour code

EE2101 Diploma Level Signals and Systems by Prof. Sankaran Aniruddhan Course ID: EE2101 Course Credits: 4+1 Course Type: Diploma Pre-requisites: EE1103 - Electrical and Electronic Circuits What you'll learn At the end of this course, the student should be able to:

1. Understand and apply the concepts about linear time-invariant (LTI) systems understand and apply Fourier Series representation of periodic continuous-time signals understand and apply Fourier Transform representation of periodic and aperiodic continuous-time signals4. Apply Laplace transforms to analyze LTI Systems Course structure & Assessments 5 credit course, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam. For details of standard course structure and assessments, visit Academics page. WEEK 1 Signal classification (analog-digital, energy-power, even-odd, periodic-aperiodic, deterministic-random etc.), standard signals (unit step, unit impulse, ramp, exponential, sinusoids), transformations of the independent variable WEEK 2 System classification (memory, causal, stable, linear, time-invariant, invertible etc.), Impulse response of an LTI system, convolution integral, graphical convolution, system properties from impulse response, complex exponential as eigenfunction of LTI systems, interconnection of LTI systems WEEK 3 Emphasize similarities and differences with continuous-time counterpart

Continuous-time Fourier series: Periodic signals and their properties, exponential and trigonometric FS representation of periodic signals, convergence, FS of standard periodic signals, salient properties of Fourier series, FS and LTI systems, some applications of FS (eg. filtering) WEEK 4 Development of Fourier representation of aperiodic signals, convergence, FT of standard signals, FT of periodic signals, properties of FT, some applications of FT (eg. modulation)

Laplace Transform: Bilateral Laplace transform, region of convergence, properties of Laplace transform, standard Laplace transform pairs, transfer function of LTI system, characterising LTI system properties from transfer function, algebra of transfer functions and block diagram representations, Unilateral Laplace transform – brief introduction and application to simple initial value problems WEEK 5 Sampling theorem and signal reconstruction, notion of aliasing with examples, Sampling in frequency domain. + Show all weeks Prescribed Books The following are the suggested books for the course: Signals and Systems: Oppenheim, Willsky and Nawab (2nd Edn). Principles of Linear Systems and Signals: B.P. Lathi (2nd Edn) About the Instructors Prof. Sankaran Aniruddhan Associate Professor, Department of Electrical Engineering, IIT Madras Dr Sankaran Aniruddhan is Associate Professor in the VLSI group of the department of Electrical Engineering at Indian Institute of Technology Madras. He obtained his B. Tech. degree in Electrical Engineering from IIT Madras in 2000, and Ph.D. degree from the University of

Washington, Seattle in 2006. Between 2006 and 2011, he worked in the RF-Analog group at Qualcomm Inc., San Diego where he designed integrated circuits for Cellular RF applications. His research primarily focuses on CMOS RF Integrated Circuits for Wireless Communications. [less Visit website](#) Other courses by the same instructor: EE1101 - Electronic Systems Thinking and Circuits , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective and - Open Elective [View all Diploma Level courses](#) honour code

Academics Overall Structure Course Registrations

EE2102 Diploma Level Analog Electronic Systems Basics of operational amplifier, op-amp based building blocks, linear and non-linear system, feedback theory, negative/positive feedback, stability criterion, bode plot with gain and phase margin, compensation, passive and active-RC analog filters, RLC filters, voltage and current regulators, AC coupling input and output and oscillators. Course ID: EE2102 Course Credits: 4 Course Type: Diploma Pre-requisites: EE2101 - Signals and Systems MA2101 - Math for Electronics II What you'll learn Learning various fundamental concepts of analog systems such as open loop system, Active-RC Analog Filters, Op-amp based building blocks, feedback theory, stability of a closed loop system, compensation, voltage and current regulation, etc. Applying the above concepts in building an analog system prototype. Learning Outcomes:By the end of this course, students should be able to understand the fundamental concepts of analog systems and applying the same in real world applications. Course structure & Assessments 4 credit course, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam. For details of standard course structure and assessments, visit Academics page. Basics of operational amplifier, op-amp based building blocks, linear and non-linear system, feedback theory, negative/positive feedback, stability criterion, bode plot with gain and phase margin, compensation, passive and active-RC analog filters, RLC filters, voltage and current regulators, AC coupling input and output and oscillators. + Show all weeks Prescribed Books The following are the suggested books for the course: Microelectronic Circuits: Theory and Applications (International Version) Paperback – 11 Mar 2013 by A. Sedra, K. Smith, A. Chandorkar Publisher: Oxford; Sixth edition (11 March 2013)ISBN-13: 978-0198089131 [View all Diploma Level courses](#) honour code

Academics Overall Structure Course Registrations Assessments Exam Cities Fee Structure Foundational Level Diploma Level BS Degree Level Sample Certificates Academic Calender Admissions Important Dates Mandatory Requirements Eligibility to Apply Application Process Admission to the Foundation Level 1. Regular Entry 2. JEE-based Entry International Students FAQ About IITM About IIT Madras Faculty Co-ordinators Contact Us SIGN IN Applications open now for May 2024 Batch. Application Close: May 28th, 2024 | Exam: Jul 07th, 2024 APPLY NOW Applications open now for May 2024 Batch. Application Close: May 26th, 2024 | Exam: Jul 07th, 2024 APPLY NOW Home Academics **EE2103 Diploma Level Digital System Design** Course ID: EE2103 Course Credits: 4+2 Course Type: Diploma Pre-requisites: EE1102 - Digital Systems What you'll learn This course is an advanced followup to the basic digital system design course. It is intended to teach concepts of larger digital systems, and the corresponding design considerations, and is designed around the use of FPGAs to implement large systems. At the end of this course, a student should be able to:
go from an informal specification to a detailed reference design in a high level language implement a suitable hardware design using HDL, and take it through the synthesis and implementation on an FPGA platform analyze the design for timing and perform optimizations to improve timing, area and other metrics interface with a CPU core using system buses and build a basic system-on-chip Course structure & Assessments 6 credit course, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam. For details of standard course structure and assessments, visit Academics page. WEEK 1 Algorithm representations and refinement from informal to mathematical specification; reference designs WEEK 2 number representations in digital design; fixed and floating point; hardware implementations WEEK 3 implementation of basic arithmetic modules in hardware WEEK 4 design of datapath and control; programmable systems WEEK 5 implementation of more complex signal processing applications; WEEK 6 optimization for timing and area; other metrics; Pareto optimality WEEK 7 System buses and interfacing peripherals; AXI interfaces + Show all weeks Prescribed Books The following are the suggested books for the course: Class notes "A Verilog HDL Primer", J. Bhasker "Parallel Programming for FPGAs", Kastner, Matai and Neuendorffer [View all Diploma Level courses](#)

EE2104 Course Credits: 3 Course Type: Laboratory Pre-requisites: None Co-requisites: EE2102 - Analog Electronic Systems What you'll learn Learning application of fundamental concepts of analog systems by building an analog system prototype. Learning Outcomes: By the end of this course, students should be able to understand the fundamental concepts of analog systems and applying the same in real world applications. Prescribed Books The following are the suggested books for the course: Laboratory manual will be provided View all Diploma Level courses

EE3101 Course Credits: 4+1 Course Type: Diploma Pre-requisites: EE2101 - Signals and Systems What you'll learn To teach the fundamentals of Digital Signal Processing Course structure & Assessments 5 credit course, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam. For details of standard course structure and assessments, visit Academics page. WEEK 1 Review of Signals and Systems: Discrete time complex exponentials and other basic signals—scaling of the independent axis and differences from its continuous-time counterpart—system properties (linearity, time-invariance, memory, causality, BIBO stability)—LTI systems described by linear constant coefficient difference equations (LCCDE)—impulse response and convolution WEEK 2 Discrete-Time Fourier Transform (DTFT): Complex exponentials as eigensignals of LTI systems—DTFT definition—inversion formula—properties—relationship to continuous-time Fourier series (CTFS) WEEK 3 Z-Transform: Generalized complex exponentials as eigensignals of LTI systems—z-transform definition—region of convergence (RoC)—properties of RoC—properties of the z-transform—inverse z-transform methods (partial fraction expansion, power series method, contour integral approach)—pole-zero plots—time-domain responses of simple pole-zero plots—RoC implications of causality and stability WEEK 4 Frequency Domain Analysis of LTI Systems: Frequency response of systems with rational transfer function—definitions of magnitude and phase response—geometric method of frequency response evaluation from pole-zero plot—frequency response of single complex zero/pole—frequency response of simple configurations (second order resonator, notch filter, averaging filter, comb filter, allpass systems)—phase response—definition of principal phase—zero-phase response—group delay—phase response of single complex zero/pole—extension to higher order systems—effect of a unit circle zero on the phase response—zero-phase response representation of systems with rational transfer function—minimum phase and allpass systems—constant group delay and its consequences—generalized linear phase—conditions that have to be met for a filter to have generalized linear phase—four types of linear phase FIR filters—on the zero locations of a linear phase FIR filter—constrained zeros at $z = 1$ and at $z = -1$ and their implications on choice of filters Type I through Type IV when designing filters—frequency response expressions for Type I through Type IV filters WEEK 5 Sampling: Impulse train sampling—relationship between impulse trained sampled continuous-time signal spectrum and the DTFT of its discrete-time counterpart—scaling of the frequency axis—relationship between true frequency and digital frequency—reconstruction through sinc interpolation—aliasing—effect of sampling at a discontinuous point—relationship between analog and digital sinc—effects of oversampling—discrete-time processing of continuous-time signals WEEK 6 Discrete Fourier Transform (DFT): Definition of the DFT and inverse DFT—relationship to discrete-time Fourier series—matrix representation—DFT as the samples of the DTFT and the implied periodicity of the time-domain signal—recovering the DTFT from the DFT—circular shift of signal and the "index mod N" concept—properties of the DFT—circular convolution and its relationship with linear convolution—effect of zero padding—introduction to the Fast Fourier Transform (FFT) algorithm—decimation-in-time and decimation-in-frequency algorithms. + Show all weeks Prescribed Books The following are the suggested books for the course: Discrete-Time Signal Processing by Alan V. Oppenheim and Ronald W. Schaffer, 3rd edition, 2010, Prentice Hall, Upper Saddle River, NJ. (1) Digital Signal Processing by John G. Proakis and Dimitris K. Manolakis, 4th edition, 2007, Prentice Hall, Upper Saddle River, NJ. (2) Digital Signal Processing by Sanjit Mitra, 4th edition, 2011, McGraw-Hill, New York, NY. View all Diploma Level courses honour code

EE3107 Electronic Product Design Course ID: EE3107 Course Credits: Course Type: Pre-requisites: EE3103 - Sensors and Applications EE3105 - Electromagnetic Fields and Transmission Lines View all Level courses honour code

HS1101 Course Credits: 4 Course Type: Foundation Pre-requisites: None What you'll learn Acquiring wide range of vocabulary and linguistic competence that is required for functional performance; Identifying patterns of basic sentence types and structural accuracy; Building elementary foundations for the knowledge related to conventions and use of language in society, particularly in speaking and listening skills; Developing the basic skills for creative reading and writing with precision. Course structure & Assessments 4 credit course, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam. For details of standard course structure and assessments, visit Academics page. WEEK 1 Sounds and Words (Vowel and Consonant sounds) WEEK 2 Parts of Speech and Articles. WEEK 3 Words and Phrases (Vocabulary, Phrasal & Modal Verbs and Idioms) WEEK 4 Speaking Skill (Spoken English Preliminaries and Telephone English) WEEK 5 Functional Grammar (Tenses) WEEK 6 Reading Skills (Skimming, Scanning and Comprehension) WEEK 7 Listening Skill (Active, Passive and Effective Listening) WEEK 8 Nuances of Words (Stress, Aspiration and Syllabification) WEEK 9 Speaking Skill 2 (Presentation and Group Discussion) WEEK 10 Writing Skill 1 (Basics of Writing) WEEK 11 Writing Skill 2 (Note, Business Writing and Essays) WEEK 12 Writing Skill 3 (Professional Writing) + Show all weeks Prescribed Books The following are the suggested books for the course: Aarts, Bas (2011). Oxford Modern English Grammar, New York: Oxford University Press Murphy, Raymond (2012). English Grammar in Use, New York: Cambridge University Press. 4th Edition Krishnaswamy, Subashree and K. Srilata eds. (2007). Short Fiction from South India. Delhi: OUP. Dhanavel, S.P. (2010). English and soft skills (V-1). Chennai: Orient Blackswan. References: Oxford English Dictionary Croft, Sebastian (2018). How to Analyze People: The Ultimate Guide to Speed Reading People Through Proven Psychological Techniques, Body Language Analysis and Personality Types and Patterns (Available on Kindle) Malgudi Days: A collection of short-stories (RK Narayan) 365 Jataka Tales (Om Books International) 365 Panchtatra Stories (Adil Mukesh) 365 Tales from Indian Mythology (Om Books International) About the Instructors Prof. Rajesh Kumar Professor, Department of Humanities and Social Sciences, IIT Madras Rajesh Kumar is professor of linguistics in the Department of Humanities and Social Sciences at the Indian Institute of Technology Madras, Chennai. He obtained his PhD in linguistics from the University of Illinois at Urbana-Champaign. Prior to joining IIT Madras, he taught at IIT Kanpur, and IIT Patna in India and at the University of Texas at Austin in the USA. He has been a visiting faculty at the Tata Institute of Social Sciences in Mumbai in India. His book on Syntax of Negation and Licensing of Negative Polarity Items was published by Routledge in their prestigious series Outstanding Dissertations in Linguistics in 2006. He is associate editor of the journal Language and Language Teaching. He has been part of the language teaching program at all the institutions he has been affiliated with. The broad goal of his research is to uncover regularities underlying both the form (what language is) and sociolinguistic functions (what language does) of natural languages. less Visit website Other courses by the same instructor: HS1102 - English II , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective and - Open Elective Prof Karthika Sathyanathan Alumna, Department of Humanities and Social Sciences, IIT Madras Prof. Karthika has an MA in English Studies from IIT Madras. She has worked as a Language & Education Consultant with multiple government departments and non-government organisations. Currently she is working as project officer with IIT Madras. Her areas of interest include ELT, multilingualism, multiculturalism and second language learning. less Other courses by the same instructor: HS1102 - English II , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective and - Open Elective View all Foundation Level courses honour code

HS1102 Foundation Level English II Focus on achieving greater degree of fluency in functional and conversational English to understand subtle and detailed meaning in conversations and texts through short literary pieces and contextualized content. by Prof. Rajesh Kumar , Prof Karthika Sathyanathan Course ID: HS1102 Course Credits: 4 Course Type: Foundation Pre-requisites: HS1101 - English I What you'll learn Integrating the basic skills of language into developing advanced skills of language proficiency to help compose clear and detailed writing on a range of subjects; Learning advanced level of vocabulary and socio-linguistic/ socio-pragmatic competence for advance reading and writing; Building nuanced structure for grammatical accuracy for fluency and creating confidence and appropriateness for expressing view-points clearly; Developing elementary foundations for comprehending and conveying underlying meaning in spoken discourse Course structure & Assessments 4 credit course, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam. For details of

standard course structure and assessments, visit Academics page. WEEK 1 Patterns in Sentences WEEK 2 Patterns in Sentences (Continued) WEEK 3 Patterns in Sentences (Continued) WEEK 4 Listening Skills WEEK 5 Listening Skills (Continued) WEEK 6 Speaking Skills WEEK 7 Speaking Skills (Continued) WEEK 8 Reading Skills WEEK 9 Writing Skills WEEK 10 Writing Skills (Continued) WEEK 11 Social Skills WEEK 12 Social Skills (Continued) + Show all weeks About the Instructors Prof. Rajesh Kumar Professor, Department of Humanities and Social Sciences, IIT Madras Rajesh Kumar is professor of linguistics in the Department of Humanities and Social Sciences at the Indian Institute of Technology Madras, Chennai. He obtained his PhD in linguistics from the University of Illinois at Urbana-Champaign. Prior to joining IIT Madras, he taught at IIT Kanpur, and IIT Patna in India and at the University of Texas at Austin in the USA. He has been a visiting faculty at the Tata Institute of Social Sciences in Mumbai in India. His book on Syntax of Negation and Licensing of Negative Polarity Items was published by Routledge in their prestigious series Outstanding Dissertations in Linguistics in 2006. He is associate editor of the journal Language and Language Teaching. He has been part of the language teaching program at all the institutions he has been affiliated with. The broad goal of his research is to uncover regularities underlying both the form (what language is) and sociolinguistic functions (what language does) of natural languages. less Visit website Other courses by the same instructor: HS1101 - English I , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective and - Open Elective Prof Karthika Sathyanathan Alumna, Department of Humanities and Social Sciences, IIT Madras Prof. Karthika has an MA in English Studies from IIT Madras. She has worked as a Language & Education Consultant with multiple government departments and non-government organisations. Currently she is working as project officer with IIT Madras. Her areas of interest include ELT, multilingualism, multiculturalism and second language learning. less Other courses by the same instructor: HS1101 - English I , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective and - Open Elective View all Foundation Level courses honour code

ID: MA1101 Course Credits: 4 Course Type: Foundation Pre-requisites: None What you'll learn VIEW COURSE VIDEOS To introduce differential/integral calculus of one variable To introduce solutions for a system of linear equations To introduce complex numbers Course structure & Assessments 4 credit course, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam. For details of standard course structure and assessments, visit Academics page. WEEK 1 Introduction, Linear equations Numbers, relations/functions, equations occurring in practical scenarios and applications Cartesian coordinates, Equation of a line in 2D, Linear equations in two variables, Graphing software Solving systems of linear equations by elimination WEEK 2 Functions of one variable, Limits and continuity Functions and graphs, scaling/shifting operations, trigonometric functions, visualising functions Limit of a function and limit laws, One-sided/two-sided limits, continuity of a function WEEK 3 Differential calculus Tangent line, Derivatives as slope/rate of change, Derivative, Rules/methods for finding derivatives Applications: Increasing/decreasing functions, Extreme values of functions WEEK 4 Integral calculus Area under step functions, Finite sums, Integrals as area under general functions, Limits of finite sums The definite integral, Fundamental theorem of calculus, Transcendental functions (log, exp, inv trig) Rules/methods for finding integrals, Applications: Areas, Volumes, Averages WEEK 5 Ordinary Differential Equations (ODEs) Applications - Capacitor charging, mass-spring, pendulum Types of ODEs, Boundary conditions, Solutions to first-order homogeneous, linear ODEs WEEK 6 Complex numbers Square root of -1, Imaginary unit i , Complex numbers and arithmetic, Geometric representation Complex-valued functions of one real variable, Complex exponentials, Examples of calculus + Show all weeks Prescribed Books The following are the suggested books for the course: "Thomas' Calculus (14th edition)," J. R. Hass, C. E. Heil and M. D. Weir, Pearson. "Calculus (8th edition)," J. Stewart, CENGAGE Learning. "Calculus, Vol 1, 2ed (An Indian Adaptation)," T. M. Apostol, J. Singh and S. Goyal, Wiley. About the Instructors Prof. Andrew Thangaraj Professor, Electrical Engineering Department, IIT Madras Andrew Thangaraj received his B. Tech in Electrical Engineering from the Indian Institute of Technology

(IIT) Madras in 1998 and Ph.D. in Electrical Engineering from the Georgia Institute of Technology, Atlanta, USA in 2003. ... more He was a post-doctoral researcher at the GTL-CNRS Telecom lab at Georgia Tech Lorraine, Metz, France from Aug 2003 till May 2004. Since 2004, he has been a faculty at the Department of Electrical Engineering, IIT Madras, where he is currently a professor. His research interests are in the broad areas of information theory, error-control coding and information-theoretic aspects of cryptography. From Jan 2012 till Jan 2018, he served as Editor for the IEEE Transactions on Communications. From July 2018, he is an Associate Editor for the IEEE Transactions on Information Theory. From Nov 2011, he has been one of the NPTEL coordinators for IIT Madras. At NPTEL, he has played a key role in the starting of online courses and certification. He is currently a National MOOCs coordinator for NPTEL under the SWAYAM project of the MHRD. Prof. Andrew is also one of the coordinators for the IIT Madras Online BSc Degree Program, which was launched in June, 2020. less Visit website Other courses by the same instructor: - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective and - Open Elective View all Foundation Level courses honour code

MA2101 Diploma Level Math for Electronics II by Prof. Andrew Thangaraj Course ID: MA2101 Course Credits: 4 Course Type: Diploma Pre-requisites: MA1101 - Math for Electronics I What you'll learn To introduce infinite sequences/series, first/second-order ordinary differential equations, vectors and multivariable calculus Course structure & Assessments 4 credit course, weekly online assignments, 2 in-person invigilated quizzes, 1 in-person invigilated end term exam. For details of standard course structure and assessments, visit Academics page. WEEK 1 Convergence, Tests for convergence, Types of convergence WEEK 2 Types of convergence, Power series, Taylor series of functions WEEK 3 Application: Approximation of functions by polynomials WEEK 4 Second-order, homogeneous, linear ODEs with constant coefficients WEEK 5 Parameterized solutions, Power series solutions, Applications - Electrical circuits WEEK 6 2D/3D coordinate systems, Vectors, Dot product, Norm, Cross product, Lines, Planes WEEK 7 Linear transformations: Matrices, Row/Column/Null space, Rank, Determinant and area/volume WEEK 8 Conics, Curves in space: Tangent, Normal, Arc length, Application: projectile motion WEEK 9 Vector-valued functions of multiple variables, Partial derivatives, Tangent plane, Gradient, Extrema WEEK 10 Double integration, Triple integration, Areas/Volumes, Change of variables in integration - Jacobian WEEK 11 Rectangular/polar coordinates in 2D, Rectangular/cylindrical/spherical coordinates in 3D + Show all weeks Prescribed Books The following are the suggested books for the course: "Thomas' Calculus (14th edition)," J. R. Hass, C. E. Heil and M. D. Weir, Pearson. "Calculus (8th edition)," J. Stewart, CENGAGE Learning. "Calculus, Vol 1 and Vol 2, 2ed (An Indian Adaptation)," T. M. Apostol, J. Singh and S. Goyal, Wiley. "Advanced Engineering Mathematics," E. Kreyszig, Wiley. "Linear Algebra and its Applications," G. Strang, CENGAGE Learning About the Instructors Prof. Andrew Thangaraj Professor, Electrical Engineering Department, IIT Madras Andrew Thangaraj received his B. Tech in Electrical Engineering from the Indian Institute of Technology (IIT) Madras in 1998 and Ph.D. in Electrical Engineering from the Georgia Institute of Technology, Atlanta, USA in 2003. ... more He was a post-doctoral researcher at the GTL-CNRS Telecom lab at Georgia Tech Lorraine, Metz, France from Aug 2003 till May 2004. Since 2004, he has been a faculty at the Department of Electrical Engineering, IIT Madras, where he is currently a professor. His research interests are in the broad areas of information theory, error-control coding and information-theoretic aspects of cryptography. From Jan 2012 till Jan 2018, he served as Editor for the IEEE Transactions on Communications. From July 2018, he is an Associate Editor for the IEEE Transactions on Information Theory. From Nov 2011, he has been one of the NPTEL coordinators for IIT Madras. At NPTEL, he has played a key role in the starting of online courses and certification. He is currently a National MOOCs coordinator for NPTEL under the SWAYAM project of the MHRD. Prof. Andrew is also one of the coordinators for the IIT Madras Online BSc Degree Program, which was launched in June, 2020. less Visit website Other courses by the same instructor: MA1101 - Math for Electronics I , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective , - Open Elective and - Open Elective View all Diploma Level courses honour code

IIT Madras
BS in Data Science and Applications
(4 year Undergraduate Degree Program)
Student Handbook
Student Handbook
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Please read this

Dear student,

This Student Handbook is intended to provide IIT Madras BS Degree students with the information and policies they should be aware of, which may help them make the most of the opportunities offered in this programme. It also gives you formal notification and explanation of the programme's regulations, policies and procedures.

It is essential, and your responsibility, to read it and familiarize yourself with the content. It should be kept handy and referred to during your time with us.

This handbook may be revised time and again. While this student handbook was prepared on the basis of the best information available at the time of publication, all information, including policies and procedures are subject to change without notice or obligation.

All rules and regulations in this document are approved by our committee. As changes keep getting approved, we will update them here.

We hope that your time as a student in this programme is successful and enjoyable.

Thank you.

This document was last updated on June 7, 2024.

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A) Data Science & Applications

IIT Madras has launched the BS in Data Science and Applications. In this program, the course contents are delivered online and can be studied by anyone from anywhere, while the monthly quizzes and final semester exams will have to be attended in-person at designated centres.

Depending on the number of courses completed, learners can earn

- a Foundation level certificate
- Diploma in Programming/Diploma in Data Science or both
- BSc degree in Programming and Data Science
- BS degree in Data Science and Applications

1. Highlights of the programme

Courses are taught by faculty of IIT Madras/other reputed institutes as well as experts from the industry.

Unlike many competitive admission exams which work on the philosophy of elimination and selection and admit a very limited number of learners into various programmes based on their performance relative to that of others, in this programme there are specific qualifying criteria, and a significantly large number of learners can enter.

Learners of any background, be it engineering, sciences, humanities, arts, medicine, law, etc can attempt and join this programme.

There is no limitation on the age of the learner or their geographical location.

2. Flexibility

There are two entry and four exit points, with learners being able to exit with either course certificates, or diploma or the degree. Learners can choose their pace of study every term.

Being an online programme, there is no geographical barrier to learning from this programme - learners only need to travel to exam centres for exams each term.

IT IS IMPORTANT TO NOTE: This programme is NOT BASED on an admission process.

Qualified learners can attempt respective stages of the programme and those who clear each stage will receive the certificate corresponding to that stage alone.

So, for example, the learner should be aware that they are not being admitted to a degree programme after the Qualifier. It is only for the set of Foundation courses, which on successful completion makes them eligible to enter the Diploma level. The diplomas or degrees are obtained by the candidate only when the requisite number of credits are accrued by completing the courses prescribed and satisfying any other mandatory criteria.

Admission to any level does not automatically entitle the learner to exit the programme with the Diploma or the degree.

3. Courses in the programme

3.1 Definition of credit in the program

The credits here are based on the UGC system of counting 14 hours of learner engagement as 1 credit. (1 credit mentioned here would be equivalent to 3 credits in the current IITM campus Credit system.)

The number of credits required to graduate with the BSc is 114 while that for the BS is 142.

The structure of the program is as follows:

3.2 Level 1: The Foundation level

- Comprises 8 courses - English 1, English 2, Mathematics 1, Mathematics 2, Statistics 1, Statistics 2, Computational Thinking, Introduction to Python

- Number of credits: 32

3.3 Level 2: Diploma level

- Includes 2 Diplomas - Diploma in Programming and Diploma in Data Science
- Each diploma comprises 6 courses (23 credits) and 2 project courses (4 credits)
- Number of credits: 54

Diploma in Programming

- Database management systems (DBMS), Programming Data Structures and Algorithms using Python (PDSA), Java programming, System Commands, Application development - 1, Application Development - 2
- Project course in Application Development - 1
- Project course in Application Development - 2

Diploma in Data Science

- Machine Learning Foundations (MLF), Machine Learning Techniques (MLT), Machine Learning Practice (MLP), Business Data Management (BDM), Business Analytics (BA), Tools in Data Science (TDS)
- Project course in Business Data Management
- Project course in Machine Learning Practice

(Those students who fall short of the 54 credits in the Diploma level (temporary, for a few students) will have to do additional courses in the BSc level to make up for the deficit in credits. A student will be eligible for the BSc degree only if they complete 114 credits as per the norms given.)

3.4 Level 3: BSc Degree level courses

- Total of 28 credits
- Mandatory 2 core pairs (Software Engineering, Software Testing, Artificial Intelligence and Deep Learning)
- Mandatory course: Strategies for professional growth
- Maximum of 4 credits can be obtained from NPTEL, technical bucket

3.5 Level 4: BS Degree level courses

- Total of 28 credits
- Option of Apprenticeship - for 4/12 credits
- Mandatory to earn 4 credits from HS/MG stream, from NPTEL or program electives
- 2 level 4 courses in programming stream and 2 level 4 courses in the data science stream should be mandatorily completed

Apprenticeship has been split into 2 courses - one of 4 credits that corresponds to the 4 month internship and another as 8 credits for the term of apprenticeship that is continued from months 5-8 in the same company and domain.

Apprenticeship is optional and one can earn 0/4/8/12 credits from it.

1. The list of courses in

- a. Table 1: List of electives offered in the program
- b. Table 2: List of NPTEL electives that can be credited at the BSc level
- c. Table 3: List of HS/MG electives that can be credited from NPTEL

The list of courses in the 3 tables here are subject to periodic revision.

2. Refer Credit Transfer for NPTEL Courses for process and credit transfer fee.

The course code defines the level of the course. If the course code is 2xxx,3xxx,4xxx then the level of the course is 2/3/4 respectively.

The fee for the level 3 courses is Rs 2500/credit while that of level 4 courses is Rs 5000/credit.

Regular Entry

Apply

Qualifier

Assignments

and Exam

9 Foundationa

Level

32 Credits

Exit with

Foundationa

Certificate

from IITM CODE

Entry

Direct Admission
to Diploma
@
Diploma
Level
12 Courses + 4 Projects
54 Credits

©
Degree
Level (BSc)
28 Credits
Exit with
BSc Degree in
Programming &
Data Science
from IIT Madras
o Degree
Level (BS)
7 Courses
28 Credits
Exit with
BS Degree in Data
Science and
Application
from IIT Madras
Exit with
Diploma in
Programming
and/or
Diploma in
Data Science
from IIT Madras

4. Fees for the entire programme

- First year fees kept low to enable learners to try out the programme
- Entry fee for Qualifier exam: Rs. 3000 (non-refundable) - with suitable waivers
- Fee waivers for learners belonging to certain categories and economic backgrounds

Number of credits in each level:

Level
Theory
Foundation
Diploma in DS
Diploma in P
BSc
BS
32
23
23
28-X
28-A-B
A (0/4/12)
Project
4
4
X (0-4)
B=4

*Only maximum of 24 credits can be transferred towards non counted CGPA course

Foundation: Rs 32000/-

Diploma Level: $62500 \times 2 = \text{Rs } 125,000/-$

BSc Level: Rs 2.21L - 2.47L

Apprenticeship NPTEL

MG/HS/HM

BS Level: 3.25L - 3.87L

Cost per credit

(Rs)

Foundation 1000/c

Diploma

BSc

2500/c for Theory

1250/c for project

Level 3 - Rs 2500/c

Level 4 - Rs 5000/c

1000/c for NPTEL

Number of credits

32c

$23 \times 2 = 46c$

$4 \times 2 = 8c$

20c for 5 mandatory courses (Level 3)

4c NPTEL+4c Level 3

4c NPTEL + 4c Level 4

8c Level 3

4c Level 3 + 4c Level 4

8c Level 4

BS

Level 3 - Rs 2500/c

Level 4 - Rs 5000/c

1000/c for NPTEL

2 Level 4 mandatory DS = 8c

2 Level 4 mandatory DP = 8c

4c NPTEL + 8c Level 3

4c NPTEL + 4c Level 3 + 4c Level 4

4c NPTEL + 8c Level 4

12c Level 3

12c Level 4

Fee waivers depend on the category of learner and family income

Family

Family Income

> 5 LPA

Fees

General

OBC

SC / ST

PwD

SC / ST +

PwD

Full Fee

Full Fee

50% waiver

50% waiver

75% waiver
Family Income > 1
LPA and <= 5 LPA
Docs Required
NIL
NIL
SC / ST
PwD
SC / ST + PwD
Income <= 1
LPA
Docs
Fees
50% waiver
50% waiver
Required
EWS +
Family
Income
OBC-NCL
+ Family
Income
50% waiver SC / ST
50% waiver
75% waiver
PwD
SC / ST +
PwD
75% waiver
75% waiver
75% waiver
75% waiver
Fees
Docs Required
EWS + Family
Income
OBC-NCL +
Family Income
SC / ST + Family
Income
PwD + EWS /
OBC-NCL +
Family Income
75% waiver SC / ST + PwD
Total fee
32000
115,000
10,000
50000
4000+10000
4000+20000
20000
30000
40000
40000

40000
4000+20000
4000+30000
4000+40000
30000
60000
Level
fees
32,000
125,000
64,000
74,000
70,000
80,000
90,000
104000
114000
124000
110000
140000

4.1 For students who are outside India:

Facilitation fee for exams is in addition to the above for candidates writing exams overseas - as fixed up with the local exam partner there. These are subject to periodic changes depending on the local exam partner identified.

Facilitation Fee

Quiz1 [irrespective of num of courses] = Rs.2000/-

Quiz2 [irrespective of num of courses] = Rs.2000/-

End term [per session] = Rs.2000/- [one course it is Rs.2000/- & more than one course it is Rs. 4000/-]

E.,g If you opt for 4 courses

Quiz1 = 2000, Quiz2 = 2000, EndTerm = 4000

Totally 8000 to be paid as a facilitation fee

*Facilitation fee may vary based on country. Eg: Kuwait & Bahrain it is Rs. 3000/-

5. Admission to the programme

5.1 Regular Entry into Foundation level

To enter the Foundation level, applicants have to pass the Qualifier exam.

The Foundation courses allow for interested applicants with a variety of educational backgrounds to be trained in the basics (Math, Statistics, Computational Thinking, Python programming and English) required to take up the Diploma level of Programming & Data Science courses.

Entry: Via the Qualifier exam into the Foundation level

Exit 1. Foundation course certificate

Exit 2. Diploma in Programming/Data Science or both

Exit 3. BSc Degree in Programming and Data Science from IIT Madras

Exit 4: BS in Data Science and Applications from IIT Madras

5.1.1 Eligibility to Apply for the Qualifier Exam

Minimum eligibility: Should have studied Mathematics and English in Class 10.

1. Anyone who has passed Class 12 or equivalent can apply irrespective of age or academic background. Those who qualify can join the program immediately. View list of accepted class 12 equivalents.

2. School students who have appeared for their Class 11 final exams can apply irrespective of their group/stream/board. Those who qualify can join the program after passing Class 12.

No additional eligibility other than the ones mentioned above is required to apply for the

qualifier process or join the foundational level courses after clearing the qualifying exam.

The week 1 content is available to all candidates to sample on the website (<https://study.iitm.ac.in/ds/academics.html#AC15>) and view when they fill the Qualifier exam form. The learner has to fill the qualifier form available on the website study.iitm.ac.in/ds. The learner has to pay the fees for the Qualifier exam - currently set as Rs 3000/-for Gen category with suitable waivers for candidates from the SC/ST and PwD with 40% disability backgrounds. Currently there is no waiver for any other group of learners.

The fee will not be refunded once paid.

5.1.2 Preparation for the Qualifier exam

All regular entry applicants must go through the 4 week Qualifier Process to earn admission to the Foundation Level.

On the start date of the qualifier process week 1, access to the content for the four Foundation level courses - English 1, Maths-1, Statistics-1 and Computational Thinking will be provided.

The content that includes videos, tutorials, practice/graded assignments and text transcripts is released week wise.

The content will be made live with an announcement on the portal, and an alert through email. Every week the graded assignment must be submitted in each course.

5.1.3 Eligibility to appear for the qualifier exam

At the end of the 4 weeks, a qualifier exam will be conducted for eligible candidates based on the content covered in the 4 weeks of study.

Each assignment will be graded out of 100

Any assignment that is not attempted will be marked as 0.

There is a change in the modality of finalizing the students who become eligible to write the qualifier exam.

- If the average of the first 2 weeks' assignment scores is $\geq 40/100$ (or as per the cutoff for each category of students) in each of the 4 subjects, the students will be eligible to write the qualifier exam in the first attempt within the term.
- For those who do not qualify after the week 2 assignments, the average of the best 2 out of the first 3 weeks' assignment scores will be considered. If this score is $\geq 40/100$ (or as per the cutoff for each category of students) in each of the 4 subjects, the students will become eligible to write the qualifier exam in the second attempt within the term.
- Reattempts within the term will be given suitably.

Only those who get the minimum required average assignment scores in all four courses (as given below) will be allowed to appear for the Qualifier Exam.

Minimum Average Assignment Score

required in each course

General Learner

40%

SC / ST / PwD with 40% disability

PwD with 40% disability & SC / ST

OBC-NCL / EWS

30%

30%

35%

Note: Relaxations in pass criteria indicated for various categories of learners is applicable ONLY for the qualifier process. There will be no relaxations in terms of grades / pass criteria once registered into the program.

Hall tickets will be released for only those candidates who become eligible to take the in-person proctored Qualifier Exam.

5.1.4 Criteria for passing the qualifier exam

In the qualifier exam comprising 4 subjects, the learner should obtain marks \geq individual subject cut-off as shown below. The total of all subject marks should be greater than the total

cut-off. The cutoff marks are clearly specified for the different categories of learners in the table below.

Min. Req. Qualifier Exam

Score in each course

General Learner

SC / ST / PwD with 40% disability

PwD with 40% disability &

SC / ST

OBC-NCL / EWS

40%

30%

30%

35%

Min. Req. Average Qualifier

Exam Score

50%

40%

40%

45%

The qualifier exam marks will be displayed within the login on the portal along with an email and whatsapp alert sent to the candidates about this.

5.1.5 Validity of the qualifier score

The qualifier marks will be valid for the 3 terms that come subsequent to the qualifier exam date for the learner to register to the Foundation level. This score will be invalid after this period and the learner will have to go through the entire qualifier process (the 1 month of weekly assignments) and retake the qualifier exam, if they wish to join the programme.

For students in std XII who take the qualifier exam, the validity is for 3 terms from when they pass std XII.

5.1.6 Communication about qualifier exam results

Those who have qualified as per the above process will be intimated through email and whatsapp and within their login on the portal - if they are eligible to register further. An admission letter will also be generated and provided to each qualified candidate.

Once a candidate has qualified, they will not be permitted to apply again until their score is valid, which is for the next 3 subsequent terms. After this they will be eligible to reapply again.

The fees paid to attempt the Qualifier exam will not be refunded in either of the two situations - for those who missed writing the qualifier exam and for those who did not pass it.

5.1.7 Second attempt: If a candidate was absent or failed the first attempt of qualifier exam

There are two attempts within any term currently. In every term, qualifier exams are conducted at the end of 4 weeks and at the end of 8 weeks.

Eligibility to apply for Reattempting Qualifier exam within the same term:

- A learner who became eligible for the hall ticket in the qualifier process of a term but was absent for the final exam
- failed in the first attempt

Such candidates do not have to repeat the assignments as they have already become eligible. This re-attempt application form will open up immediately after the qualifier results are announced. The fee for this is as follows:

General Category / OBC Applicant

SC / ST Category / PwD ($\geq 40\%$ disability) Applicant

SC / ST Category Applicant who is ALSO PwD ($\geq 40\%$ disability)

1500 re-attempt fee

750 re-attempt fee

375 re-attempt fee

5.1.8 Candidates who did not become eligible for Qualifier exam

There are no limits on the number of times a candidate can attempt the qualifier process.

The candidate can attempt again the subsequent terms.

They have to pay the full fees as per the fee norms applicable for their category. (and additional exam facilitation fee in case of candidates outside India)

This will be considered like a fresh application and they have to redo the 4 weeks of course work and weekly graded assignments and become eligible to get the hall ticket for the qualifier exam

5.1.9 Options to register to courses once qualified

- Candidates who qualify in the first attempt within a term

- have the option to register to courses and continue with completing them in the same term. In this case, qualifier score is treated as Quiz1 score to calculate the Final score.

- Have the option to register to courses in the next 2 terms till when the qualifier score is valid.

- Candidates who qualify in the second attempt within a term can ONLY register from the subsequent term till the qualifier score is valid.

In a learner's first term immediately following the qualifier exam, the qualifier exam scores and assignment scores in the subjects registered will be considered as Quiz 1 score and first 4 assignment scores of the corresponding subjects.

5.2 JEE-based Entry into Foundation Level

There is a direct entry into the Foundation level of the program for students who have qualified for the JEE Advanced Exams. Currently the validity of this is for the 3 terms following the release of the JEE Advanced Eligibility list.

Candidates who qualified to appear for JEE Advanced 2022 can directly join our program in the Sep 2023/Jan 2024 Term and Candidates who qualified to appear for JEE Advanced 2023 can directly join our program in the Sep 2023/Jan 2024/May 2024/Sep 2024/Jan 2025 Terms

The process will be as follows:

Apply to the Qualifier process, saying Yes to the question on eligibility to JEE Advanced level.

Upload a valid proof for the same.

- If the proof is found to be valid:

- The candidate will be declared eligible to join the Foundational level courses.

- They will be issued the admission letter.

- Such candidates can directly register to courses in the foundation level with CCC as 4.

- If the proof document submitted is found to be not valid, the student will be moved into the category of non-JEE and will be treated as a regular entry candidate to the foundation level and have to go through the qualifier process.

6. Credit Clearing Capability

The value S used to determine the maximum number of courses that the learner is permitted to register in a term is calculated as shown below.

- Term 1: decided by qualifier marks

- Term 2: decided by average of marks of all courses taken in Term 1 in which the learner has passed

- Term n ($n > 2$): $M = \text{average marks of courses passed in the previous two terms Term } n-1 \text{ and Term } n-2$ (This will be calculated using marks of subjects in which the

candidate has passed, not those which he/she has not passed or is not completed yet); ($n-1$ and $n-2$ terms must be terms where the learner status is Active - defined in section 11. Learner Life Cycle

Marks M (as defined above) Maximum number of courses that learner is permitted to register in any term

0 ≤ M < 50
50 ≤ M < 70
M ≥ 70

2
3
4

The credit clearing capability CCC will be decided as follows:

- If a learner has passed at least one course in term n-1, then the CCC of term n will be calculated based on the marks as given in the above table.
- If a learner has failed all courses the learner has appeared for in term n-1, CCC of next term n will be 2.
- If a learner is absent for final exam of all courses, thus not completing their courses and not getting grades, CCC of next term = CCC of the learner's last term
CCC is kept as 4 by default for

- everyone who chooses to register to courses in the same term as the qualifier exam
- For all JEE candidates in the first term
- For everyone in the Diploma and Degree levels

7. Course registration - steps involved

Students who are continuing with the program will go through the following steps to sign up for the courses:

- Within the registration window, students will pick the courses they want to take in the coming term, with limiting criteria on total courses registered being their CCC i.e learners can register to maximum number of courses ≤ their CCC.
- Students pick 2 cities among the choices provided for their quizzes and exams for that term.
 - They have the freedom to choose a different set of cities than the ones they opted for in the previous terms.
 - Also they can choose a different set of cities for every quiz/final exam while registering for the courses so that accordingly booking may be done with the Exam vendor for slots in these cities.
- Students can register to courses for which the prerequisite is completed. The pre-requisites are mentioned in 13.9 Prerequisite course requirements
 - e.g. in order to sign up for Math-2, the learner must have cleared Math-1
- Students can take any course within a particular level of study but are not allowed to sign up for courses across levels.

○ Students who successfully complete all courses in the Foundation level will be eligible for admission to the Diploma level program.

○ Learners who successfully complete all courses in the Foundation and diploma programme will be eligible for admission to the degree level, if they satisfy the prescribed/regulatory criteria.

○ Students who complete 114 credits as per the norms will be eligible for the BSc degree and can continue onto the BS level.

• Learners pay only for the number of credits they are signing up for (online payment only).

8. Direct Entry into Diploma programme

For those who have the foundations to enter the Diploma programme directly and those who wish to do just the Diploma and exit with it, this is a pathway. It is primarily aimed at working professionals or learners who already possess the fundamentals taught in Year 1 of this programme to enter the Diploma level directly.

Entry - Into Diploma level

Exit - One or both Diplomas from IIT Madras

8.1 Eligibility to Apply

Students who have completed 2 years in any UG degree programme are permitted to apply to the diploma level through direct entry. Their second year marksheets or higher must be submitted as proof to qualify under this category.

8.2 Qualifying Process

1. A separate Direct Admission to Diploma (DAD) qualifier exam will be conducted for the Diploma in programming (DP) and Diploma in Data Science (DS).
2. These are conducted on the same date as the end term examinations of the IITM BS DS program. Hence these are conducted three times a year.
3. Any candidate crossing the cut off marks defined below will be eligible to enter the Diploma Programme corresponding to the qualifier attempted and register to the courses.
4. There will be no limit on the number of attempts by any candidate for direct entry, though the recommendation would be that if they do not pass the qualifier, they attempt through the foundation level.
5. The qualifier for DAD-DP will be a 3 hr exam, subjects being English, Aptitude and 6 weeks of Maths 1. Students have to study Computational Thinking, Introduction to Python and then move on to the Programming Diploma subjects.
6. The qualifier exam for the DAD-DS will be a 4 hr exam, with subjects being English, Maths 1, Statistics 1 and Python programming. Students have to start with Maths 2 and Statistics 2 and then continue with subjects in the Data Science diploma.

Students who have completed the Diploma in Data Science by Direct admission are directly eligible to also pursue the Diploma in Programming, if they wish to, without attempting the qualifier exam for this.

But students who complete the Diploma in Programming and wish to pursue the Diploma in Data Science have to appear for the qualifier for DS as they would not have studied Statistics 1 and Maths 1 as part of course work.

Fees for the DAD
qualifier exam

GEN / OBC-CL

SC/ST/PwD

Rs 6000/-

Rs 3000/-

SC/ST AND PwD Rs 1500/-

OBC-NCL, EWS Rs 6000/-

Minimum
required

Qualifier Exam

Score in each

subject

40%

30%

30%

35%

Table 1: Department Core/Elective Courses

Jan 2028| CourseFes

Cut off marks required

in DAD Qualifier exam

50/100

40/100

40/100

45/100

Table 2: SWAYAM NPTEL Courses Applicable for Department/Free

Electives

The NPTEL courses given in the below can be credited at the BSc level. Any course can be credited only once in this programme. Also, the same NPTEL course cannot be credited twice - within your college for another academic programme and this BSc programme. It should be credited

only in either of the above.

SWAYAM NPTEL Approved Dep/Free Elective course list:

https://docs.google.com/spreadsheets/d/e/2PACX-1vSJXV0JECyoQvgWvBIVxO13G0KRm5a1qNCRBa7rAw8GDY4e0cfm1KiVCwlgS_ed80ObtzQ1rfx_JWIR/pubhtml?gid=399341609&single=true

Note that the list of courses is subject to periodic revision.

Table 3: SWAYAM NPTEL courses Applicable under HS/MG

category for crediting in the BS level

Upto a maximum of 4 credits can be credited under the HM category in the BS degree level, which can be done from NPTEL or courses within the program.

(Refer Credit Transfer for NPTEL Courses)

SWAYAM NPTEL Approved HS/MG course list:

https://docs.google.com/spreadsheets/d/e/2PACX-1vSJXV0JECyoQvgWvBIVxO13G0KRm5a1qNCRBa7rAw8GDY4e0cfm1KiVCwlgS_ed80ObtzQ1rfx_JWIR/pubhtml?gid=1418834182&single=true

Note that the list of courses is subject to periodic revision. From the NPTEL course URL, please select the SWAYAM Certification courses. Only these are eligible for Credit Transfer

9. Credit Transfer

Credit Transfer for NPTEL Courses

The following process is to be followed for credit transfer from NPTEL:

- An NPTEL course of duration 4/8/12 weeks carries credit equivalence of 1/2/3 credits in the BS degree program.
- The learner must register for the NPTEL exam using the @ds.study.iitm.ac.in Email ID.
- The learner has to register for NPTEL exams, pay the exam fee, and complete the NPTEL course.

d. An NPTEL course can be transferred for credit only once and only to one program. The learner has to give an undertaking that they are submitting this course for credit transfer only to the IITM BS Degree program.

e. The NPTEL courses will be added in PASS/FAIL mode and counted towards the credits with no letter grade and will not be included in the CGPA calculation.

f. The fee for credit transfer from NPTEL courses is fixed as Rs 1000/- per credit. Hence, Rs 1000/-, Rs 2000/-, Rs 3000/- should be remitted as fees if a learner opts for credit transfer from NPTEL courses of duration 4/8/12 weeks. This fee is to be paid to the BS degree program, and is separate from the fee to be paid to NPTEL to complete the course.

g. The learner can complete NPTEL courses any time after joining the Foundation Level (using the official IITM email) and apply for the course credit transfer in the BSc/BS levels.

h. Refer the below table to know which term NPTEL courses can be transferred to which term in BS

NPTEL courses completed in below term Credit Transfer to BS Program in Term

January

September

July

January

Credit Transfer from courses that are conducted on IITM campus (**This will be in effect from January 2024**)

- A maximum of 24 credits can be earned from IITM campus courses.
- Students who have completed the foundation and the 2 diplomas and have cgpa of ≥ 8 will be eligible to earn credits from campus courses.
- The maximum number of credits that can be taken at the BSc level will be 8. These credits are to be obtained from the Engineering, Science or Management departments.
- Students who have completed 114 credits in the IITM BS program and completed the BSc level with a cgpa of ≥ 8 will be permitted to credit 24-x credits at the BS level where x is the number of credits they have earned in the BSc level from IITM campus courses. A maximum of 8 credits can be transferred from the HS category in the BS

level, including the HS category credits earned through NPTEL.

- IITM BS students can apply to courses they are interested in and their acceptance will be based on the availability of seats for the course.
- The fees for transferring the credits from each on-campus course will be Rs 2500/- per credit of IITM BS program. The fee to be paid to the institute will be apart from this and will be as per the institute norms.
- Students will have to attend the class in person unless a hybrid mode of accessing the classes is available. The on-campus courses credited by the BS students will be listed in the transcript along with the corresponding grades. The credits transferred from the on-campus courses into the BS program will be counted towards the CGPA of the student.

10. Learner Life Cycle

Once a learner clears the qualifier, he/she will be eligible to register for the Foundation level. Using their personal email id, they register to as many courses as permitted by CCC and make the payment. After approval of the uploaded documents, the learner is given a roll_number@ds.study.iitm.ac.in email id.

Henceforth all interactions on the portal right from login to accessing the learner dashboard and courses will be via this email id.

There will be 5 statuses for any learner in the programme : On the rolls/Active, On Academic Probation, Struck off the rolls, Alumnus, Quit the programme

- On the rolls/Active - When a learner is registered in any term for one or more courses after paying the course fees, the status will be "On the rolls" or Active.

- On academic probation/Not registering to any course in a term:

After joining the programme, a learner may skip up to 2 terms consecutively without taking any courses. In the two terms where the learner does not register for any course, the learner status will be marked as "On Academic Probation". The learner email ID will still be kept alive while the learner is on academic probation.

- The learner can actively inform us about not registering to courses by paying the "Registration keep alive fee (RKA)" of Rs 1000/- per term. In case of registering to courses in the next term, the learners have to only pay the course fees.

- The learner may not pay the RKA and have it as pending to be paid. Pending RKA will include 10% extra over regular RKA when re-registering back.

■ To register to courses in the next term if not paid the RKA: The learner will have to pay the pending dues = (which will be Rs 1100/- or Rs 2200/- (Rs 1000 RKA +10% as penalty for each term where no courses are registered). The learner has to select the courses and pay the course fees.

Once they do this, the learner status is changed to "On the rolls".

- Struck off the rolls: If a learner with status "On Academic Probation" for 2 consecutive terms does not register for courses in the next term too, the learner's status is changed to "Struck off the rolls". The official email id is suspended.

- Once struck off the rolls, to reactivate the registration, they will have to apply through a separate process as defined:

- If the RKA for the previous 3 terms has already been paid, they have to request for reactivating the email id on payment of Re-admission fee of Rs 2500/-. Once done, they can register for the courses in the upcoming term.

- If the RKA for the previous 3 terms has not been paid, the learner has to apply to activate his/her account by paying the pending dues which will be Rs 5800/- = Rs 2500 (Readmission fee) + Rs 3300/- (Rs 1000 RKA x 3terms+Rs 300 (10% as penalty)). On receipt of the payment, the official email id is activated again and they are permitted to register using this id. Once they do this, the status is changed to "On the rolls".

- Any learner who is struck off the rolls 2 times, is removed from the programme.

- Quitting the programme: There will also be an option inside the candidate dashboard which says "I quit the programme". Once the learner applies for this midway through a

level, we suspend the official email account and activate the personal email account to access the dashboard. No reactivation for continuing the program is possible.

- Alumnus: Learners who complete the BSc level / BS level and quit the program, at the end of it, we again suspend the official email id and activate the personal email account to access the dashboard. Their status will be changed to “Alumnus”.

Students completing the foundation or diploma level and quitting the programme will have status as “FL certified” and “DS certified”/”DP certified”/”Both diplomas certified” but will not be awarded the Alumnus status.

Timeline for certificate:

*We need to get the senate approval before generating the original certificate. Senate meetings will be conducted three or four times in a year. Please refer the below timeline for certificate issue date

Term

May 2023

Cut off date for quit

gform response

Friday, November 17,
2023

Sep 2023 Friday, December 1, 2023

Cert Delivery date

Friday, December 22,
2023

Friday, December 15,
2023*

Sep 2023 Friday, January 12, 2024 Friday, March 1, 2024

Jan 2024 Friday, March 15, 2024 Tuesday, April 2, 2024*

Jan 2024 Monday, May 20, 2024 Wednesday, July 3, 2024

May 2024 Sunday, July 28, 2024 Sunday, August 11, 2024*

May 2024

Sep 2024

Sep 2024

Sunday, September 22,
2024

Sunday, November 17,
2024

Sunday, January 12,
2025

Tuesday, November 5,
2024

Monday, December 2,
2024*

Thursday, February 27,
2025

Type of Cert

Original

Provisional

Provisional (P) or Original
(O)

Provisional

Provisional (P) or Original
(O)

Provisional

Provisional (P) or Original
(O)

Provisional
Provisional (P) or Original
(O)

*Applicable only for project only registered students.

2024 calendar link: https://study.iitm.ac.in/ds/academic_calendar.html

Note: Updated photo used for hall ticket will be printed in provisional certificate.

11. Design of certificates for the 4 levels of the program

The design has been finalised for the 4 levels of certificates, as shown on the website.

Indian Institute of Technology Madras

Aarcli confers the degree of

Bachelor of Science (B.HJ

a

Data Science and Applications

on

NAME OF LEARNER

Given this day the Twelfth of, (year 2004

of the Institute

under the seal

0s21n0023

Signature

Doishen

Signature

Signature

Dents

Chairman, Board of Governors

Indian Institute of Technology Madras

thereby confers the

BSc in Programming and Data Science

on

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2

Given this day the Twelfth

of September, 2022 at

under the seal of, the Institute

NAME OF LEARNER

Lage

As"

Chairman, Board of Governors

Indian Institute of Technology Madras

thereby confers the

Diploma in Programming

on

MRE

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NAME OF LEARNER

Given this day the Twelfth

of, September, 2022

under the seal of the Institute

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Registrar
Lirector
Chairman, Board of, Governors

Snidian Mnstitute of Technology Madras

herely confers lthe
Diploma in Data Science

AZ
NAME OF LEARNER

Given this day the TwelfthofSeptember, 2022
under the seal of the Institute

Fa Cate

Cte
Sbeyistrar
Director

Chawman, Bourd of Governors
Indian Institute ofTechnology Madras
Centre for Outreach and Digital Education

This is to certify that

LearnerName
has successfully completed the Foundational Level in
Programming and Data Science

Term_Year

RollNumber

Nope

Nop

ae
Program Coordinator

L.
Design for provisional certificates:
Director

age
Chairman, Centre for Outreach and Digital Education

|

Sudian SJustitute of Technology Madras

NAME OF LEARNER

has completed the requirements for the
BSc IN PROGRAMMING AND DATA SCIENCE
on this day the Twenty Seventh of May 2023

|

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Prof. Vignesh Muthuvijayan
Coordinator

IIT Madras BS Program

Prof. Andrew Thangaraj

Coordinator

IIT Madras BS Program

Snidian Institute of Technology Madras

NAME OF LEARNER

has completed the requirements for the
DIPLOMA IN PROGRAMMING

on this day the Twenty Seventh of May 2023

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Prof. Vignesh Muthuvijayan

Coordinator

IIT Madras BS Program

Prof. Andrew Thangaraj

Coordinator

IIT Madras BS Program

Indian Institute of Technology Madras

NAME OF LEARNER

has completed the requirements for the

DIPLOMA IN DATA SCIENCE

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on this day the Twenty Seventh of May 2023

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Prof. Vignesh Muthuvijayan

Coordinator

IIT Madras BS Program

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Prof, Andrew Thangaraj

Coordinator

IIT Madras BS Program

11.1 Mark transcripts

There will be 2 types of documents that will be made available automatically.

1. Term wise Progress card

This document will list all the courses taken by the learner term wise.

The values for every course will be course code, course name, level, grade obtained.

Note that the transcript will show all attempts and grades obtained in each of the attempts.

2. Grade Card

This will have the courses at each level listed only once. The best score obtained among all attempts for each course is what will be shown here.

GPA will be calculated for the courses in a particular term of the programme.

$$GPA = \frac{\sum (GP_i * C_i)}{\sum C_i}$$

Σ

Σ

Where GP = grade point of a course and C_i is the number of credits assigned to that course and C_i is the total number of credits of all courses in the term, including those with

Σ

U or W grades.

The CGPA will also be computed for all unique courses completed until this point in time with the best grade being considered in case a course is attempted multiple times.

11.2 Procedure to Apply for Official Transcript & Bonafide

Certificate

Students who are interested in applying for a transcript/bonafide certificate have to follow these steps. Note that these certificates will be issued every Thursday. Students have to plan suitably and contact us.

Please refer the link to know the criteria for official documents given to students:

<https://docs.google.com/document/d/e/2PACX-1vQnn2cFan5BqTTABByCoqtue-0XSmFXQPT9>

12. Academic aspects

12.1 Academic calendar

1. There will be 3 terms every year - Jan-Apr, May-Aug and Sep-Dec.

2. All the foundation, diploma level courses, the mandatory courses of the BSc level will be offered in every term.

Three Terms a Year

January Term

May Term

JAN

FEB

MAR

APR

MAY

JUN

JUL

AUG

SEP

September Term

OCT

NOV

DEC

Regular Term

MONTH 1

MONTH 2

MONTH 3

Register > |«—— 12 weeks of coursework —————>
and pay

|

Quiz 1

|

Quiz 2

End Term

Exams

Term Ends >

* While 36 months (3 years/9 terms) is time permitted for completion of any level, 96 months (8 years/24 terms) is the time permitted for the entire programme.

For Project:

Category

New Registration

Fee for Level 1 or 2 reattempt

If the project is not completed in the registered term - the fee is retained for the subsequent term, grade will be marked as I.

. If the project is not completed in the second term also, then the registration becomes invalid, grade will be marked as U and the student has to pay the full fees again.

If the student fails in the project, grade awarded will be U and Student has to redo the project by registering to the project by paying the full fees.

If the submission is found to be Plagiarized,

a. Student maybe subjected to disciplinary action

b. Student has to redo the project by registering to the project by paying the full fees.

Yes
I or U
Payment Category Waiver Grade
2500
Yes
1000
No
Actual grade
Actual grade
MONTH 4
2500
Yes
U
2500
Yes
U

12.2 Course structure suitable for online delivery

All courses of 4 credits will be of duration 12 weeks.

The recorded content which is released every week will be for a total of about 2-4 hours, split into multiple lectures which includes the theory and tutorial videos. All videos are copyrighted to IIT Madras but will be available on YouTube as a public playlist for anyone to access and view.

Self test assessments for every video lecture, a practice assignment for the week with solutions will also be released apart from text transcripts and any related notes.

The weekly graded assignment will also be released along with the above content.

12.3 Evaluation and grading of courses in every term

Each course has 3 types of assessments - online weekly assignments, monthly in-person proctored quizzes and an in-person end term exam.

1. Online assignments:

- A 12 week course will have one or more weekly assignments to be submitted online within the due date specified.
- The average score of the best 5 out of the first 9 weekly assignments given during the course run should be $\geq 40/100$ to be eligible to write the final exam and get the hall ticket for the same.
- This will also contribute to the Final score and course grade. (Score in any unattempted assignment will be counted as 0).
- May change from course to course - check the grading document for actual details

2. 2 proctored Quizzes - to be attempted in person in the city chosen

Two quizzes will be conducted at the end of Weeks 4 and 8 based on the content of Weeks 1-4 and 1-8 respectively.

- Will be a single session exam with 4 hrs to attempt 4 subjects, 3 hrs to attempt 3 subjects and 2 hrs to attempt 2 or 1 subject.
- The Qualifier score will be counted as Quiz 1 score for the courses registered in the Foundation level only in the subsequent term of the qualifier exam, unless the candidate attempts Quiz 1 again in which case the better of the 2 scores will be used for calculations.
- The score of a quiz not attempted will be taken as 0. No make-up quiz will be provided.
- At least one of the 2 quizzes has to be mandatorily attended by the candidate else he/she will not be eligible to write the final exam. (check grading document for changes)

3. Final end term exam at the end of the course

- At the end of a term, there will be an end term exam of 1.5 hours duration for each

course. (This will ensure exams can be conducted only on Sundays and exams for 4 courses completed in 2 sessions of 3 hrs each throughout the program.)

- Eligibility to write the End sem exam: Pls check the grading document for details.

- The final exam score accounts for 50% of the Total Course Score T - called End Semester Score (E)

12.4 Pass criteria for each course

Total Course Score (T) will be the sum of all assessment components in every course as defined in the Grading document of that term.

A candidate is deemed to have passed a course IF Total Course Score (T) $\geq 40/100$

This criteria is the same for all learners in the course.

An absolute grading system, as described in the following table, will be followed:

Condition satisfied by

Status

'T' - Total Course Score (Out Of 100)

($T \geq 90$)

($90 > T \geq 80$)

($80 > T \geq 70$)

($70 > T \geq 60$)

($60 > T \geq 50$)

($50 > T \geq 40$)

($T < 40$)

Weekly average assignment score

$< 40/100$

or 0 quizzes attended - (Not eligible to write the final exam)

Complete ET alone in next term;

OPPE will NOT be scheduled.

GA, quiz and OPPE marks will be carried over OR Repeat the entire course

Complete ET and OPE in next term, Both oppes will be scheduled.

GA and quiz marks will be carried over

OR Repeat the entire course

Complete OPE alone in next term, Both oppes will be scheduled. GA, quiz and ET marks will be carried over OR Repeat the entire course

entire course

Incomplete

(Absent in ET alone)

Incomplete

(Absent in both ET & OPPE)

Incomplete

(Absent/fail in OPPE)

I_OP

-

I_BOTH

-

I

-

Pass

Pass

Pass

Pass
Pass
Pass
Fail
Fail
Letter Grade
S
A
B
C
D
E
U
WA/WQ
Grade point
10
9
8
7
6
4
0
0

12.5 Repeating a course

1. For improvement

A learner can repeat a course for improvement in grades any number of times. The fee for repeating the course for improvement will be twice the regular course fee and the learner will have to submit all the weekly assignments, appear for the quizzes and final exams. The highest score amongst all attempts for a course will be used for calculating the CGPA.

2. If learner was not eligible to attempt the end term exam (grade=WA/WQ) or if the learner did not pass the course (Grade = U)

If average assignment score < 40/100 or no quiz attended or T<40/100, the learner has to repeat the entire course. This includes submission of assignments and redoing all the subsequent quizzes and the end term exam. Fees for repeating the course is the same as the course fees.

3. If the learner was absent for the final exam alone (grade = I): The learner has 2 options:

a.

Reappear for the final term exam - Makeup exam: They can attend only the end term exam whenever it is conducted in the subsequent term.

- The fee to repeat an end term exam will be Rs.1000 for each course of the foundational level and Rs. 2000 for each course of the diploma / degree levels.

- If the learner reattempts the course in the immediate next term, then the average Quiz Score Q will be carried over and the learner does not have to resubmit the quizzes or the assignments.

- If the learner wishes to skip the immediate next term and attempt the course in subsequent terms, then the entire course will have to be repeated including the weekly assignments and quizzes.

- A learner can reappear for the makeup exam only once. If the learner misses the makeup exam, then the learner has to repeat the entire course in the term thereafter, by paying the full course fees and repeating all assignments, invigilated quizzes and the end term exam.

b.

Repeat the entire course: They can choose to repeat the entire course.

- The fee to repeat the course will be the same as the regular course fees.
- The learner must complete all assignments, invigilated quizzes and the end term exam.
- Registering to this course will be counted as one of the courses permitted as per the CCC of the learner.

Note: Learners repeating a course for any reason must do so within the time and term limits:

- Each level must be completed within 36 months (3 years / 9 terms).
- The entire programme must be completed within 96 months (8 years / 24 terms).

12.5.1 Registering for Courses: Term 2 Onwards

- Maximum number of final exams (full course+makeup exams) ≤ 4
- Maximum number of new + repeat full course (if failed/absent if reqd/improvement) \leq CCC
- Registering for new courses is subject to fulfilment of all rules and prerequisites.
- If a student passes all/some courses then CCC is calculated on the average of passed courses.
- If a student fails all courses, then CCC is set to 2.
- If a student is absent for all courses then CCC of the previous term is carried forward.
- Make up exam will be permitted as an option only once in the subsequent term.

12.5.2 Repeating a Course - WA, WQ, U or I grade

Applicable for courses with WA, WQ, U or I grade.

You can choose to repeat courses in a single term or across multiple terms. You can also register for new courses in the term. The total number of courses must be within the CCC limit. Learners with an Incomplete (I) grade in a course can take a Make Up Exam instead of repeating the course.

12.5.3 Repeating a Course for Improvement

Applicable for courses with S, A, B, C, D or E grade.

You can choose to repeat courses to improve the grade in the course. The highest grade will be recorded in the transcript. The total number of courses must be within the CCC limit.

Course fee Repeat for Improvement courses will be double the normal fee. Improvement courses can be registered at any level. Eg: Foundation course improvement can be registered at diploma level.

Note: It is recommended that learners try and progress with new courses instead of repeating courses for improvement, unless a learner deems it absolutely necessary or needs to improve their learning of a course. All course material of completed courses are available to the learner throughout the course.

Please write to support to get an improvement gform. Students have to mandatorily apply for any new course or RKA in course registration form. We will not accept gform entry alone.

12.5.4 Make Up Exams

Applicable for courses with I grade.

You can choose to take a Makeup Exam for a course with Incomplete (I) grade. Learners will only be required to reappear for the Final Exam for that course. The Makeup Exam does not count towards CCC, but a student can appear for a maximum of FOUR final exams in a term. If you have already registered for 4 courses, you do not have any more final exam slots available.

Note: The grading pattern for make-up exams will be as follows: the pattern used will be as per the formula used in the term the course work was done and not as per the term the makeup exam was taken.

Quick Reckoner Table

COURSE PASS

STATUS

Passed all
Failed any/all
Absent for all
final exams
Passed + Absent
Failed + Absent
Repeating OPPE:
OPE1/OPE2
Absent
ET
Absent
T
-
Grade
U
Condition for
OPPE/course reg
Foundation Diploma
Repeat the entire course Course Fee
Complete OPE alone in
>=35
Absent
Present
<35
U
I
next term, GA, quiz and ET
marks will be carried over
OR
Repeat the entire course
Repeat the entire course Course Fee
Complete OPE alone in
>=40
Present
Present
score< x/100
<40
Absent
-
>=40
Present
score> x/100
Present
<40
U
I
Actual
grade
U
Repeat the entire course Course Fee
Repeat OPPE and ET OR
Repeat Entire course
PASS (depending on
course criteria)
2000

Course Fee
Repeat entire course Course Fee
I

next term, GA, quiz and ET
marks will be carried over

OR
Repeat the entire course

Course

Fee

4000

Course

Fee

Course

Fee

1000

2000

Course

Fee

1000

2000

Course

Fee

New Course

Allowed?

Yes

Yes

Yes

Yes

Yes

Repeat

Course?

Yes

Yes

Yes

Yes

Yes

Take Make Up

Exam?

Not recommended

but available

Absent

-

I

Repeat ET alone OR

Repeat Entire course

1000

2000

- OPPE will not be applicable for the students who registered for repeating ET alone.
- ET will not be applicable for the students who registered for repeating OPPE alone.
- Students who registered for repeating OPPE & ET will have to appear for OPPE1, OPPE2 & ET.

Registered Category

ET alone

OPPE alone

ET + OPPE

OPPE

No OPPE will be conducted

Both OPPE will be conducted

Both OPPE will be conducted

12.6 Dropping a course (This is not applicable for the students who are continuing after qualifier in the same term)

Once the registration window closes in any term, adding courses will not be allowed.

Dropping a course will be allowed within 4 weeks of the term start date and not beyond. Rs 2000 will be deducted if a Foundation level course is dropped and Rs 4000 will be deducted if a Diploma/Degree level course is dropped.

a.

If the learner decides to drop out of the programme completely using the “I quit the programme” option, the course fee paid minus the deduction will be refunded to the learner and the learner will be removed from the programme, cancelling his official email id access. The status will also be changed to “Quit the programme”.

b.

If the learner drops one/a few of the courses registered to in a term, the refund will be made as given in the table below but the email id will be kept active so that he/she can continue with other ongoing courses and the programme. Status will be “Active”.

c.

If the learner opts to drop all courses registered in a term, the refund will be done as per the table given below and the email id will be kept active so that the learner can come in and register in the next term. But this will be counted as a term with 0 courses. Status will be changed to “Academic probation”.

d.

e.

The fee receipt will be generated post these 4 weeks after term start when drop is permitted so that all the courses and fees are tallied and confirmed.

Learners writing exams outside India would have paid Exam facilitation Fee while registering for the courses. For such learners:

i.

If they drop from all courses in a term, 100% of the facilitation fee for Quiz 1 will be retained while 50% of the facilitation fee for quizzes 2 and final exam will be refunded.

Paid

Level

Foundation

4000

2000

1000

Diploma/Degree

Project Course

10000

5000

2500

2500

Retained by IITM

as Admin charges

2000

2000

2000

4000
4000
4000
500
Refund
2000
0
0
6000
1000
0
2000

Please note, The amount to be refunded will be added to your student wallet and NOT refunded to the bank account. This amount can be used when you register for courses in the next term and deducted from the fees to be paid then.

13. Learning paths available

Here are some suggested learning paths...

1. Foundation course certificate
2. Diploma in Programming
3. Diploma in Data Science
4. Diploma in Programming and Data Science
5. BSc degree in Programming and Data Science

Shortest

Term
Year 1
Year 2
Year 3
Term 1
Term 2
Term 3
Term 1
Term 2
Term 3
Term 1
Term 2
Term 3
Year 4 Term 1

Foundatio

n
3
2
3

Plan for One

Diploma

1
2
2
2
1
2
1
1
2

Plan for Both
the Diplomas

1
2
2
2
2
2
2
1
2
1
2
BSc Degree BS Degree

2
3
3
3
2
2
3
3
2
3
2
3
3
3
2
2
3
3
3
2
3
3
2
3
Path for BSc
Degree

4
4
4
4
4
4
4
4
3

Term 2
Term 3
2
1
Total Courses
8
14
20

13.1 Prerequisite course requirements
Foundation courses
Level
Foundation
Course

Maths 1
Statistics 1
English 1
CT
Maths 2
Statistics 2
English 2
Pre-req

-
-
-
-

Maths 1
Statistics 1
English 1
Intro to python CT

A co-requisite for Statistics-2 is Maths-2. So either Maths-2 has to be done before statistics-2 or both can be taken together. Statistics-2 cannot be done without having done Maths-2.

All the 8 Foundation courses should be completed before the candidate can register to any Year 2 Diploma level course.

Diploma level courses

Level
Maths2
Coreq

-
-
-

2
3
31
2
3
31

Course
Diploma in DS MLF
BDM
MLT
MLP
BA
TDS
Diploma in Prog DBMS
PDSA

-
-

App dev 1 -
Java

-

App dev 2 App dev 1
SC

-

Pre-req

-
-

MLT, MLF

BDM

MLF

-

-

DBMS

-

-

Coreq

-

-

MLF

Without completing all the 8 Foundation courses and the 12 Diploma level courses + 4 project courses, one cannot proceed to register for Year 3 Degree level courses.

Degree Level Courses:

an 2025|CourseFee

Please note that L5_Degree courses are complex compared to Degree and L4_Degree courses. Course fee and credits are same as L4_Degree courses.

14. Changes in project grading (wef now) and

Eligibility to enter the BSc Level (wef May 2024)

Here are two changes being effected with respect to project grading and eligibility to enter the degree level.

1. Project grading:

So far - students had to complete all feature requirements given for a project, pass the L1 viva and move onto the L2 viva and pass that too to get a pass grade.

Looking into the data we have, we understand that all students may not be equally proficient in the areas of programming, machine learning and business and excel in all 4 projects.

Hence the grading is being changed as follows:

MAD1, MAD2, MLP projects: WEF current term

1. For MAD1 and MAD2 projects, when the submitted Application passes the check for Appdev, L1 viva will be scheduled.

For MLP project, if the cutoff is crossed in the Kaggle contest and the student declares that all the models have been completed, the L1 viva is scheduled.

2. There are 2 cutoff marks that will be decided for the L1 level for each term:

a. Cutoff1: X, Cutoff2: Y;

b. $X < Y$, $X > 0$

3. The L1 viva will be conducted and scoring will be done based on the rubrics defined for it. Based on the marks scored in L1 viva ($L1_S$), the following are the possibilities:

a. If ($L1_S < X$): Student has to resubmit the project. A few days are given for them to resubmit in the same term. If the second time also, $L1_S < X$, they will have to redo the project in the next term.

b. If ($X \leq L1_S < Y$), then students are asked some additional questions for assessing their knowledge and awarded D or E grade. Such students do not go in for L2 viva at all. They will have a pass grade.

c. If ($L1_S \geq Y$), L2 viva is scheduled for them.

i.

If they pass the viva cutoff for L2, they get a grade including L1 and L2 scores.

ii.

iii.

If they do not pass the L2 viva cutoff, they get one more chance at L2 viva.

If they do not pass in the second attempt at L2 viva, they get an

appropriate grade (C or D or E) based on their L1 performance alone.

BDM project evaluation

So far: The process has been identifying the business, collecting data, analysing and sharing their insights.

Going forward from Jan 2024:

Students will be allowed to web scrape data and analyse it, sharing the source from where the data was taken. The BDM team will outline the steps involved. The maximum grade that the student can earn in this case will be D.

Eligibility for entering degree level of the program: WEF May 2024

- For a student to progress to the degree level (BSc) of the Data Science and Applications program:

- they must secure a CGPA of 6.0 or higher at the end of two diplomas (includes the courses in the foundation level and the diploma level and the projects)

- AND a CGPA of 7.0 or higher in all the projects completed at the diploma level.

- These CGPA requirements are not applicable to students who exit the program with the diploma(s).

- Such students who exit the program with the diploma(s) without meeting either CGPA

criteria will not be eligible for any certificates of academic achievements or prizes.

- Students can repeat the theory courses any number of times within the stipulated period for diploma level to improve the overall CGPA.

- Students who have overall CGPA of 6.0 or above and CGPA < 7.0 in projects, which prevents them from entering the degree level, will be given one additional opportunity to improve their project grades to earn the eligibility to progress to the degree level.

- Students who cannot improve their CGPA above the required cut-offs must exit the program with the diploma(s).

- This rule shall be applicable to all students entering the degree level (BSc) from the May 2024 term.

For those students who completed diplomas with less than 4 standalone projects (in Sep 2021/Jan 2022 terms projects were included in theory courses), whatever projects were done standalone will be counted for the average CGPA of 7.0. For example, if 2 projects were done as part of the theory and 2 projects standalone, then only the grades in the two standalone projects will be used to compute the project CGPA. The projects done as part of the theory courses will not be counted.

For those who do 4 standalone projects, eligibility to enter degree level is illustrated below with some examples:

P1

E

E

D

D

D

P2

E

E

E

D

D

P3

S

S

S

S/A/B

C

P4

S

A

S/A/B

S/A/B

C

Total points

28

27

30/29/28

28-32

26

Eligible to enter the degree level?

Yes

No

Yes

Yes

No

15. New Rules for Foundation & Diploma Level Completion

15.1 Foundation level checkpoints:

These conditions shall be applicable to the students admitted to the foundation level from May 2024. These are not applicable for students who have entered in Jan 2024 term or before that.

Students will be removed from the program if they do not complete

a. at least 4 courses within 4 terms.

b. at least 6 courses within 6 terms.

c. the 8 foundation courses within 9 terms.

The student will be issued warnings about insufficient progress and about complying with these conditions starting from term 3.

15.2 Change in CCC at the foundation level:

This is for ALL students in the foundation level.

Currently, the CCC is calculated based on the courses passed in the last 2 terms by the students and enforced too, deciding the number of courses that students can take in a given term in the Foundation Level.

In view of the conditions imposed above leading to exit from the program if not satisfied, it was proposed that the CCC will only be a recommendation and not enforced. This will enable students to make up for term breaks and meet the proposed course completion criteria.

15.3 Increasing the maximum number of terms for completing the diploma level

The Diploma level can now be completed in a maximum of 12 terms instead of 9 terms as has been the case till now. This extension of 12 terms as the maximum limit to complete the Diploma level shall be applied for all learners, starting from the first batch, who started the Diploma Level in September 2021.

The maximum duration for the BSc and BS levels shall remain unchanged at 9 terms. The total duration permissible for the BSc and BS degrees shall also remain at 6 and 8 years, respectively.

15.4 Checkpoints in the Diploma level

These conditions below shall be applicable to the students admitted to the Diploma level from May 2024. These are not applicable for students who have entered in Jan 2024 term or before that.

To ensure continuous progress and steer students towards completing courses on time, the following intermediate checkpoints were also proposed. The student must complete

a. at least 3 courses and 1 project in the first 3 terms from starting the Diploma level - if not, they will be put on academic probation and given a warning.

b. at least 6 courses and 2 projects in the first 6 terms from starting the Diploma level - if not, they will be removed from the program.

c. at least 9 courses and 3 projects in the first 9 terms from starting the Diploma level - if not, they will be removed from the program.

d. All 12 courses and 4 projects in 12 terms from starting the Diploma level - if not, they will be removed from the program

The student will be issued sufficient alerts and warnings about these checkpoints.

16. Eligibility Criteria Prize

The Direct admission to the Diploma, where students exit with the Diploma, comprises 8 courses and 2 projects (35 credits).

Eligibility for Prizes:

1. Certificate of Merit

Awarded to students at 2 levels: completing Foundation+2 Diplomas (86 credits), completing the BS degree (142 credits)

Criteria: CGPA between 9.00 and 9.50 at the end of Foundation+2 Diplomas or when graduating with BS.

2. Certificate of Academic Distinction

Awarded to students at 2 levels: completing Foundation+2 Diplomas (86 credits) or completing the BS degree (142 credits)

Criteria: All students with CGPA greater than 9.50 at the end of Foundation+2 Diplomas or when graduating with BS.

3. Certificate of Academic Excellence

Awarded to students at 2 levels: completing Foundation+2 Diplomas (86 credits) or completing the BS degree (142 credits)

Criteria: The students with the highest CGPA at the end of Foundation+2 Diplomas or when graduating with BS will be identified and awarded. The actual number of students will be decided by the Steering committee.

Such students will be awarded a medal along with the certificate.

The following will be the process followed for identifying the students eligible for the awards:

a. The list of students completing the foundation+2 diplomas or the BS degree in a calendar year January-December will be consolidated and considered to finalize the prizes.

b. Certificates will be awarded for the 3 categories with medals being given for the students identified as having the highest CGPA alone.

c. The students completing Diplomas through the Direct admission process will be considered as a separate category and will be eligible for prizes in the highest CGPA category alone.

Prize Eligibility Criteria for Improvement Courses

We will consider the CGPA for prizes only till the term when the student completed 2 diploma's. We will not consider the courses if the student registers as improvement after they have completed both diplomas.

Eg: Student registered foundation/diploma course as improvement in May 2023 but completed both diplomas in Jan 2023, then the CGPA secured in JAN 2023 will be considered for prize.

17. Apprenticeship in the BS level of IIT

Madras' BS in Data Science and Applications

The program provides the students in the BS level of the program to pursue an apprenticeship with companies and research projects and earn up to 12 credits in this level. Doing an apprenticeship is optional.

Steps involved in the Apprenticeship program:

1. Approval for the company/research project where the student can work as an apprentice

If the student applies and is accepted by any of the companies that are preapproved by IITM for this purpose, the apprenticeship will be directly approved.

Else the student will have to submit the details of the company/organization and the Apprenticeship committee will decide based on the details submitted.

2. Reporting Manager

Once the apprenticeship is approved, the student has to submit the details of the Reporting Manager in the Organization to IITM.

3. Logging the weekly work report

Student has to file the work log to IITM BS office every week.

4. Review after first 4 weeks

After 4 weeks, based on the student's performance, the reporting manager has to confirm if they would like to continue with the student as an apprentice for the next 7 months. This confirmation letter should be submitted to the IITM BS Program's Office.

5. Possible exit after 4 months

After the completion of 4 months, the student or the company can choose to discontinue the apprenticeship. A letter from the company has to be submitted outlining the work done by the student and whether it was satisfactory to obtain partial credits.

6. After the completion of 8 months of internship

A letter from the Reporting Manager should be submitted to the IITM BS program on the company's letterhead stating the work done by the student and whether it was satisfactory.

The following will be norms with respect to pursuing an apprenticeship:

1. Number of courses that can be taken along while pursuing the apprenticeship

Students can pursue a maximum of 2 courses each term during the duration of the apprenticeship.

2. Duration of the apprenticeship that can be credited - 8 months, full time

3. Academic Credits

a. <4 months: 0 credits.

b. 4<duration<8 months: 4 credits

c. 8 months: 12 credits

4. Stipend: This is mutually agreed upon between the student and the company when finalizing the apprenticeship.

5. Mode of apprenticeship: Remote or On-site: This will depend on the company's policy.

6. Pre-placement Offer: On successful completion of the apprenticeship, companies will have the option to give a pre-placement offer to the students.

7. Payment of fees:

The fee for credit transfer is fixed as Rs 5000/- per credit for Apprenticeship. When students opt to credit this at the BS level, they have to pay the credit transfer fee at the time of registration.

Please refer the link to know more about Apprenticeship:

https://docs.google.com/document/d/e/2PACX-1vQ_ZCTw1_PzVDBJ7u-wX18KUgl-IK1POIYRvyjAYsj_A-tS99K7ARRuNVKk0tp34B1woqclNxvY_0Lc/pub

18. Software and Hardware Requirements -

Mandatory System Specifications

The following are the essential requirements that are recommended to pursue the BSc Degree program from IIT Madras¹. Please note that there will be updates in some of the specifications with changes happening in technology.

Hardware

To enroll and study in the program, every student is required to have a laptop or desktop with the minimum configuration being as follows:

1. RAM Size - 8 GB or higher (The ability to install more memory is desirable).

2. Processor - Intel 8th Generation or AMD 4th Generation or upwards or its equivalent (The latest processor configuration is always recommended)

3. Storage - Minimum of 500 GB, Desirable of 1 TB. Having an SSD storage is desirable.

4. Screen size and resolution - Minimum of 13" for laptop and Minimum of 15" for desktop with 1080p

5. Webcam, a mic and speaker or an earphone/headphone with mic.

Software/Applications

1. Operating System - Minimum requirement of Windows 10 or Ubuntu LTS Version 20.04 (or any equivalent) or Mac OS Mojave. Having the capability of dual boot is desirable. If there is no capability for dual boot, then the operating system must support virtualization software like VirtualBox using which Ubuntu 20.04 can be emulated. The System Commands course in Semester 4 will be taught primarily on Ubuntu 20.04.

2. Browser - Latest version of Chrome with Google Account signed in

3. Basic familiarity with Google Suite of tools (Docs, Sheets and Slides), specifically collaboration features.

4. Any other software that is specified within the course

Internet Bandwidth

Minimum of 2 MBPS connection is required to attend sessions without disruptions. However we strongly recommend broadband connections with much higher bandwidth for the best learning experience.

For Online Interactions/Proctored Examinations

1. Browser - Latest version of Chrome is desirable

2. Mobile with a front camera and good internet connection (VOLTE connections are ideal)

3. Mic and speaker to be able to speak to and listen to the person at the other end

4. Any applications as required to be installed for the interactions/examinations

System compatibility test

All students have to mandatorily attend the system compatibility test and ensure that the system you have conforms to the above requirements and student has to participate in this on the dates mentioned by the Admin team to get this completed.

Other References

Some more helpful links that will help you in understanding possible system configurations:

1. <https://towardsdatascience.com/20-necessary-requirements-of-a-perfect-laptop-for-data-science-and-machine-learning-tasks-7d0c59c3cb63>

2. https://www.practicaldatascience.org/html/buying_datascience_computer.html

3. <https://www.umass.edu/it/support/hardware/recommended-minimum-computer-configurations-windows>

4. <https://www.du.edu/it/support/how-to/students/laptops>

5. <https://wmich.edu/cs/laptop-requirements>