

# IIT Madras

## BS in Data Science and Applications

(4 year Undergraduate Degree Program)

# Student Handbook

# 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.

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# BS in Data Science & Applications - from IIT Madras

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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.

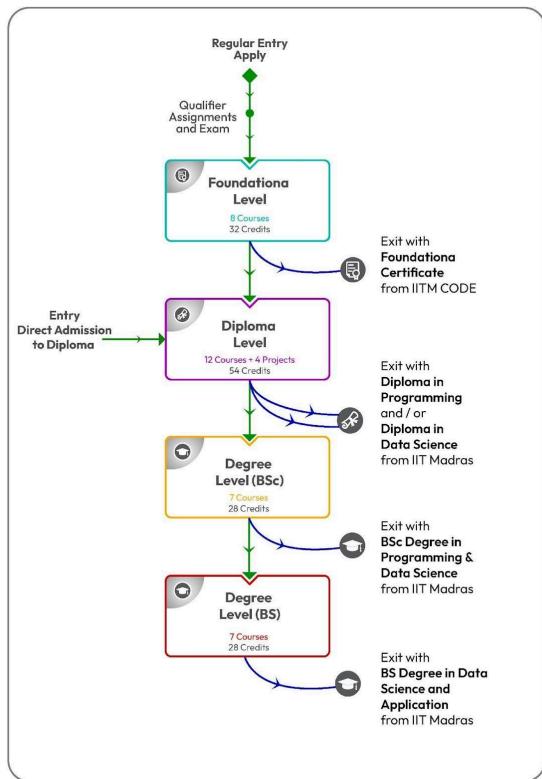
#### **Minor in Economics and Finance:**

The minor in Economics and Finance can be earned by completing 2 mandatory courses, namely Corporate Finance and Managerial Economics and one elective course from the list below, to which more courses will be added shortly.

Game Theory and Strategy (Elective Already available)

These 3 courses can be credited within the 142 credits required for the BS degree. The Minor can be earned only with the BS degree and not the Bsc degree.

A separate document will be issued by IITM stating that the Minor has been completed. There will be no change in transcript or the degree certificate for those who do the minor.



## 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	Project	Apprenticeship	NPTEL	MG/HS/HM
Foundation	32				
Diploma in DS	23	4			
Diploma in P	23	4			
BSc	28-X			X (0-4)	
BS	28-A-B		A (0/4/12)		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**

**BS Level: 3.25L - 3.87L**

	<b>Cost per credit (Rs)</b>	<b>Number of credits</b>	<b>Total fee</b>	<b>Level fees</b>
Foundation	1000/c	32c	32000	32,000
Diploma	2500/c for Theory 1250/c for project	23x2=46c 4x2 = 8c	115,000 10,000	125,000
BSc	Level 3 - Rs 2500/c Level 4 - Rs 5000/c 1000/c for NPTEL	<b>20c for 5 mandatory courses (Level 3)</b> 4c NPTEL+4c Level 3 4c NPTEL + 4c Level 4 8c Level 3 4c Level 3 + 4c Level 4 8c Level 4	<b>50000</b> 4000+10000 4000+20000 20000 30000 40000	64,000 74,000 70,000 80,000 90,000
BS	Level 3 - Rs 2500/c Level 4 - Rs 5000/c 1000/c for NPTEL	<b>2 Level 4 mandatory DS = 8c</b> <b>2 Level 4 mandatory DP = 8c</b> 4c NPTEL + 8c Level 3 4c NPTEL + 4c Level 3 + 4c Level 4 4c NPTEL + 8c Level 4 12c Level 3 12c Level 4	<b>40000</b> <b>40000</b> 4000+20000 4000+30000 4000+40000 30000 60000	104000 114000 124000 110000 140000

Fee waivers depend on the 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	75% waiver	SC / ST + PwD
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### **SBI Loan Process:**

Please contact Martina/Angelin Ph No 9444020900/8608076093, for any help.

**Rate of interest starts from 8.10% with no collateral security and simple interest till course completion**

- Loan is given to students along with any one parent, Father or Mother.
- Student is known as Borrower and the parent who is taking out a loan with the student will be known as Co-borrower.
- Student and co borrower both should have EITHER JOINT ACCOUNT IN SBI (any branch) or Separate accounts in SBI.
- We will provide you Application form which needs to be filled digitally. Once filled, you need to take coloured print and sign the documents wherever needed. Also attach the documents as per LIST OF DOCUMENTS given below.
- Application Print, and documents must be sent to following address using INDIA POST courier. 1st Cross Road, CAMPUS, Indian Institute of Technology, Chennai 600036

### **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	30%
PwD with 40% disability & SC / ST	30%
OBSC-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.

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	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%

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	₹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

### 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 = average marks of courses passed in the previous two terms Term n-1 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
$0 \leq M < 50$	2
$50 \leq M < 70$	3
$M \geq 70$	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  $\leq$  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 marksheet 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	Minimum required Qualifier Exam Score in each subject	Cut off marks required in DAD Qualifier exam
<b>GEN / OBC-CL</b>	Rs 6000/-	40%	50/100
<b>SC/ST/PwD</b>	Rs 3000/-	30%	40/100
<b>SC/ST AND PwD</b>	Rs 1500/-	30%	40/100
<b>OBC-NCL, EWS</b>	Rs 6000/-	35%	45/100

**Table 1: Department Core/Elective Courses**

Course ID	Course Level	Course Name	Course Type	Co-requisite Code	Prerequisite code	May2024	Sep2024	Jan2025	May2025	Sep2025	CourseFee
BSCS3001	DEGREE	Software Engineering	Core_BP			Y	Y	Y	Y	Y	10K
BSCS3002	DEGREE	Software Testing	Core_BP	-	-	Y	Y	Y	Y	Y	10K
BSCS3003	DEGREE	AI: Search Methods for Problem Solving	Core_BD	-	-	Y	Y	Y	Y	Y	10K
BSCS3004	DEGREE	Deep Learning	Core_BD	-	-	Y	Y	Y	Y	Y	10K
BSGN3001	DEGREE	Strategies for Professional Growth	Core_HM	-	-	Y	Y	Y	Y	Y	10K
BSBT4001	L4_DEGREE	Algorithmic Thinking in Bioinformatics	BD/BP	-	-	Y	N	Y	Y	N	20K
BSBT4002	L4_DEGREE	Big Data and Biological Networks	BD/BP	-	-	N	N	Y	N	N	20K
BSCS4001	L4_DEGREE	Data Visualization Design	BD	-	-	Y	N	Y	N	Y	20K
BSEE4001	L4_DEGREE	Speech Technology	BD	-	-	N	Y	N	Y	N	20K
BSMS4002	L4_DEGREE	Design Thinking for Data-Driven App Development	HM/BP	-	-	N	Y	N	Y	Y	20K
BSMS4001	L4_DEGREE	Industry 4.0	HM/BD	-	-	Y	N	Y	N	Y	20K
BSMS4003	L4_DEGREE	Financial Forensics	HM/BD	-	-	Y	Y	Y	N	Y	20K
BSMS3002	DEGREE	Market Research	HM	-	-	N	Y	N	Y	N	10K
BSCS4004	L4_DEGREE	Introduction to Big Data	BD/BP	-	-	Y	Y	Y	Y	Y	20K
BSCS4003	L4_DEGREE	Privacy & Security in Online Social Media	BD/BP	-	-	N	Y	N	Y	Y	20K
BSMA2001	DEGREE	Mathematical Thinking	SE			Y	N	Y	N	Y	10K
BSMA3012	DEGREE	Linear Statistical Models	SE			Y	N	Y	N	N	10K
BSMA3014	DEGREE	Statistical Computing	SE			N	Y	N	Y	Y	10K
BSCS4021	L4_DEGREE	Advanced Algorithms	BP			Y	Y	N	Y	Y	20K
BSCS3031	DEGREE	Computer Systems Design	BP	BSCS3005		N	Y	N	Y	Y	10K
BSCS4022	L4_DEGREE	Operating Systems	BP	BSCS3031		Y	N	Y	N	Y	20K
BSCS4002	L4_DEGREE	Special topics in ML (Reinforcement Learning)	BD	BSCS3004		Y	N	Y	N	Y	20K
BSCS3005	DEGREE	Programming in C	BP			Y	Y	Y	Y	Y	10K
BSCS5002	L5_DEGREE	Introduction to Natural Language Processing (i-NLP)	BD			N	Y	Y	N	Y	20K
BSCS5003	L5_DEGREE	Deep Learning for Computer Vision	BD			Y	Y	Y	Y	Y	20K
BSCS5001	L5_DEGREE	Large Language Models	BD	BSCS3004		N	Y	Y	Y	Y	20K
BSMS4023	L4_DEGREE	Game Theory and Strategy	HM/BD			Y	Y	N	Y	Y	20K
BSMS3033	DEGREE	Managerial Economics	HM			Y	N	Y	Y	N	10K
BSMS3034	DEGREE	Corporate Finance	HM			N	Y	Y	N	Y	10K
BSDA5013	L5_DEGREE	Deep Learning Practice	BD/BP	BSCS3004		N	Y	Y	N	Y	20K

**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-1vSJXV0JECyoQvgWvBlVxO13G0KRm5a1qNCRBa7rAw8GDY4e0cfm1KiVCwlgs\\_ed80ObtzQ1rfx\\_JWIR/pubhtml?gid=399341609&single=true](https://docs.google.com/spreadsheets/d/e/2PACX-1vSJXV0JECyoQvgWvBlVxO13G0KRm5a1qNCRBa7rAw8GDY4e0cfm1KiVCwlgs_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-1vSJXV0JECyoQvgWvBlVxO13G0KRm5a1qNCRBa7rAw8GDY4e0cfm1KiVCwlgs\\_ed80ObtzQ1rfx\\_JWIR/pubhtml?gid=1418834182&single=true](https://docs.google.com/spreadsheets/d/e/2PACX-1vSJXV0JECyoQvgWvBlVxO13G0KRm5a1qNCRBa7rAw8GDY4e0cfm1KiVCwlgs_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:

- a. An NPTEL course of duration 4/8/12 weeks carries credit equivalence of 1/2/3 credits in the BS degree program.
- b. The learner must register for the NPTEL exam using the @ds.study.iitm.ac.in Email ID.
- c. 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
- i. Students are required to pay the RKA fee if they are only doing a credit transfer in a term.

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 any campus courses.
- 24 Graded [from on campus courses of IITM], 24 non graded credits allowed [apprenticeship, other institute, NPTEL]. MS (approve / reject) 28 credits [Theory (16 credits) + Apprenticeship (12 credits) ] allowed. 3 campus credits (from IITM) = 1 BS credit.
- Students who have completed the foundation and the 2 diplomas and have cgpa of  $\geq 8$  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  $\geq 8$  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.

### Applicable for the student who completed 142 credits:

Once a student completes 142 credits in term X and has not started any CGPA or credit-earning courses in or before Term X, they will not be permitted to register any further in the program and their BS degree certificate will be processed.

Case 2: If a student completes 142 credits in Term X and has started any CGPA or credit-earning courses in or before Term X, they will have two options:

Case 2a: If the student chooses to complete the BS in term X and receive the certificate, the CGPA or credit-earning courses will not be listed on the BS transcript.

Case 2b: If the student opts to receive the BS certificate only when the additional components such as apprenticeship or other campus courses are completed, then the BS transcript will include the credits for these also and the BS certificate will be generated after this.

Note: IITM Campus Courses are counted towards CGPA while apprenticeships and on-campus courses from other institutes are counted only for credits and not CGPA.

## **Upgradation from Online BS in Data Science and Applications to MS by research in Data Science & Artificial Intelligence**

- Students with a CGPA $\geq$ 8.0, upon completion of core courses at the degree level of the BS program(at least 106 credits)shall be eligible to apply for the opportunity to complete their remaining credits at the Department of DSAI,IIT Madras and continue for an MS 9by research)degree.
- The BS program team will collate the applications and share the list of eligible candidates with the Department of DSAI.
- The Department of DSAI will screen the applications(using a written test,interview,or both) and shortlisted qualified candidates for this program.
- Selected candidates can complete the BS level (28 credits)by taking courses and completing an 8-month research project (counted under the 12-credit apprenticeship) at the Department of DSAI,IIT Madras.
- Students who complete the BS level credits with a CGPA $\geq$ 8.0 from campus courses/projects shall continue for the MS(by research)degrees at the Department of DSAI,IIT Madras.
- Students who complete the BS level credits with a CGPA  $<$ 8.0 from campus courses/projects shall not be upgraded to the MS(by research)degree. The credits earned shall be transferred back to the BS program. Such students may apply for the MS(by research)program by clearing the GATE exam.

## **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 original 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

Note: Students who have completed the bsc and bs degree and wish to take their original certificate have to mandatorily register with the IITM alumni association, pay the fees of Rs 6000/- and confirm to the BS team. Only after this will the original certificate be processed.

<b>Next Exit form Open</b>	<b>Exit form closure</b>	<b>Senate date</b>	<b>Certificate Processing Timeline ( Tentative)</b>
-	Jan 31 2025	March 7 2025	April 30 2025
March 8 2025	March 31 2025	June 13 2025	Jul 31 2025
June 15 2025	June 30 2025	Sep 12 2025	Oct 31 2025
Sep 15 2025	Sep 30 2025	Nov 17 2025	Dec 31 2025
Nov 18 2025	Nov 30 2025	-	

**Important Points to be remembered :****Original certificate will be processed only if the below criteria is satisfied.**

- a. Required credits completed with all the Mandatory courses in Degree Level.
- b. Exit form has to be filled by the Student with a Handwritten document and a proper professional photograph with a blue background.
- c. Minimum duration of 3 years (9 terms) for BSc and 4 years (12 terms) for BS should be completed from the first term of starting the program

**For Eg :**

**21f1's - will complete 4 years in 24f3 (end of the Sep Term) - BS Certificates can be processed if a & b above is satisfied from Jan 2025 onwards.**

**21f3's - will complete 4 years in 25f2 (at the end May Term) - hence OC shall be processed at the end of 25f2 only - which will be after September 2025.**

\*\*Same applies for BSc with 3 years completion criteria.

**d. Applicable only for BSc and BS completed students.**

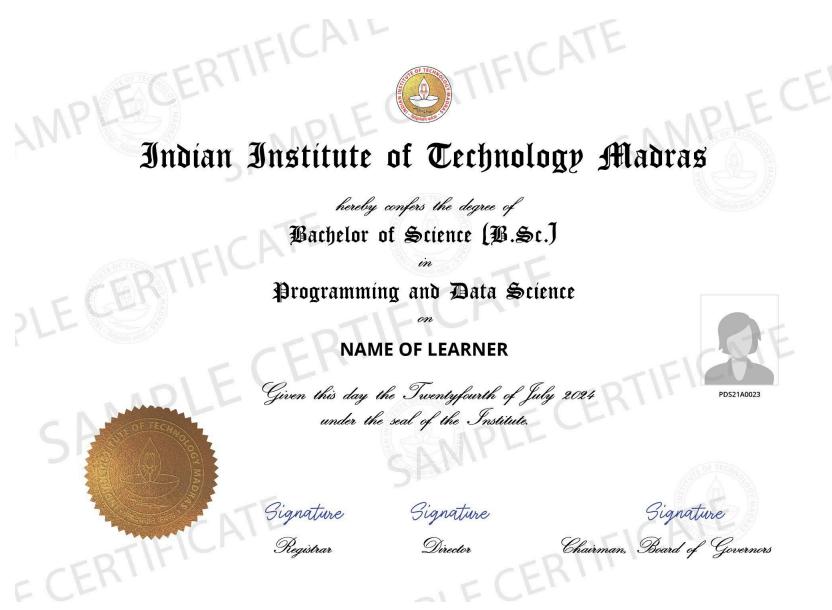
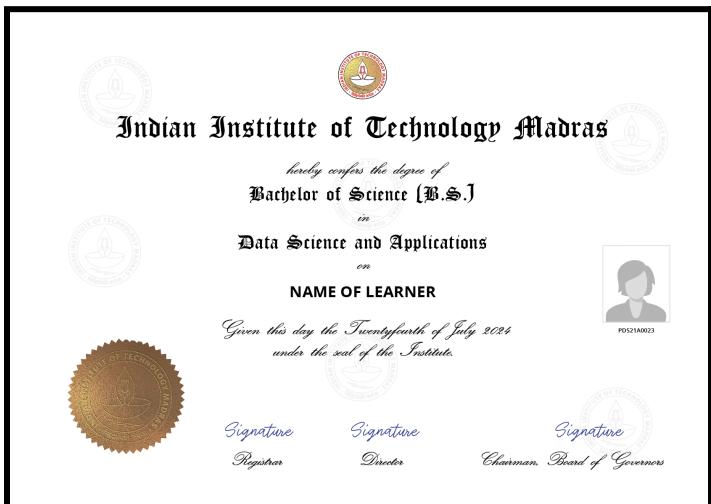
- i. For the students exiting with BSc & BS IITM Alum Card is mandatory.
- ii. Once you fill the exit form we will verify your details and will send you the Alum registration process which has to be completed for processing the Original certificates.
- iii. For Alum card registration Rs.6000+GST is payable by the students.
- iv. Once after Alum card registration is completed , we will process the Alum card along with your original certificates and will be dispatched by

post / handed over to you based on the mode you selected in the Exit form.

Photo Orientation: Students have to upload a passport size (JPG Format) photo in formal attire with a blue background in high resolution.

## 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

hereby confers the  
Diploma in Programming

on



NAME OF LEARNER



PD521A0023

Given this day the Twelfth of September, 2022  
under the seal of the Institute



*Signature*  
Registrar

*Signature*  
Director

*Signature*  
Chairman, Board of Governors

Photo

# Indian Institute of Technology Madras

hereby confers the  
Diploma in Data Science

on



NAME OF LEARNER



PD521A0023

Given this day the Twelfth of September, 2022  
under the seal of the Institute



*Signature*  
Registrar

*Signature*  
Director

*Signature*  
Chairman, Board of Governors

Photo

## Indian Institute of Technology Madras Centre for Outreach and Digital Education



This is to certify that  
**LearnerName**



RollNumber

has successfully completed the Foundational Level in  
Programming and Data Science

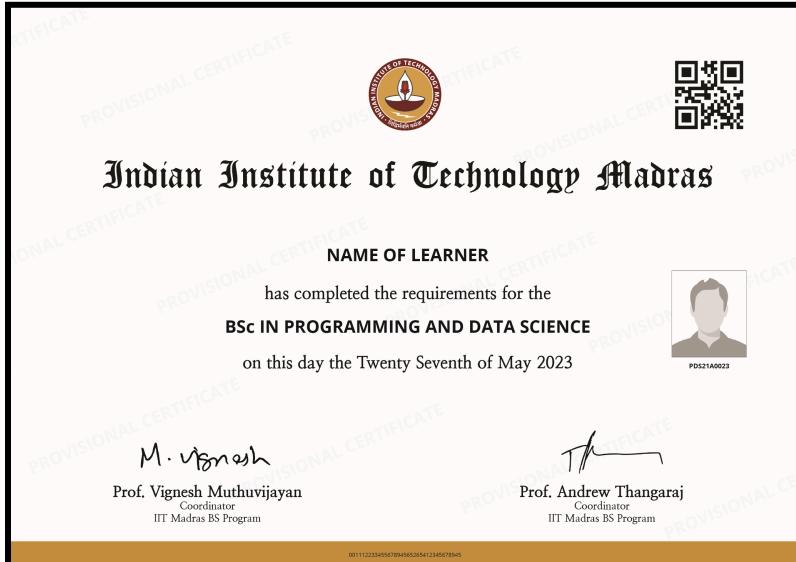
**Term\_Year**

*Signature*  
Program Coordinator

*Signature*  
Director

Chairman, Centre for Outreach and Digital Education

## Design for provisional certificates:



## 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.

$$GPA = \frac{\sum i(GP_i * C_i)}{\sum C_i}$$

Where GP = grade point of a course and Ci is the number of credits assigned to that course and  $\sum C_i$  is the total number of credits of all courses in the term, including those with 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.

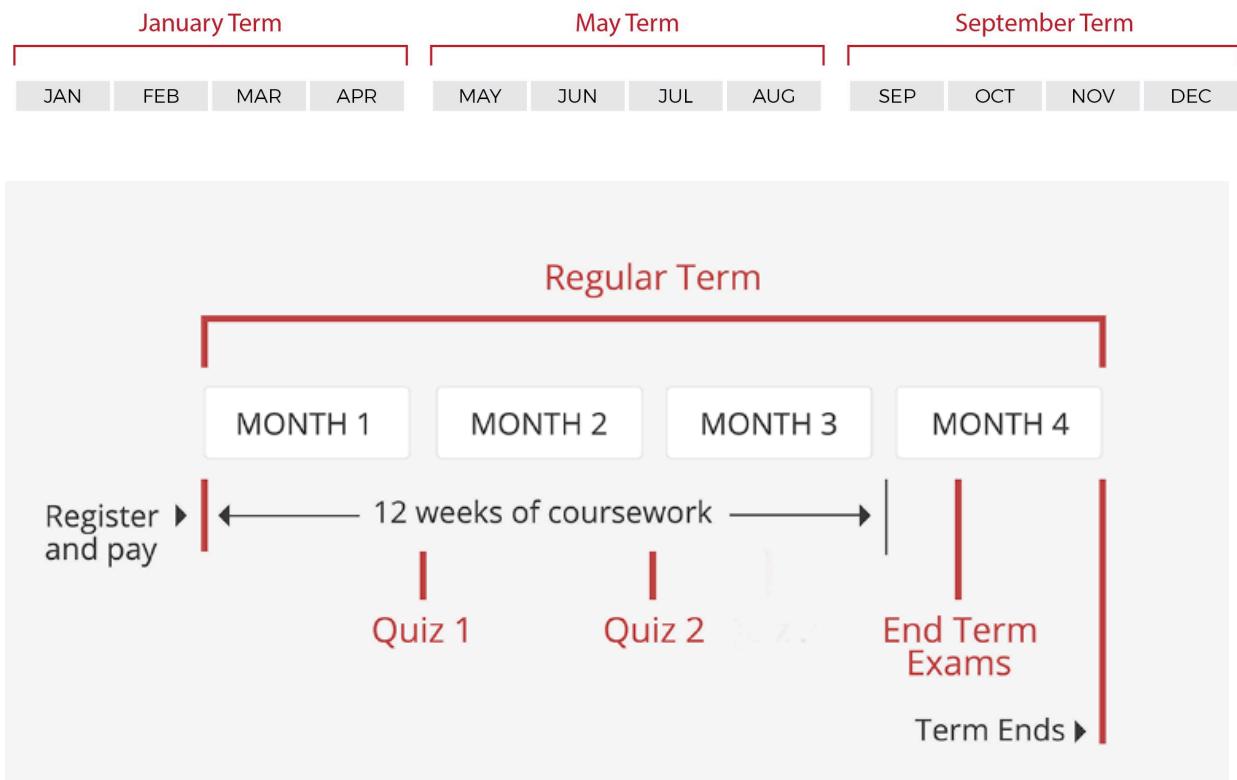
Please refer the link to know the criteria for official documents given to students:  
[https://docs.google.com/document/d/e/2PACX-1vQnn2cFan5BqTTAByCoqtue-0XSmFXQPT91bADDL\\_i33tHMh8C0ZJepvFBwze4E5zJbGiBMdQa59VeT/pub](https://docs.google.com/document/d/e/2PACX-1vQnn2cFan5BqTTAByCoqtue-0XSmFXQPT91bADDL_i33tHMh8C0ZJepvFBwze4E5zJbGiBMdQa59VeT/pub)

## 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



\* 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	Payment	Category Waiver	Grade
New Registration	2500	Yes	Actual grade
Fee for Level 1 or 2 reattempt	1000	No	Actual grade
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.	2500	Yes	I or U
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.	2500	Yes	U
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.	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 7 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)

Exam City Details (we have added few new cities from Sept 2024 term):

<https://docs.google.com/spreadsheets/d/e/2PACX-1vT6KKXyQjldD7sUVpinTd9oW1dpaDhkm3cq1b2RM5wqGNHrComOQbXR3C9jh14arLmxhnxc9jNUbC8O/pubhtml>

## 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 'T' - Total Course Score (Out Of 100)	Status	Letter Grade	Grade point
$(T \geq 90)$	Pass	S	10
$(90 > T \geq 80)$	Pass	A	9
$(80 > T \geq 70)$	Pass	B	8
$(70 > T \geq 60)$	Pass	C	7
$(60 > T \geq 50)$	Pass	D	6
$(50 > T \geq 40)$	Pass	E	4
$(T < 40)$	Fail	U	0
Weekly average assignment score $<40/100$ or 0 quizzes attended - (Not eligible to write the final exam)	Fail	WA/WQ	0
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	Incomplete (Absent in ET alone)	I	-
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	Incomplete (Absent in both ET & OPPE)	I_BOTH	-

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	Incomplete (Absent/fail in OPPE)	I_OP	-
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## 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) <= 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 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.

### 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	New Course Allowed?	Repeat Course?	Take Make Up Exam?	
Passed all	Yes			Not recommended but available
Failed any/all	Yes	Yes		
Absent for all final exams	Yes		Yes	
Passed + Absent	Yes		Yes	
Failed + Absent	Yes	Yes	Yes	

#### Repeating OPPE:

OPE1/OPE2	ET	T	Grade	Condition for OPPE/course reg	Foundation	Diploma
Absent	Absent	-	U	Repeat the entire course	Course Fee	Course Fee
Absent	Present	>=35	I	Complete OPE alone in next term, GA, quiz and ET marks will be carried over OR Repeat the entire course	1000	2000
		<35	U	Repeat the entire course	Course Fee	Course Fee
Present score< x/100	Present	>=40	I	Complete OPE alone in next term, GA, quiz and ET marks will be carried over OR Repeat the entire course	1000	2000
		<40	U	Repeat the entire course	Course Fee	Course Fee
	Absent	-	I	Repeat OPPE and ET OR Repeat Entire course	2000	4000
Present score> x/100	Present	>=40	Actual grade	PASS (depending on course criteria)	Course Fee	Course Fee
		<40	U	Repeat entire course	Course Fee	Course

						Fee
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	OPPE
ET alone	No OPPE will be conducted
OPPE alone	Both OPPE will be conducted
ET + OPPE	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. 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.
- e. 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.

Level	Paid	Retained by IITM as Admin charges	Refund
Foundation	4000	2000	2000
	2000	2000	0
	1000	2000	0
Diploma/Degree	10000	4000	6000
	5000	4000	1000
	2500	4000	0
Project Course	2500	500	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

	Term	Foundatio n	Plan for One Diploma	Plan for Both the Diplomas	BSc Degree	BS Degree	Shortest Path for BSc Degree
Year 1	Term 1	3	1	1	2	2	4
	Term 2	2	2	2	3	3	4
	Term 3	3	2	2	3	3	4
Year 2	Term 1		2	2	3	3	4
	Term 2		1	2	2	2	4
	Term 3		2	2	2	2	4
Year 3	Term 1		1	1	3	3	4
	Term 2		1	2	3	3	3
	Term 3		2	1	2	2	

<b>Year 4</b>	Term 1			2	3	3	
	Term 2			2	2	2	
	Term 3			1	3	3	
<b>Total Courses</b>	8	14	20	31			31

## 13.1 Prerequisite course requirements

### Foundation courses

Level	Course	Pre-req	Coreq
<b>Foundation</b>	Maths 1	-	-
	Statistics 1	-	-
	English 1	-	-
	CT	-	-
	Maths 2	Maths 1	
	Statistics 2	Statistics 1	Maths2
	English 2	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	Course	Pre-req	Coreq
<b>Diploma in DS</b>	MLF	-	-
	BDM	-	-
	MLT		MLF
	MLP	MLT, MLF	
	BA	BDM	
	TDS		MLF
<b>Diploma in Prog</b>	DBMS	-	-
	PDSA	-	-
	App dev 1	-	DBMS
	Java	-	-
	App dev 2	App dev 1	

	SC	-	-
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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:

Course ID	Course Level	Course Name	Course Type	Co-requisite Code	Prerequisite code	May2024	Sep2024	Jan 2025	CourseFee
BSCS3001	DEGREE	Software Engineering	Core_BP			Y	Y	Y	10K
BSCS3002	DEGREE	Software Testing	Core_BP	-	-	Y	Y	Y	10K
BSCS3003	DEGREE	AI: Search Methods for Problem Solving	Core_BD	-	-	Y	Y	Y	10K
BSCS3004	DEGREE	Deep Learning	Core_BD	-	-	Y	Y	Y	10K
BSGN3001	DEGREE	Strategies for Professional Growth	Core_HM	-	-	Y	Y	Y	10K
BSBT4001	L4_DEGREE	Algorithmic Thinking in Bioinformatics	BD/BP	-	-	Y	N	Y	20K
BSBT4002	L4_DEGREE	Big Data and Biological Networks	BD/BP	-	-	N	N	N	20K
BSCS4001	L4_DEGREE	Data Visualization Design	BD	-	-	Y	N	Y	20K
BSEE4001	L4_DEGREE	Speech Technology	BD	-	-	N	Y	N	20K
BSMS4002	L4_DEGREE	Design Thinking for Data-Driven App Development	HM/BP	-	-	N	Y	N	20K
BSMS4001	L4_DEGREE	Industry 4.0	HM/BD	-	-	Y	N	Y	20K
BSMS4003	L4_DEGREE	Financial Forensics	HM/BD	-	-	Y	N	Y	20K
BSMS3002	DEGREE	Market Research	HM	-	-	N	Y	N	10K
BSCS4004	L4_DEGREE	Introduction to Big Data	BD/BP	-	-	Y	Y	Y	20K
BSCS4003	L4_DEGREE	Privacy & Security in Online Social Media	BD/BP	-	-	N	Y	N	20K
BSMA2001	DEGREE	Mathematical Thinking	SE			Y	N	Y	10K
BSMA3012	DEGREE	Linear Statistical Models	SE			Y	N	Y	10K
BSMA3014	DEGREE	Statistical Computing	SE			N	Y	N	10K
BSCS4021	L4_DEGREE	Advanced Algorithms	BP			Y	Y	N	20K
BSCS3031	DEGREE	Computer Systems Design	BP	BSCS3005		N	Y	N	10K
BSCS4022	L4_DEGREE	Operating Systems	BP		BSCS3031	Y	N	Y	20K
BSCS4002	L4_DEGREE	Special topics in ML (Reinforcement Learning)	BD	BSCS3004		Y	N	Y	20K
BSCS3005	DEGREE	Programming in C	BP			Y	Y	Y	10K
BSCS5002	L5_DEGREE	Introduction to Natural Language Processing (i-NLP)	BD			N	Y	Y	20K
BSCS5003	L5_DEGREE	Deep Learning for Computer Vision	BD			Y	N	Y	20K
BSCS5001	L5_DEGREE	Large Language Models	BD			N	Y	N	20K
BSMS4023	L4_DEGREE	Game Theory and Strategy	HM/BD			Y	Y	N	20K
BSMS3033	DEGREE	Managerial Economics	HM			Y	N	Y	10K
BSMS3034	DEGREE	Corporate Finance	HM			N	Y	Y	10K

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. If they do not pass the L2 viva cutoff, they get one more chance at L2 viva.
    - iii. 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	P2	P3	P4	Total points	Eligible to enter the degree level?
E	E	S	S	28	Yes
E	E	S	A	27	No
D	E	S	S/A/B	30/29/28	Yes
D	D	S/A/B	S/A/B	28-32	Yes
D	D	C	C	26	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. But completing the foundation level in 9 terms is applicable for all.**

Students will be removed from the program if they do not complete

- at least 4 courses within 4 terms.
- at least 6 courses within 6 terms.
- 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**

For the prizes awarded after the diploma level, we will consider the CGPA only till the term  
when the student completes the two diplomas. Improvements in foundational/diploma courses  
done after completion of both diplomas will not be considered for the diploma-level prizes. For  
example, if a student had repeated a foundation/diploma course for improvement in  
September 2023 but had completed both diplomas in May 2023, then the CGPA secured in  
May 2023 will be considered for diploma-level prize. Diploma-level prizes will not be given  
retrospectively.

For eligibility with respect to BS-level prizes, CGPA at time of completion of BS will be  
considered.

## 17. PGD/MTech upgrade path

<https://docs.google.com/document/d/e/2PACX-1vRrtiiHlurfHtFnJnDwtNZ0NHAcI8PQ7pHsiX3V3SZKmbSmALDk4whCO5La6efs4MSmBLVTH2ZfGJNL/pub>

## **18. 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-tS99K7ARRuNVKk0tp34B1woqclNvxY\\_0Lc/pub](https://docs.google.com/document/d/e/2PACX-1vQ_ZCTw1_PzVDBJ7u-wX18KUgl-IK1POIYRvyjAYsj_A-tS99K7ARRuNVKk0tp34B1woqclNvxY_0Lc/pub)

## 19. Software and Hardware Requirements - Mandatory System Specifications

The following are the essential requirements that are recommended to pursue the BSc Degree program from IIT Madras<sup>1</sup>. 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](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>

## 20. Non Academic Rules

[https://docs.google.com/document/u/1/d/1N5ZmPJZUDHznjt6G\\_ZiRS1baG\\_WpOfJM-oFnvWve76Y/pub](https://docs.google.com/document/u/1/d/1N5ZmPJZUDHznjt6G_ZiRS1baG_WpOfJM-oFnvWve76Y/pub)