

Ms syllabus

[Environment](#), [Electricity](#)



Birla Institute of Technology & Science, Pilani Work-Integrated Learning Programmes M. S. Microelectronics at BITS Pilani Professional Development Centre, Bangalore Type of Input | Sponsored employees (with adequate work experience in Microelectronics area) with a First Degree of BITS or its equivalent | Duration| Normally Four Semesters| Special Feature | This is a specially designed programme to meet the Human Resource Development requirements of various collaborating organizations at Bangalore.

Structured classes would be held in Bangalore regularly. | Semesterwise Pattern Course No. | Course Title| Units| First Year First Semester| MELTI ZG573MELTI ZG512MELTI ZG511MELTI ZG631| Digital Signal Processing Embedded System Design Design & Analysis of Algorithms Physics & Modelling of Microelectronics Devices| 3455| First Year Second Semester| MELTI ZG621MELTI ZG632MELTI ZG641MELTI ZG611| VLSI Design Analog IC Design CAD for IC Design IC Fabrication Technology| 5555| Second Year First Semester|

MELTI ZG642MELTI ZG531MELTI ZG625MELTI ZG651| VLSI Architecture Testability for VLSI Advanced Analog and Mixed Signal Design Hardware Software Co-Design| 4554| Second Year Second Semester| MELTI ZG629T| Dissertation| 20| Note: This is the currently operative pattern as approved by the Senate-appointed committee, subject to change if the situation warrants. Fee Schedule Application Processing Fees Rs. 800/-, Admission Fees Rs. 10000/-, Each Semester Fees Rs. 17500/-, Each Semester BITS Professional Development Centre Membership Fees Rs. 2500/-. Course Descriptions MELTI ZG511 Design & Analysis of Algorithms 5 Design techniques such as divide-and-conquer, recursion, backtracking, branch-and-

bound, simulation; Analysis in terms of average level and worst level efficiency; Relationship to appropriate data structures; Illustrations dealing with problems in computer science, graph theory and mathematics; Computational complexity and bounds; NP-hard and NP-complete problems.

MELTI ZG512 Embedded Systems Design 4

Introduction to embedded systems; embedded architectures: Architectures and programming of microcontrollers and DSPs. Embedded applications and technologies; power issues in system design; introduction to software and hardware co-design. MELTI ZG531 Testability for VLSI 5 BIST, boundary scan, stuck-at faults, test generation algorithms for combinatorial logic circuits and sequential circuits, logic simulation and fault simulation, synthesis for test, built in self test, pseudo-random test techniques, other test methods - IDDQ testing, boundary scan etc.

MELTI ZG573 Digital Signal Processing 3 Introduction; design of analog filters; design of digital filters: (IIR and FIR); structures for the realization of digital filters; random signals and random processes; linear estimation and prediction; Wiener filters; DSP processor architecture; DSP algorithms for different applications. MELTI ZG611 IC Fabrication Technology 5 Material properties; Crystal growth and doping; diffusion; oxidation; epitaxy; Ion implantation; Deposition of films using CVD, LPCVD and sputtering techniques; Wet and dry etching and cleaning; Lithographic process; Device and circuit fabrication; Process modeling and simulation. MELTI ZG621 VLSI Design 5 Introduction to NMOS and CMOS circuits; NMOS and CMOS processing technology; CMOS circuits and logic design; circuit

characterization and performance estimation; Structured design and testing; Symbolic layout systems; CMOS subsystem design; System case studies.

MELTI ZG625 Advanced Analog and Mixed Signal Design 5 Design of high speed comparators and Op-amps; analog buffers; different architectures of A/D and D/A converters; analog multipliers and dividers; design of PLLS; design methods for switched capacitor filters sample and hold circuits; mixed signal design issues; noise coupling from substrate and its reduction; cross talk and shielding; analog layout techniques for mixed signal designs. MELTI ZG629T Dissertation 20

A student registered in this course must take a topic in an area of professional interest drawn from the on the job work requirement which is simultaneously of direct relevance to the degree pursued by the student as well as to the employing / collaborating organization of the student and submit a comprehensive report at the end of the semester working under the overall supervision and guidance of a professional expert who will be deemed as the supervisor for evaluation of all components of the dissertation.

Normally the Mentor of the student would be the Dissertation supervisor and in case Mentor is not approved as the supervisor, Mentor may play the role of additional supervisor. The final grades for dissertation are Non-letter grades namely Excellent, Good, Fair and Poor, which do not go into CGPA computation. MELTI ZG631 Physics & Modeling of Microelectronics Devices5 Physics and Properties of semiconductor - a review; PN junction diode; bipolar transistor; Metal-semiconductor contacts; JFET and MESFET; MOSFET and scaling; CCD and photonic devices.

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MELTI ZG632 Analog IC Design 5 Basic concepts; BICMOS process and technology; current and voltage sources; Differential and Operational Amplifiers; Multipliers and modulators; phase-lock techniques; D-to-A and A-to-D converters; Micropower circuits; High voltage circuits; Radiation Resistant Circuits; Filter design considerations. MELTI ZG641 CAD for IC Design 5

Introduction to VLSI design methodologies and supporting CAD toolenvironment; Overview of 'C', Data structure, Graphics and CIF; Concepts, structures and algorithms of some of the following CAD tools; Schematic editors; Layout editors; Module generators; Silicon compilers; Placement and routing tools; Behavioral, functional, logic and circuit simulators; Aids for test generation and testing. MELTI ZG642 VLSI Architecture 4

Overview of CISC processor architectures; Instruction set architecture of CISC processor; hardware flow-charting methods; implementing microprocessor logic from hardware flowcharts; RISC instruction set architecture; pipelined execution of RISC instructions; pipeline execution unit design; control hazards; design of memory hierarchy. MELTI ZG651 Hardware Software Co-Design 4 FPGA and ASIC based design, Low-Power Techniques in RT Embedded Systems On-chip networking. Hardware Software partitioning and scheduling, Co-simulation, synthesis and verifications, Architecture mapping, HW-SW Interfaces and Re-configurable computing.