innovate achieve lead

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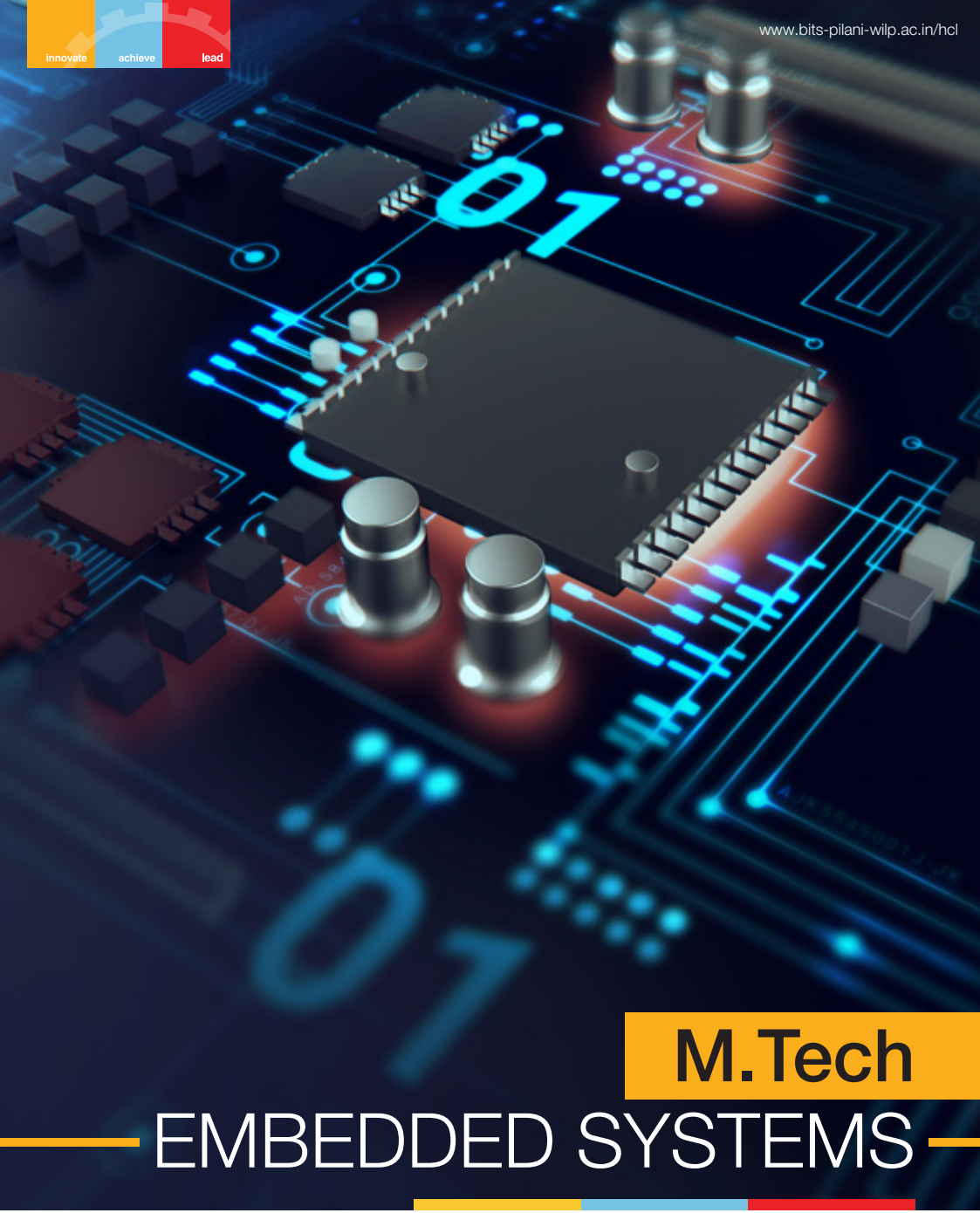


M.Tech

EMBEDDED SYSTEMS

BITS Pilani
Pilani | Dubai | Goa | Hyderabad
Work Integrated Learning Programmes

HCL

WHO SHOULD APPLY?

M.Tech. Embedded Systems is a four semester Work Integrated Learning Programme designed for engineers working in the embedded systems industry (automotive, avionics, consumer electronics, medical devices, defense, and processor design) who want to gain knowledge in state-of-the-art tools and theories.

The core topics span embedded control, real-time systems, model-based design and verification, Processor Architecture, Chip Design and implementation of embedded systems.

- Highly driven and ambitious engineers working for Embedded Systems services or product companies and wish to advance their careers in hyper-growth areas such as Consumer Electronics, Automotive, Semiconductors, Medical Equipment and Process industries
- Professionals in technical areas such as Software Development & Testing (System or Applications), Hardware Design & Validation, Product Design, Tech Support, Communications and Network Engineering

WHAT ARE THE MAIN HIGHLIGHTS OF THE PROGRAMME?

- The programme is offered by BITS Pilani, a top-ranked institution, recently announced as an Institution of Eminence by MHRD, Govt. of India.
- The programme is of four semesters, and can be pursued without a career break.
- Classes will be conducted by BITS Pilani faculty over weekends through live online sessions.
- Participants will be able to use Remote Labs, that provide remote access to hardware and software tools that are used for designing and testing embedded systems on various platforms such as MultiCore STM32, Raspberry Pi, Ardunio, Xilinix FPGA.
- The programme makes use of VLSI Architecture tools, Simulation tools and Mathematical Modelling tools. These include GEM5, Tossim, Cheddar, Keil, CCS Studio, and MATLAB.
- The programme emphasizes on experiential learning through Simulations, Online Labs, Case Studies, Group Discussions, Assignments and Project work.
- Dissertation/ Project Work in the final semester enables learners to apply concepts and techniques learnt during the programme.

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, and problem solving situations and cross-functional collaboration. The programme aims to:

- 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 gain expertise in some of the fastest growing domains like IoT, Instrumentation, Automotive Engineering, Aeronautics, Telecommunication and Defense

WHAT ARE THE STUDENT LEARNING OUTCOMES?

The program aims to create Embedded Designers who will be able to:

- Design, describe, validate, and optimize embedded electronic systems in different industrial application areas
- Define hardware and software communication and control requirements and be able to effectively bridge the gap between hardware and software design in different industrial production contexts
- To use tools for the development and debugging on a variety of platform

WHAT IS THE EDUCATION DELIVERY METHODOLOGY?

CLASSROOM SESSIONS

- Classroom sessions in this programme will be conducted through live online sessions which can be accessed by the learners from any location using a computer and a high-speed internet connection.

- Classes will be conducted by BITS Pilani faculty over weekends. A typical weekend classroom session per subject is of 1.5-2 hours duration. Since students typically pursue 4 courses in a semester, they will be expected to attend approximately 4 classroom sessions over a weekend. These classroom sessions will be typically scheduled over 16 weekends per semester.

The schedule of the classroom sessions, will be announced at the beginning of each semester.

EXPERIENTIAL LEARNING & LABS

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 Simulations, Online Labs, Case Studies, Group Discussions, and Assignments, etc.
The remote labs provide you with remote access to hardware and software tools that are used for designing and testing embedded systems on various platforms such as MultiCore STM32, Raspberry Pi, Ardunio, Xilinix FPGA.

Some or all of the following simulation labs would be utilised across the programme:

VLSI Architecture tools like GEM5
Simulation tools like Tossim, Cheddar, Keil, CCS Studio Mathematical Modelling tools such as MATLAB

PROJECT WORK

During the final semester participants carryout a semester-long intensive project work applying the various concepts learnt throughout the program guided by the organisation mentor and supervisor. Participants are provided access to virtual labs where applicable, and faculty expertise to support the project work.

DIGITAL LEARNING

Learners can access engaging learning material at their own pace which lecture videos, student notes, curated content etc. for select courses, through a learning management platform that is engaging and mobile-friendly.

EXAMINATIONS & CONTINUOUS ASSESSMENT

The learners' performance is assessed continuously throughout the semester using various tools such as quiz, assignments, mid-semester and comprehensive exams. The assessment results are shared with the learners to improve their performance.

Each course will entail a minimum of 1 Assignment/ Quiz, a Mid-semester exam and a final Comprehensive exam. Your semester calendar will clearly indicate the dates of the Mid-semester and Comprehensive exam. Typically, a Mid-semester or Comprehensive examination for a course is for 2-3 hours duration. The examinations are typically conducted over a weekend, i.e. Saturday and Sunday. These exams will be conducted either at the learners' office premises, or at another suitable location. Details regarding the exam location will be communicated at the beginning of the semester.

What is the Eligibility Criteria?

The minimum eligibility to apply: Employed professionals holding Bachelor of Engineering in EEE/ECE/ENI/ Computer Science or equivalent with at least 60% aggregate marks and minimum two years of relevant work experience within HCL are eligible to apply.

FEE STRUCTURE

The following fees schedule is applicable for candidates seeking new admission during the academic year 2022-23:

Application Fees (one time)	:INR 1,500
Admission Fees (one time)	:INR 16,500
Semester Fees (per semester)	:INR 60,500

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

- Embedded System Design
- Real Time Systems
- Software for Embedded System
- Hardware Software Co-Design

Second Semester

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

Third Semester

- Elective 5
- Elective 6
- Elective 7
- Elective 8

Fourth Semester

- Dissertation

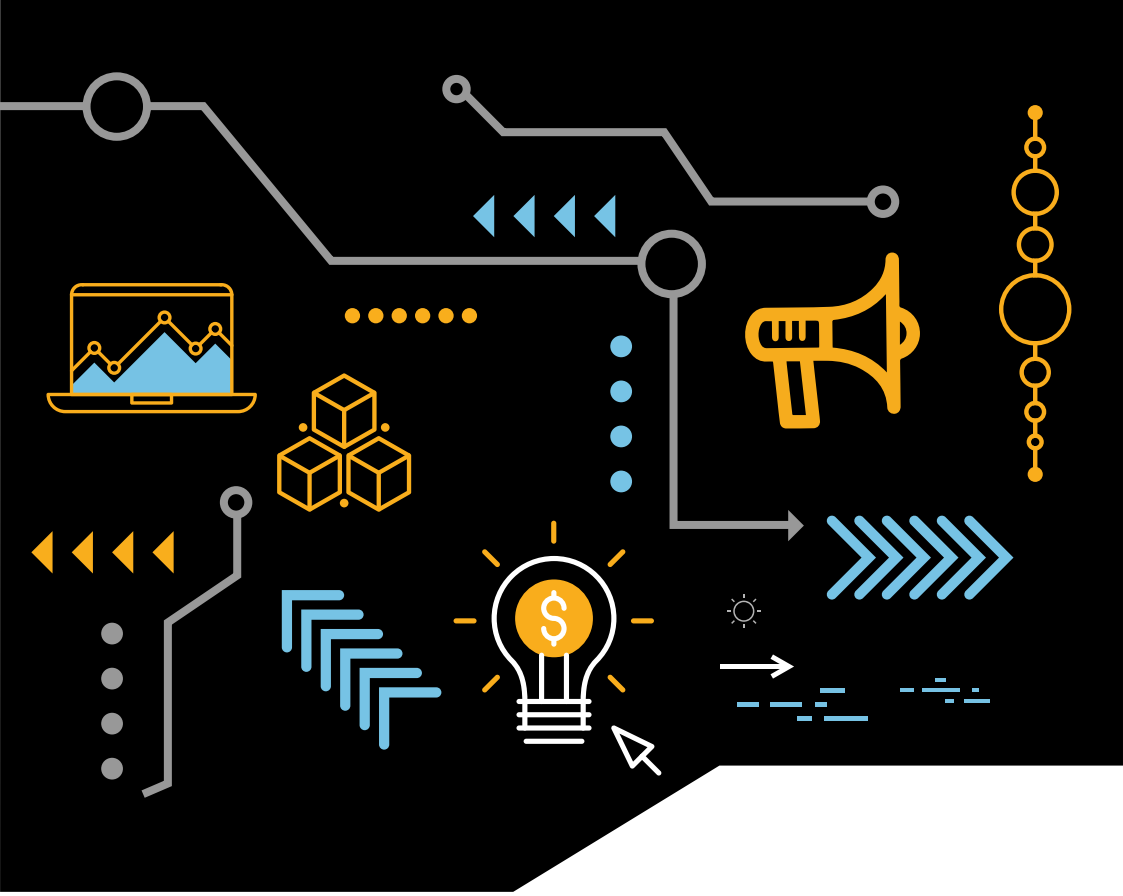
Electives

- Computer Networks
- Network Security
- Wireless & Mobile Communication
- Project Management
- Real-Time Operating Systems
- Pervasive Computing
- Reconfigurable Computing
- Digital Signal Processing
- Fault-Tolerant System Design
- VLSI Architecture
- Networked Embedded Applications
- Advanced digital signal processing
- VLSI Design
- Testability for VLSI
- Advanced Computer networks
- Optical Communication
- Mechatronics
- Mechanism & Robotics
- Data Storage Technology & Networks

Electives finally offered will be at the discretion of the BITS Pilani, and will be decided in consultation with HCL. Offered electives will be made available to enrolled students at the beginning of each semester.

HOW TO APPLY

- Create your login at the Online Application Center by entering your official HCL Email ID only and create a password of your choice. Once your login has been created, you can anytime access the Online Application Center using your official email ID and password
- 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
- Now, click on 'Pay Application Fee' to pay INR 1,500/- using Netbanking/ Debit Card/ Credit Card
- Finally, click on 'Upload & Submit All Required Documents'. This will allow you to upload one-by-one all the mandatory supporting documents such academic certificates and transcripts, photograph, etc. 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.

HCL_10/06/2022