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# M.Tech. SOFTWARE SYSTEMS

Work Integrated  
Learning Programmes



**BITS Pilani**  
Pilani | Dubai | Goa | Hyderabad



As per the recent 'Future of Jobs in India: A 2022 Perspective' report published by NASCOMM, FICCI, and EY, 70-75 percent of the IT-BPM jobs in 2022 would require new skill sets. Some of the roles that will evolve will include Software developer/designer (into UX designer), Database administrator (into database based service analyst), and Data mining/warehousing expert (into data analyst).


M.Tech. in Software Systems is a four-semester Work Integrated Learning

Programme designed to equip technology professionals with the skills required to remain competitive in the rapidly evolving workplace, and enable rapid career progression in domains such as Software Engineering, Embedded systems, Data Analytics, and Networking & Networked Systems.

## WHO SHOULD APPLY?

Highly driven and ambitious engineers working for software services or product companies and wish to advance their careers in hyper-growth areas of Software Engineering, Data Analytics, Networking & Networked Systems, or Embedded systems.





## What are the Highlights of the Programme?


- ▶ Learn without a career break with online classes conducted mostly on weekends or after-business hours.
- ▶ The programme offers a set of core courses and elective courses, allowing students to specialize in Software engineering, Data analytics, Networks & Networked Systems, and Embedded systems.
- ▶ The programme makes use of Simulation Software, Design & Modelling Tools, and Programming Environments. These include NS2, Tossim, Net-SNMP, MultiSim, CPU-OS Simulator, Cheddar, Keil, CCS Studio, StarUML, Eclipse, Code::Blocks, Amazon Cloud, Android Studio, SQLite, WireShark, Weka, OpenProj
- ▶ Semesters 1st, 2nd, and 3rd cover four courses each. The 4th semester covers Dissertation/ Project Work.
- ▶ The Dissertation (Project Work) in the final semester enables students to apply concepts and techniques learnt during the programme
- ▶ The education delivery methodology is a blend of classroom and experiential learning. Experiential learning consists of lab exercises, assignments, case studies and work integrated activities.
- ▶ The programme uses a Continuous Evaluation System that assesses the learners over convenient and regular intervals. Such a system provides timely and frequent feedback and helps busy working professionals stay on course with the programme.
- ▶ Participants who successfully complete the programme will become members of an elite & global community of BITS Pilani Alumni
- ▶ Submit fee using easy-EMI option.

*Classes are conducted by a pool of faculty members comprising of academicians from BITS Pilani, and guest faculty who are experienced industry professionals.*



## WHAT ARE THE PROGRAMME OBJECTIVES?

Studies have shown that senior positions in technology industry require holistic understanding and capabilities that span multiple technologies, critical thinking & problem solving situations and cross-functional collaboration. The programme aims to:

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- ▶ Build and nurture the knowledge, skills, and aptitude required to realise long-term career growth and enables participants to undertake higher responsibilities at the workplace.
  - ▶ Provide a requisite conceptual foundation, and contextual understanding of real-world applications that enable a learner to enhance workplace performance and stand out among peers for growth opportunities.
  - ▶ Enable the learners to choose to specialize in some of the fastest growing domains like Software Engineering, Data Analytics, Networking, or Embedded Systems.



## WHAT ARE THE STUDENT LEARNING OUTCOMES?

Upon successful completion of the program, participants will have developed:

- ▶ A strong foundation in software development methods and best practices
- ▶ An understanding of various software technologies used to develop software systems.
- ▶ Ability to understand & analyse requirements of large software systems and to design, develop & manage them in an effective manner.



# WHAT IS THE EDUCATION DELIVERY METHODOLOGY?



## ATTEND ONLINE LECTURES OVER WEEKENDS

Lectures are conducted live via online classes. These lectures can be attended via the internet using a computer from any location. These online classrooms offer similar levels of interactivity as regular classrooms at the BITS Pilani campus.

Classes for students admitted during the period Nov-Dec 2019 will begin in Jan 2020. The class schedule is announced within 1 week of completion of the admission process.

The online lectures are conducted usually over weekends for a total of 7-8 hours per week. If you miss a lecture, you can also access the recorded lecture on the internet.



## DIGITAL LEARNING

Learners can access engaging learning material at their own pace which includes recorded lectures from BITS Pilani faculty members, course handouts and recorded lab content where applicable



## CONTINUOUS ASSESSMENT

Continuous Assessment includes graded Assignments/ Quizzes, Mid-semester exam, and Comprehensive Exam



## EXPERIENTIAL LEARNING

The programme emphasises on Experiential Learning that allows learners to apply concepts learnt in classroom in simulated, and real work situations. This is achieved through:



**Simulation Tools, Platforms & Environments:** Some or all of the following would be utilised across the programme

- i. Simulation Software like NS2, Tossim, Net-SNMP, MultiSim, CPU-OS Simulator, Cheddar, Keil, CCS Studio
- ii. Design & Modelling Tools like StarUML
- iii. Programming Environments like Eclipse, Code::Blocks, Amazon Cloud, Android Studio
- iv. Other software/ tools like SQLite, WireShark, Weka, OpenProj



**Case Studies and Assignments:** Carefully chosen real-world cases & assignments are both discussed and used as problem-solving exercises during the programme



**Dissertation/ Project Work:** The fourth semester offers an opportunity for learners to apply their knowledge gained during the programme to a real-world like complex project. The learner is expected to demonstrate understanding of vital principles learnt across semesters and their ability to successfully apply these concepts



## WHAT IS THE ELIGIBILITY CRITERIA?

Minimum eligibility to apply: Employed professionals holding B Tech./ BE/M.Sc./ MCA or equivalent in relevant disciplines with at least 60% aggregate marks, and minimum one year of work experience in relevant domains.

## FEE STRUCTURE

The following fees schedule is applicable for candidates seeking new admission during the academic year 2019-20

Application Fees  
(one time) :INR 1,500

Admission Fees  
(one time) :INR 16,500

Semester Fees  
(per semester) :INR 50,000

### EMI OPTION

Instant EMI option is now available that allows you to pay programme fee in an easy and convenient way.

- Instant online approval in seconds
- No Credit Cards/ CIBIL score required
- Easy & Secure online process using Aadhaar and PAN number
- Anyone with a Salary Account with Netbanking can apply
- Special interest rate for BITS Pilani WILP applicants
- Pay fee in easy installments of INR 11,438 p.m. for the First Semester, and only INR 8,600 p.m. for subsequent Semesters

[Click here](#) to learn more about EMI option

# Programme Curriculum

Participants need to take at least 12 courses towards coursework, and complete one Project/ Dissertation. The coursework requirement for the programme would consist of a set of core courses and electives. Core courses are compulsory for all participants, while electives can be chosen based on individual learning preferences.

## First Semester

- Object Oriented Analysis & Design
- Data Structures & Algorithms Design
- Database Design & Applications
- Software Architectures

## Second Semester

- Elective 1
- Elective 2
- Elective 3
- Elective 4

## Third Semester

- Distributed Computing
- Elective 5
- Elective 6
- Elective 7

## Fourth Semester

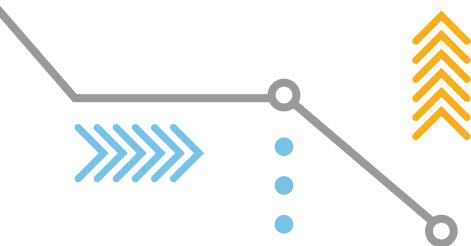
- Dissertation



Electives can be chosen either from the General Pool of Electives or from across other pools of electives for Specialisations. Specialisations are optional. To earn a Specialization, a participant must select and successfully complete at least 4 courses from that Specialisation pool.

## General Pool of Electives

- Artificial Intelligence
- Parallel Computing





## 1. Specialisation in Software Engineering

- Software for Embedded Systems
- Software Project Management
- Software Quality Management
- Software Testing Methodologies
- Usability Engineering

## 2. Specialisation in Data Analytics

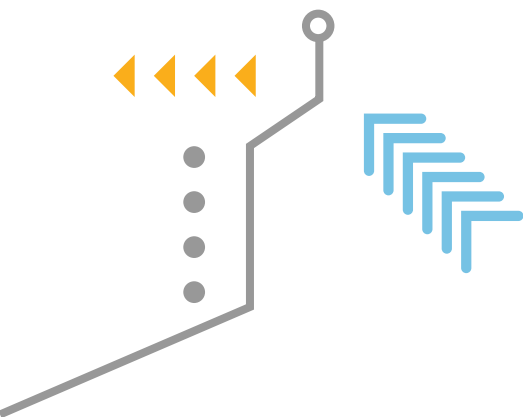
- Advanced Data Mining
- Advanced Statistical
- Techniques for Analytics
- Data Mining
- Data Storage Technologies & Networks
- Data Warehousing
- Distributed Data Systems
- Information Retrieval
- Machine Learning

## 3. Specialisation in Networks and Networked Systems

- Computer Networks
- Advanced Computer Networks
- Cloud Computing
- Computer Graphics
- Cryptography
- Data Storage Technologies & Networks
- Infrastructure Management
- Internetworking Technologies
- Network Programming
- Network Security
- Telecom Network Management
- Wireless & Mobile Communication

## 4. Specialisation in Embedded Systems

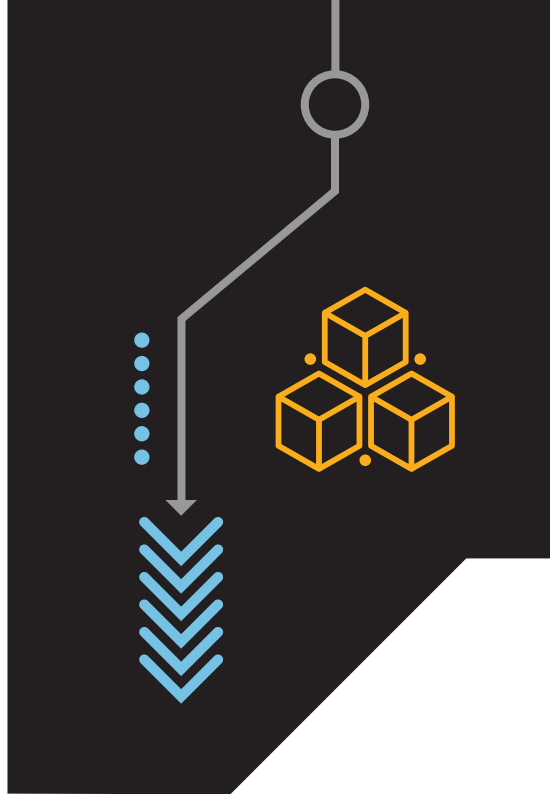
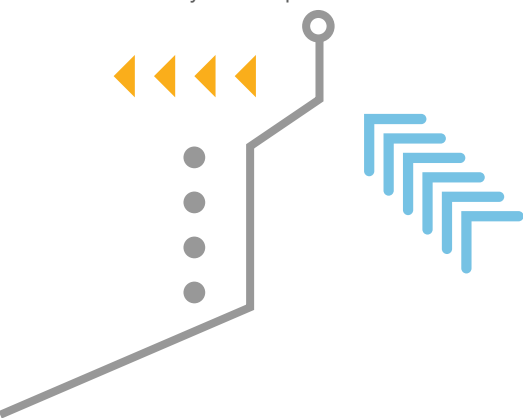
- Embedded System Design
- Hardware Software Co-Design
- Networked Embedded Applications
- Pervasive Computing
- Real Time Operating Systems
- Real Time Systems
- Software Development for Portable Devices
- Software for Embedded Systems



*Choice of Electives is made available to enrolled students at the beginning of each semester. Students' choice will be taken as one of the factors while deciding on the Electives offered. However, Electives finally offered will be at the discretion of the Institute.*

# HOW TO APPLY

- ▶ Admissions will begin in April 2020. To apply, you will need to visit the BITS Pilani Online Application Center. Create your login at the Application Center by entering your unique Email id and create a password of your choice. Once your login has been created, you can anytime access the online Application Center using your email id and password
- ▶ Once you have logged in, you will see a screen showing 4 essential steps to be completed to apply for the programme of your choice.
- ▶ Begin by clicking on Step 1 - 'Fill/ Edit and Submit Application Form'. This will enable you to select the programme of your choice. After you have chosen your programme, you will be asked to fill your details in an online form. You must fill all details and press 'Submit' button given at the bottom of the form.
- ▶ Take the next step by clicking on Step 2 - 'Download Application PDF Copy'. This will download a pdf copy of the application form on your computer.



- ▶ Now, click on Step 3 - 'Pay Application Fee' to pay INR 1,500/- using Net banking/ Debit Card/ Credit Card.
- ▶ Take a printout of the downloaded Application Form and note down the Application Form Number that appear on the top-right corner of the first page. This Application Form Number should be referred in all future correspondence with BITS Pilani.
- ▶ In the printout of the downloaded Application Form, you will notice on page no. 3 a section called the Employer Consent Form. Complete the Employer Consent Form. This form needs to be signed and stamped by your organisation's HR or any other authorised signatory of the company.

- Further on page no. 4 of the printed Application Form is a section called the Mentor Consent Form. The Mentor Consent Form needs to be signed by the Mentor.

### WHO IS A MENTOR:

Candidates applying to Work Integrated Learning Programmes must choose a Mentor, who will monitor the academic progress of the candidate, and act as an advisor & coach for successful completion of the programme.

Candidates should ideally choose the immediate supervisor or another senior person from the same organisation. In case a suitable mentor is not available in the same organisation, a candidate could approach a senior person in another organisation who has the required qualifications. Wherever the proposed Mentor is not from the same employing organization as that of the candidate, a supporting document giving justification for the same should be provided by the candidate's employer.

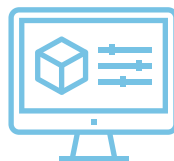
Candidates applying to B.Tech. programmes should choose a Mentor who is an employed professional with B.E./ B.S./ B.Tech./ M.Sc./ A.M.I.E./ Integrated First Degree of BITS or equivalent.

Candidates applying to M.Tech., M.Sc., MBA, M.Phil programme should choose a Mentor who is an employed professional with:

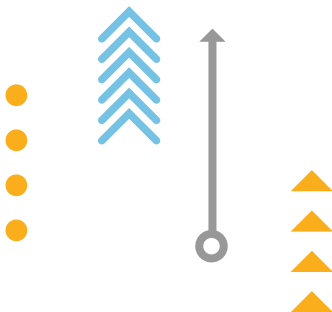
- a. B.E./ M.Sc./ M.B.A./ M.C.A./ M.B.B.S. etc. and with a minimum of five years of relevant work experience

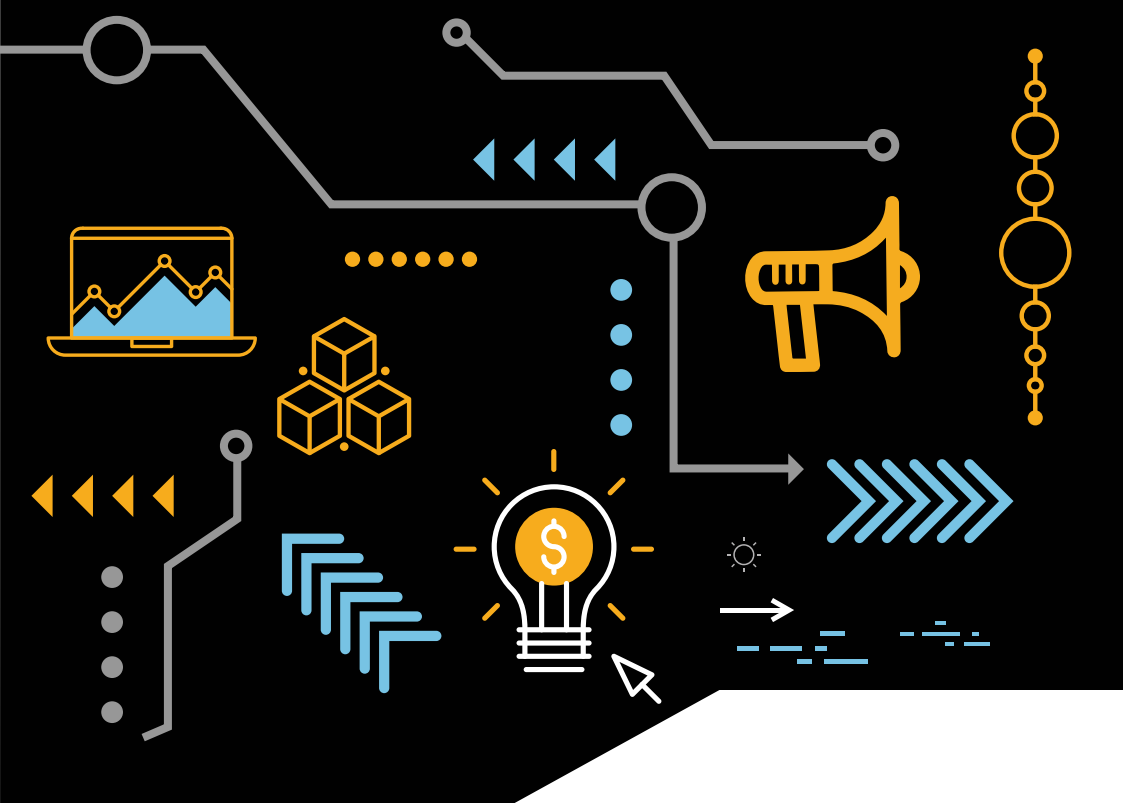
OR

- b. M.E./ M.S./ M.Tech./ M.Phil./ M.D./ Higher Degree of BITS or equivalent



- Further on page no. 5 of the downloaded Application Form, is a Checklist of Enclosures/ Attachments.
- Make photocopies of the documents mentioned in this Checklist
  - Applicants are required to self-attest all academic mark sheets and certificates
- Finally, click on Step 4 - 'Upload & Submit All Required Documents'. This will allow you to upload one-by-one the printed Application Form, Mentor Consent Form, Employer Consent Form, and all mandatory supporting documents and complete the application process. Acceptable file formats for uploading these documents are .DOC, .DOCX, .PDF, .ZIP and .JPEG.
- Upon receipt of your Application Form and all other enclosures, the Admissions Cell will scrutinise them for completeness, accuracy and eligibility.
- Admission Cell will intimate selected candidates by email within two weeks of submission of application with all supporting documents. The selection status can also be checked by logging in to the Online Application Centre.





## DISCLAIMER

Ever since it was declared as a Deemed to be University in 1964, BITS Pilani has been offering higher education programmes in science and technology, and has earned an enviable reputation for its innovations in this sphere. The Work Integrated Learning Programmes (WILP) of BITS Pilani constitutes a unique set of educational offerings for working professionals. These programmes, which BITS began to offer in 1979, have, over the years, evolved along the lines envisaged in the National Policy on Education, 1986.

The WILP are rigorous higher education programmes in technology areas, designed keeping the evolving needs of industry in view, and meant for working professionals in their respective domains. The very intent is to deliver the education at the workplace, in order that the greatest degree

of work integration of the education is achieved, and thus the WILP are very distinct in philosophy and pedagogy from open, distance learning programmes. Though it is incorrect and improper, at times the WILP are compared to ODL programmes. Accordingly, it has been our constant endeavor to engage with the regulator, and provide all necessary information about these programmes.

The WILP have been well received, and accepted by industry, because of the high quality of the programmes in terms of the curriculum and the instruction, and also because of the high degree of work integration, which results not only in up gradation of knowledge, but also in up skilling, and productivity increase.