CONTENTS

AMRITA M.TECH./ PG DIPLOMA / MCA ADMISSIONS 2011

HANDBOOK

1. INTRODUCTION

Amrita Vishwa Vidyapeetham is an internationally acclaimed University that aims at creating professionals who will be driven by a firm commitment to excellence, yet rooted in the rich cultural heritage of our nation. This Multi-Campus University, with headquarters at Ettimadai, Coimbatore and having campuses in Amritapuri, Bangalore, Kochi and Mysore, is accredited by National Assessment and Accreditation Council (NAAC), Government of India, with 'A' grade. It is fast emerging as a pioneering Research cum Teaching Institution moulding a new generation of engineers, doctors, managers, healthcare and media professionals, scientists and entrepreneurs of calibre and character.

The engineering schools at Amritapuri, Bangalore, and Coimbatore are offering under graduate and post graduate programmes including Ph.D. in multiple disciplines of engineering. The two - year post graduate programme leads to an M.Tech. degree to which the admission is on an all India basis. Candidates who satisfy the eligibility criteria stipulated by the University can apply.

Amrita Vishwa Vidyapeetham is also conducting its MCA Entrance Examination every year on an all India basis for admission to the 3 year MCA programme offered in the four campuses at Amritapuri (Kollam), Ettimadai (Coimbatore), Kochi and Mysore. Candidates who satisfy the eligibility criteria will be admitted to the MCA programme through counseling, based on their ranks in the Entrance Examination.

Amrita is committed to provide the best career opportunities to the students of the University by maintaining close rapport with the corporates, identifying potential recruiters and organising campus recruitment processes. The meticulously planned and executed placement programme for students who have been put through the paces of a well structured training schedule has contributed to the high percentage of student placements in reputed organisations like TCS, Microsoft, Wipro, L&T, Infosys, Patni, Cognizant, Caterpillar, Hindustan Motors, HP, HCL, Accord Soft, Honey Well, I - flex, Mind Tree etc. More than 100 Companies visit the campus regularly to meet their human resource needs.

This handbook contains general information and rules relating to the M.Tech./ PG Diploma / MCA admissions 2011 and other relevant details. Candidates are required to go through the handbook carefully and acquaint themselves with the procedures relating to the admission. The contents of the handbook are subject to modification as may be deemed necessary by the University. The decision of the University will be final and binding on any issue related to the admission .

2. CAMPUSES & PROGRAMMES *(M.Tech, PG Diploma and MCA)*

The various PG programmes offered in our campuses are listed below :

Amritapuri Campus

Amrita School of Engineering
Amritapuri, Clappana (P. O)
Kollam - 690 525, Kerala, India
Tel: 0476 - 2801280
Fax: 0476 - 2896178
Email: admissions@amritapuri.amrita.edu
Website: http://amritapuri.amrita.edu

M.Tech
VLSI Design
Computer Science & Engg.
Wireless Networks & Applications
Thermal and Fluids Engineering
Power & Energy
Master of Computer Applications (MCA)

Bangalore Campus

Amrita School of Engineering
Kasavanahalli, Carmelaram (P.O)
Bangalore - 560 035, Karnataka, India
Tel: 080 - 28439565 / 66
 Fax:080 - 28440092
Email: admissions@blr.amrita.edu
Website: http://blr.amrita.edu

M.Tech
VLSI Design
Embedded Systems
Power Electronics

Coimbatore Campus

Amrita School of Engineering
Ettimadai (P.O)
Coimbatore – 641 105
Tamilnadu, India.
Tel: 0422 - 2656422,
Admission Enquiry: 0422 - 2652424
Fax: 0422 - 2656274
Email: admissions@amrita.edu
Website: www.amrita.edu

M.Tech
VLSI Design
Bio-Medical Engineering
Power Electronics
Embedded Systems
Computer Vision & Image Processing
Computer Science & Engineering
Computational Engineering & Networking
Remote Sensing & Wireless Sensor Networks
Cyber Security
Integrated Design & Manufacturing
Engineering Design
Automotive Engineering
Chemical Engineering
PG Diploma
Wind Power Development
Wind Resource Assessment
Master of Computer Applications(MCA)

Kochi Campus

Amrita School of Arts & Sciences
Brahmasthanam
Edapally North (P.O)
Kochi 682 024, Kerala, India
Tel: 0484 2802899 / 2801965
Fax: 0484 2802811
E-Mail:asaskochi@amrita.edu
Website:www.amrita.edu

Master of Computer Applications (MCA)

Mysore Campus

Amrita School of Arts & Sciences
114, 7th Cross Road
Bagadi 2nd Stage
Mysore   570 026   (Karnataka)
Tel: 0821 2343479 / 80
Fax: 0821 2340911
Website:www.amrita.edu

Master of Computer Applications (MCA)

3. ELIGIBILITY

3.1 M.Tech

◆ **VLSI Design**

Pass with Minimum 60% in B.E./B,Tech in any one of the following disciplines or equivalent.
- Electronics & Communication Engineering
- Electrical & Electronics Engineering
- Electronics & Instrumentation Engineering
- Instrumentation & Control Engineering

◆ **Bio-Medical Engineering**

Pass with Minimum 60% in B.E./B,Tech/M.B.B.S/M.Sc (In relevant area) /B.D.S/
B.Pharm(candidates should have studied Biology and Maths at the +2 level)

◆ **Power Electronics**

Pass with Minimum 60% in B.E./B.Tech in any one the following disciplines or equivalent.
- Electronics & Communication Engineering
- Electrical & Electronics Engineering
- Electronics & Instrumentation Engineering
- Electronics & Telecommunication Engineering
- Instrumentation & Control Engineering

◆ **Embedded Systems**

Pass with Minimum 60% in B.E./B.Tech in any one of the following disciplines or equivalent.
- Electronics & Communication Engineering
- Electrical & Electronics Engineering
- Computer Science and Engineering
- Information Technology
- Electronics & Instrumentation Engineering
- Instrumentation & Control Engineering

◆ **Engineering Design**

Pass with Minimum 60% in B.E./B.Tech in any one of the following disciplines or equivalent.
- Mechanical Engineering
- Automobile Engineering
- Production Engineering
- Manufacturing Engineering
- Metallurgical Engineering
- Industrial Engineering

◆ **Integrated Design and Manufacturing**

Pass with Minimum 60% in B.E./B.Tech in any one of the following disciplines or equivalent.
- Mechanical Engineering
- Automobile Engineering
- Production Engineering
- Manufacturing Engineering
- Metallurgical Engineering
- Industrial Engineering

◆ **Computer Vision and Image Processing**

Pass with Minimum 60% in B.E./B.Tech in any one of the following disciplines or equivalent.
- Electronics and Communication Engineering
- Electrical and Electronics Engineering
- Electronics and Telecommunication Engineering
- Instrumentation and Control Engineering
- Computer Science and Engineering
- Information Technology
- Electronics and Instrumentation Engineering
- MCA / M.Sc. Software Engineering / M.Sc. Computer Science.

◆ Computational Engineering and Networking

Pass with Minimum 60% in B.E./B.Tech in any branch of engg. or equivalent or M.Sc.Maths/ Physics/Computer Science(70% minimum).

◆ **Remote Sensing and Wireless Sensor Networks**

Pass with Minimum 60% in B.E./B.Tech in any branch of engg. or equivalent or M.Sc.Maths/ Physics/Computer Science(70% minimum).

◆ **Cyber Security**

Pass with Minimum 60% in B.E./B.Tech in any one of the following disciplines or equivalent.

- Computer Science & Engineering
- Information Technology
- Electronics & Communication Engineering

◆ **Computer Science & Engineering**

Pass with Minimum 60% in B.E./B.Tech in any one of the following disciplines or equivalent.
- Electronics and Communication Engineering
- Electrical and Electronics Engineering
- Electronics and Telecommunication Engineering
- Instrumentation and Control Engineering

- Computer Science and Engineering
- Information Technology
- Electronics and Instrumentation Engineering
- MCA / M.Sc. in Computer Science / Sofrware Engineering

◆ **Wireless Networks & Applications**

Pass with Minimum 60% in B.E./B.Tech in any one of the following disciplines or equivalent.
- Electronics & Communication Engineering
- Electrical & Electronics Engineering
- Electronics & Telecommunication Engineering
- Instrumentation & Control Engineering
- Computer Science & Engineering
- Information Technology
- Electronics & Instrumentation Engineering
- MCA / MSc Computer Science / Software Engineeriing / Electronics Science

◆ **Chemical Engineering**

Pass with Minimum 60% in B.E./B.Tech in any one of the following disciplines or equivalent.
- Chemical Engineering
- Chemical & Electro-chemical Engineering
- Petroleum / Petro-chemical Engineering
- Polymer Engineering
- Bio Technology

◆ **Automotive Engineering**

Pass with Minimum 60% in B.E./B.Tech in any one of the following disciplines or equivalent.
- Mechanical Engineering
- Automobile Engineering
- Production Engineering

◆ **Power and Energy**

Pass with Minimum 60% in B.E./B.Tech in Electrical & Electronics Engineering or equivalent.

◆ **Thermal and Fluids Engineering**

Pass with Minimum 60% in B.E./B.Tech in any one of the following disciplines or equivalent.
- Mechanical Engineering
- Automobile Engineering
- Production Engineering
- Manufacturing Engineering
- Metallurgical Engineering
- Industrial Engineering

3.2 P G Diploma:

◆ **PG Diploma in Wind Power Development**

Pass with Minimum 60% in B.E./B.Tech in any one of the following disciplines or equivalent.
- Electrical Engineering
- Electrical & Electronics Engineering
- Electronics Engineering
- Electronics & Communication Engineering
- Mechanical Engineering
- Production Engineering
- Instrumentation Engineering

◆ **PG Diploma in Wind Resource Assessment**

Pass with Minimum 60% in B.E./B.Tech/M.Sc. in any one of the following disciplines or equivalent.

- Electrical Engineering
- Electrical & Electronics Engineering
- Electronics Engineering
- Electronics & Communication Engineering
- Mechanical Engineering
- Production Engineering
- Instrumentation Engineering
- M.Sc. Physics
- M.Sc. Mathematics
- M.Sc. Statistics

3.3 MCA :

A Bachelors Degree with minimum 60% marks, with Mathematics / Statistics / Business

Mathematics as one of the subjects in any one semester or year, in addition to Maths at +2 level.

4. DURATION OF THE PROGRAMME:

- **M.Tech** : **2 Years(4 Semesters)**
- **P.G. Diploma** : **1 Year (2 Semesters)**
- **MCA** : **3 Years (6 Semesters)**

5. HOW TO APPLY :

5.1   Application fee is Rs. 650/-, which covers the cost of Application form, University Brochure, and Information Handbook . Application fee once paid will not be refunded.

5.2   Application forms for admission can be obtained as below:-¨By post, from the Admission Co-ordinators of Amrita Schools of Engineering at Amritapuri, Bangalore or Coimbatore (see section 2) and Amrita School of Arts & Sciences at Kochi and Mysore, on a written request indicating their full address together with a Demand Draft for Rs.650/- drawn in favour of "Amrita School of Engineering" payable at Coimbatore. (On the back of the Demand Draft, candidate should write his / her Name.Please keep a photocopy of the Demand Draft with you for future reference)

OR

From the University counters of Amrita Schools of Engineering at Amritapuri, Bangalore or Coimbatore / Amrita School of Arts & Sciences at Kochi, Mysore on producing a demand draft for Rs 650/- as above.

OR

From the designated branches of Dhanalakshmi Bank Ltd on payment of Rs.650/-

Branches of Dhanalakshmi Bank where Applications are available:

- **THRISSUR MAIN BRANCH**
  Naickanal Junction
  The Round, Thrissur
  Kerala- 680 001
  Ph. 0487 - 2335177

- **ERNAKULAM KALOOR BRANCH**
  Noorjahan Building
  Opp.Privat Bus stand, Kaloor
  Ernakulam, Kerala - 682 017
  Ph. 0484 - 6453559 / 564

- **VAZHUTHACAUD BRANCH**
  Vasudham, 1C/15/877(2), Cotton Hills
  Vazhuthacaud, Thiruvananthapuram
  Kerala - 695 010
  Ph. 0471 - 6451149 / 6451153

- **COIMBATORE MAIN BRANCH**
  PB No. 2951, 268 Crosscut Road
  Gandhipuram, Coimbatore
  Tamil Nadu - 641 012
  Ph. 0422 - 2234332

- **BENGALURU MG ROAD BRANCH**
  No. 9/3 First Floor
  Nitish Broadway, MG Road,
  Bengaluru, Karnataka - 560 002
  Ph: 080 - 64548698 / 99

- **HYDERABAD BRANCH**
  PB No. 246
  4-1-353/A , Abids Road
  Hyderabad, Andrapradesh - 500 001
  Ph. 040 - 4752831

- **CALICUT BRANCH**
  17/1341H, Rammohan Road
  Chinthavalappu
  Calicut - 673 004
  Ph: 0495 - 6453463

- **MANGALORE BRANCH**
  Dhinda Chambers, Ground Floor
  5-5-301/3, Kodialbail
  Opp. SBM Law College
  Mangalore - 575 003
  Ph: 0824 - 6450741

6. ONLINE :

Apply online through the website **amrita.edu** and submit the application printout in an A4 sheet along with the Demand Draft for Rs.650/- drawn in favour of **Amrita School of Engineering** payable at **Coimbatore**.

7. SELECTION PROCEDURE:

7.1 M.Tech : Admission is based on Academic Merit and Interview / Entrance Test. Candidates with valid GATE Score are given preference.

7.2 P G Diploma : Admission is based on Academic Merit and Interview.

7.3 MCA : Admission is based on performance in the Entrance Test conducted by the University, academic record and subsequent Interview.

8. GENERAL GUIDELINES:

8.1 Mere submission of the application does not guarantee admission to the programme.

8.2 Admission will stand cancelled automatically if the candidate fails to join the University on the specified date.

8.3 All the relevant original Certificates / mark statements should be submitted at the time of interview or on the stipulated date.

8.4 The candidate should submit the completed application at the following address:

> The Admission Co-ordinator
> Amrita School of Engineering
> Amrita Vishwa Vidyapeetham
> Ettimadai (P.O), Coimbatore 641105,Tamil Nadu
> Phone: 0422 – 2656422
> E-mail : admissions@amrita.edu

8.5 Candidates are advised to send the filled-in applications by SPEED POST / COURIER.

9. ENQUIRIES:

For all enquiries related to the Amrita M.Tech./ MCA / PG Diploma Admission - 2011
please contact : 0422 – 2685169/70

10. LIST OF EXAMINATION CENTRES FOR MCA ENTRANCE TEST:

Tamilnadu	:	Coimbatore, Chennai, Salem, Trichy, Madurai
Keralam	:	Thiruvananthapuram, Amritapuri (Kollam), Ernakulam, Thrissur, Kozhikode
Karnataka	:	Mysore, Bangalore, Mangalore
Andhra Pradesh	:	Hyderabad, Vijayawada

11.FEE STRUCTURE - 2011 Admissions (In Rupees)

11.1 For M.Tech. Programme

SI No	Head	Term	Amritapuri	Bangalore	Coimbatore
1.	Tuition Fee	Per semester	40,000	35,000	45,000
2.	University Fee	Annual	6,000	6,000	6,000
3.	Special Fee	Annual	9,500	10,000	12,000
4.	Insurance	One time	1000	600	1000
5	Caution Deposit (Refundable)	One time	5,000	3,000	5,000
	TOTAL		61,500	54,600	69,000

11.2 For PG Diploma Programme

PG Diploma Programmes are Govt. Funded Programmes. Hence, no Fees / Charges are applicable except the Caution Deposit of Rs.5,000/-(One time,Refundable).

11.3 For MCA Programme

SI No	Head	Term	Amritapuri	Coimbatore	Kochi	Mysore
1.	Tuition Fee	Annual	40,000	40,000	40,000	40,000
2.	University Fee	Annual	6,000	6,000	6,000	6,000
3.	Special Fee	Annual	9,500	12,000	4,500	9,500
4.	Insurance	Annual	1,500	1,400	600	900
5	Caution Deposit (Refundable)	One time	5,000	5,000	3,000	5,000
6.	Uniform Fee	Annual	2,500		1,480	1,500
7.	Fees for text book Handouts & Study Materials	Per Sem.			2,500	
	TOTAL		64,500	64,400	58,080	62,900

12. HOSTEL CHARGES (In Rupees)

2.1. Hostel Charges M.Tech. / MCA / PG Diploma

SI No	Head	Term	Amritapuri		Bangalore	Coimbatore	Kochi	Mysore
1.	Room Rent	Annual	M.Tech.	12,000	18,000	24,000	8,400	7,000
			MCA Boys	10,000				
			MCA Girls	6,000				
2.	Establishment Charges	Annual	7,000		14,000	17,000	1,000	
3.	Medical	Annual			1,000	1,000		
4.	Admission Registration	One Time					500	
5.	Mess Charge	Annual	24,000		30,000	30,000	23,400	23,000
6.	Caution Deposit (Refundable)	One time	3,000		5,000	5,000	3,000	2,000
TOTAL			M.Tech.	46,000	**68,000**	**77,000**	**36,300**	**32,000**
			MCA Boys	44,000				
			MCA Girls	40,000				

13. REFUND RULES:

Refund of fees will be made as per the regulations of the Govt. of India. If a student admitted to the M.Tech / PG Diploma /MCA programme withdraws from the programme before the starting of the classes, the fees collected from the student will be refunded after deducting a processing fee of Rs.1000/-. If a student leaves after starting of the classes, but before closing of the admission, and if the seat consequently falling vacant is filled by another candidate before the last date of submission, the University will return the fees collected with proportionate deductions of monthly fees. If the vacant seat is not filled up as above, the fee will not be refunded.No refund will be given to a student leaving after the closing of admissions. The date of closing of admissions will be announced by the University.

14. M.TECH, P G DIPLOMA & MCA PROGRAMMES IN A NUTSHELL

DEPARTMENT: ELECTRONICS & COMMUNICATION ENGINEERING

M.Tech. in VLSI Design

Very Large Scale Integration (VLSI) Design is a branch of Electronics Engineering that represents a vast set of skills and methodologies necessary for integrating millions of semiconductor devices into a small area inside an integrated circuit (IC). The increasing demand for better performance and shrinking sizes of modern electronic appliances such as mobile phones and laptops is making the task of electronic design highly challenging. Currently engineers are required to bring out new designs with very short lead times. This has led to the automation of design process at all levels with a host of sophisticated software tools being used for designing and validating modern IC chips.

The M. Tech programme in VLSI Design aims to cater to the increasing demand for highly skilled VLSI professionals. A large number of our M.Tech alumni are working in leading VLSI Design houses or pursuing research programmes in many prestigious institutions in India and abroad.

The curriculum is designed to balance theoretical content and practical skills. Apart from basic courses in subjects such as Mathematics and Digital Design, the curriculum covers a wide range of areas such as HDL-based design, Analog and Mixed Signal VLSI design, Device physics, VLSI Testing, Low Power Design, VLSI Fabrication, VLSI Computer Aided Design etc. The curriculum includes extensive lab courses to impart training in use of modern VLSI Design software and implementation technologies such as FPGAs. The students are required to do an individual project during the third and fourth semesters that produce sufficient potential for an international journal paper. The Department has a dedicated VLSI Laboratory equipped with the latest Electronic Design Automation (EDA) software under the Mentor Graphics Higher Education Programme and Xilinx Virtex 5 and Spartan FPGA kits. Students also have opportunity to pursue projects either in-house or in reputed organizations such as ISRO, DRDO, Wipro, Tessolve etc.

Core Courses
- Probability Theory and Linear Algebra
- CMOS Digital Integrated Circuits
- Digital Hardware Modelling
- Digital Signal Processing and Processors
- Orthogonal Functions, Optimization & Graph Theory
- Solid state Devices Modelling and Simulation
- Digital Design
- Analysis & Design of Analog and Mixed Signal VLSI circuits
- Testing of VLSI circuits
- VLSI Design Laboratory
- Computer Aided Design of VLSI Circuits
- Digital Hardware Modelling Laboratory
- Minor Project
- Dissertation

Electives
- Low power VLSI circuits
- VLSI Signal Processing
- Block Codes:Algorithms& Implementation
- Soft Computing
- Digital Signal Processing Integrated Circuits
- Static timing Analysis of VLSI Circuits
- Embedded Controllers and RTOS
- VLSI Fabrication Technology
- Wireless Communication Systems
- RFIC Devices and Modelling
- Computer Architecture and Processor Design
- System on a Chip
- Wavelets and Applications
- Cryptography and Applications
- Sequential Coding Alg. and Imp.
- Network on a Chip
- CMOS RF System Design
- Statistical Signal Processing
- Digital Image and Video Processing Algorithms
- Applied Graph Theory and Routing Algorithms

M.Tech. in Bio-Medical Engineering:

he M.Tech Programme in Bio-Medical Engineering aims to fuse technology with medical sciences so that the synergistic benefits of these two can lead to better understanding of biosystems and development of better products and devices for medical treatment and healthcare services. It prepares students in understanding basic biological and engineering processes and enables them to develop innovative approaches for the prevention, diagnosis and treatment of diseases. It involves quantitative, analytical and integrative methods from the microscopic level to that of whole organisms, dealt in medical profession. The course deals with medical electronics, analytical skills to develop medical diagnosis, telemetry and processing of medical data including imaging and enhancement techniques. It promotes participation of engineers in the field of medicine.

Biomedical engineers may include doctors too for grasping engineering concepts that are applied to medicine, and engineers with an aim to undertake inter disciplinary projects with their back ground in engineering.

This course offers a bright career for PG doctors in hospitals as supporting experts. Ultra modern hospitals require expert medical engineers, who can collaborate with doctors and their machines with a view to obtain better and accurate diagnosis. Medical equipment manufacturers also require Biomedical engineers for R&D work. This course offers research opportunities in the field of biomedical instrumentation, medical signal processing, biomaterials and bio mechanics, all over the world. With the availability of advanced hospital facilities under Amrita Vishwa Vidyapeetham, students have access to latest developments in the field of medicine.

On the completion of the course, students will have the experience and expertise of having studied real life projects in a tertiary care super specialty hospital using the state-of-the-art medical and surgical equipments.

Core Courses
- Biomathematics
- Medical Physiology
- Signal Processing
- Biosoftware Engineering
- Biomaterials
- Bio Instrumentation
- Medical Imaging Techniques
- Biofluid Mechanics
- Bio Mechanics
- Biomedical Laboratory I
- Biomedical Laboratory II
- Seminar
- Minor Project
- Dissertation

Electives
- Ergonomics
- Biostatistics
- Electromagnetics for Biomedical Engineering
- Drug Designing and Delivery Systems
- Tissue Engineering
- Soft Computing
- Medical Robotics
- Embedded Controllers for Medical Applications
- Wavelets and Applications
- Computational Medical Diagnostics
- Biomedical Nanotechnology
- Cryptography and Applications
- Medical Informatics and Telemedicine
- Biosensors
- Statistical Signal Processing

DEPARTMENT: ELECTRICAL & ELECTRONICS ENGINEERING

M.Tech. in Power Electronics

Power Electronics deals with application of solid state electronics for conversion and control of electric power from a few microwatts to several megawatts. The characteristics of the devices used for conversion and control are continually improved to handle megawatts of power at frequencies of the order of MHz, which leads to saving of energy and reduction in size of components. The cost of devices is coming down with increase in efficiency, reliability, and life of the devices.

The application areas include wide spectrum such as control of electric drives, AC and DC power supply, Power Quality Improvement, High Voltage DC Transmission, Electric Lighting, Flexible AC Transmission Systems, intelligent vehicle technology and tapping of clean source of power such as from wind, solar, and fuel cell etc. The latest control strategies are Digital Control Techniques using Artificial Intelligence tools.

The objective of the post graduate programme on Power Electronics is to introduce students to various types of power electronics devices and the control of electric power using these devices. The programme is structured to cover the fundamentals and application areas through a set of core subjects and electives which the students can select based on their interest, followed by a full time project work during the fourth semester.

The Power Electronics laboratory is equipped with Digital Real Time Oscilloscopes, DSP based Digital AC motor control, LABVIEW Kit, DSP Trainer Kits, ETAP,PSCAD,EMTCD, Power Quality Analyser, Advanced FPGE Trainer Kits etc. in addition to several other measuring instruments.

Core Courses
- Linear Algebra and Matrix Algebra
- Digital Signal Processing
- Electrical Machine Analysis
- Power Converters I
- Digital System Design
- Digital Control Systems
- Power Converters II
- Electric Drives and Control
- Analog Signal Processing and Control Systems
- Seminar
- Digital Signal Processors
- Minor Project
- Dissertation

Electives
- Flexible AC Transmission Systems
- Electric Power Quality
- Power Quality Improvement
- Over Voltage in Power Systems
- Renewable Energy Technologies
- Energy Conservation and Management
- High Voltage DC Transmission
- Design for Reliability
- Soft Computing
- Computational Optimization Techniques
- Computational Optimization Theory – Linear and Non-Linear Methods
- Algorithms for Power Electronics Applications
- Special Electric Machines
- Industrial Electronics
- Electromagnetic Interference and Compatibility
- Electrical Machine Analysis Using Finite Element Analysis

M.Tech. in Embedded Systems

Almost all Electronics, Electrical and Mechanical systems are now controlled by a controller whichis embedded as a part of the complete system. Such a system is called an Embedded System.Examples are tele-communication systems, chemical processing plants, transportation systems such as aircrafts and automobiles, bio-medical instruments and home appliances like microwave ovens and washing machines. The main characteristics of embedded systems are that they are designed to do some specific tasks in real time satisfying certain performance requirements.

Often controllers use shared networks to communicate with each other and with a large number of sensors and actuators that are scattered throughout the system. The design of embedded controllers and the intricate, automated communication networks that support them, raises many new problems both theoretical and practical, such as network protocols, compatibility of operating systems and ways to maximize the effectiveness of the embedded hardware. This programme will address many such questions and various aspects of embedded and networked control. The newly developed Embedded Systems Laboratory with the assistance of Microsoft India is equipped with necessary Processors, Embedded PC's, Robots and wireless networks obtained by Zigbee, Blue tooth, Wi Fi etc..

Core Courses
- Probability and Random Processes
- Network Embedded Systems
- Digital System Design
- Embedded Software Essentials
- Digital Signal Processing
- Real Time Systems
- Computer Organization and Design using ARM Processor
- Instrumentation and control
- Sensor Networks
- Power Management In Embedded Systems
- Seminar
- Minor Project
- Dissertation

Electives
- Mobile and Wireless Networks
- Wavelets and Applications
- Opto electronics and Fiber Optic Communications
- Digital Image Processing
- Digital Control Theory
- Parallel Programming
- Embedded System for Automotive Applications
- Multi-core Architectures
- Soft Computing
- Object Oriented Analysis and Design
- Computational Optimization Theory – Linear and Non-Linear Methods
- Simulation and Modeling
- Embedded Systems in Robotics
- DSP Processors
- Micro Electro Mechanical Systems
- Hardware Software Co-design

M.Tech. in Power and Energy

The electric power industry in our country is undergoing fundamental changes since the enactment of Energy Act 2003.This act has paved the way for deregulation of power industry.The power system involves the study and analysis of generation, transmission and distribution fields. But this is a conventional approach. The present day trend has been undergoing number of changes globally.This includes flexible ac transmission,two terminal and multi terminal dc links embedded in the conventional ac transmission networks etc. So conventional Power system is to be redefined and power electronic components are also to be added to the existing system. Then only the modern power system can exist in its fullest meaning. Further, as our global population and its appetite for energy rise drastically, resource depletion and global warming have become the most pressing issues facing humanity today. Scientists and experts agree that the use of renewable energy such as solar and wind power, coupled with higher efficiency and conservation, will be key factors in preserving our quality of life and paving the way to

a sustainable world for future generations. This M. Tech program may initiate to explore the above mentioned challenges and also to take up problems in the form of research activities and generate employment opportunities within the country and abroad.

The power industry faces many new problems, with one of the highest priority issues being reliability that is bringing not only a steady, uninterruptable power supply but also ensuring a quality supply to electricity consumers. The restructuring and deregulation of electric utilities together with recent progress in technology introduce unprecedented challenges and opportunities for power & energy systems research and open up new opportunities to young Power Engineers. There exists a lot of scope for employment for Power&Energy Engineers in our country and especially in Kerala, as the State has already made energy auditing a mandatory requirement in industries and commercial establishments (Kerala was the first state in the country to do so dated back in 1992). The energy conservation act has boosted this requirement of qualified professionals in this area through out the country.

Core Courses

- Advanced Engineering Mathematics
- Power Electronics in Power Systems
- Computer Applications in Power Systems
- Linear & Non Linear Systems Theory
- Industrial Training / Interaction
- New & Renewable Sources of Energy
- Power Systems Dynamics
- Electric Drives and Controls
- Space Conditioning Systems
- Energy Management and Energy Audit
- Seminar – 1
- Seminar – 2
- Laboratory Practice – 1
- Laboratory Practice – 2
- Minor Project
- Dissertation

Electives

- Soft Computing Techniques
- Advanced Protective Relaying
- Embedded Systems
- Demand Side Management
- Energy System Economics
- Insulation Systems
- Power & Energy Reliability
- Power Quality
- Energy Management of Thermal Utilities
- Digital Control Systems
- Energy Performance Evaluation
- Integrated Energy Systems
- Advanced Engineering Thermodynamics
- Power Plant Engineering
- Advanced Fluid Flow & Heat Transfer
- De-regulation in Power Systems
- Environmental Science & Engineering
- Digital System Design
- Transient Analysis in Power Systems
- Power System Operation & Control

DEPARTMENT: COMPUTER SCIENCE & ENGINEERING

M.Tech. in Computer Vision & Image Processing

In recent times, Computer Vision and Image Processing has drawn a great deal of attention due to its wide spread application in the area of Defence, Satellite imaging, Remote Sensing, Surveillance, Document Processing, Medical Imaging and Entertainment Etc. A large number of researchers are working in this area of specialization and many interesting techniques and algorithms are being proposed. The issues and scope for research in these areas of specialization are so enormous that the nation has to gear up for producing the required amount of technocrats and utilise them for developing various applications especially in the areas of Defence and Space technology

With this as the main goal, the University is offering a 2 Year Master's programme in Computer Vision & Image Processing to provide a comprehensive expertise in this area and induce in the students the ability and skill sets to pursue research.

Apart from necessary introduction to the mathematical methods, core courses offered include Digital Signal Processing, Computer Graphic, Image Processing, Pattern Recognition and Computer Vision. This Programme is course work intensive for 3 semesters followed by a full time project in the 4th Semester. The course work is amply supported by Labs which provide hands-on experience. Students have the opportunity to pursue their project as interns in major companies and national laboratories like Honey Well, HP, ISRO,HCL and NPOL (Naval Physical and Oceanographic Laboratory). Students can also avail bright career opportunities in top Computer Companies.

Core Courses

- Computer Graphics
- Multidimensional Digital Signal Processing
- Digital Image Processing
- Image Analysis and Applications
- Pattern Recognition & Machine Learning
- Computer Vision
- High Level Computer Vision
- Linear Algebra and Optimization Techniques
- Probability and Random Processes
- Advanced Data Structures and Algorithms
- Multidimensional Data Structures for Image Processing
- Minor Project
- Dissertation

Electives

- Digital Video Processing
- Embedded Systems and Sensors for Image Processing
- Virtual Reality and Applications
- Principles of Multimedia Databases
- Document Image Analysis
- 3-D Modelling for Visualisation
- Cloud Computing
- Medical Image Analysis
- Multimedia Compression
- Data Hiding
- Haptic User Interfaces
- Content based Image and Video Retrieval
- Geographic Information Systems
- Computational Intelligence for Image Processing
- Cluster Analysis

M.Tech. in Computer Science & Engineering

The opportunities for post graduate studies in Engineering and Applied Sciences, especially in Computer Science subjects in India are insignificant by any measure. However, the nation is fast turning towards a knowledge based society. This demands a very studied and meaningful effort for generating trained, competent manpower in many critical areas. No doubt, computer science and allied areas form one discipline which requires careful attention. Computer Science itself has grown enormously in the last two decades with the introduction of concepts like distributed computing, mobile computing, cloud computing, Artificial Intelligence etc. This programme is motivated by a faithful assessment of the future needs of the society in this direction.

The M. Tech programme is basically envisaged as also a first level research course aimed at preparing the students to take up research and development activities in emerging areas in Computer Science.This programme will serve as a preparatory course for those who opt for an academic profession or doctoral work in CSE, in addition to preparing the students in taking up jobs in the emerging areas of automated applications. The overall aim of the programme is to generate human resources capable of supporting R & D activities in critical areas like automated, secured, monitoring and surveillance systems, medical diagnostics, intelligent monitoring systems etc.

Core Courses
- Advanced Computer Architecture
- Advanced Algorithms and Analysis
- Operating System Design
- Probability and Random Processes
- Advanced Computer Networks
- Advanced Computation Lab
- Distributed Systems and Security
- Computational Intelligence
- Advanced Database Design
- Case Study
- Seminar
- Machine Learning
- Minor Project
- Dissertation

Electives
- Principles of Multimedia Systems
- Distributed Computing.
- Digital Image Computing
- Compiler Design
- Principles of Neural Networks
- Computational Statistics
- Fuzzy Logic and Fuzzy Systems
- Distributed Databases
- Pattern Recognition: Approaches & Applications
- Computational Models and Network Applications
- Machine Learning Applications
- Information Theory and Applications
- Data Compression Methods
- Cryptography and Network Security
- Robotics
- Haptics

CENTRE FOR WIRELESS NETWORKING AND APPLICATIONS
M.Tech. in Wireless Networks and Applications

Building on a very successful joint project called WINSOC with about a dozen international partners, Amrita Vishwa Vidyapeetham launched the MTech program in one of the advanced topics of today, wireless networks and applications, at its Amritapuri campus, Kollam, Kerala. This MTech program includes the latest advanced topics in wireless communications, mobile computing, sensor networks, Embedded Systems, signal processing, wireless networks and applications such as landslide detection, environmental monitoring etc.The students get a hands-on experience in real-time wireless sensor networks for land slide detection using the landslide monitoring system deployed at the land slide prone area in Munnar, Kerala. Reputed researchers and well known faculty from highly ranked international universities across the world teach and guide the students. The program provides

opportunities for students to get project guidance from well established research groups around the world and work on excitiing, real-world installations of wireless sensor networks. There are many projects going on at the research centre (WINSOC, DST, DIT, Indo-German, Indo-Brazil etc.) and the students get a unique opportunity to work in these live projects. Upon graduation, students can find employment in a broad spectrum of industries such as computers, communication networks, Earth sciences, Environmental Sciences, Disaster Management, Bio and Nano technologies, VLSI and Embedded Systems, Transportation and Infrastructure, Structural Engineering, Agriculture and Chemical Industries.

Core Courses
- Design and Analysis of Algorithms
- Basics of Digital Signal Processing
- Probablity and Statistical Inference
- Advanced Computer Networks
- Fundamentals of Wireless Communications
- Advanced Computer Networks Lab
- Wireless Sensor Networks
- Wireless LAN
- Embedded System Design
- Wireless Sensor Netwoks Laboratory
- Advanced Wireless Networks
- Distributed Network Algorithms
- Seminar
- Minor Project
- Dissertation

Electives
- Principles of Multimedia Systems
- Wireless Networks Applications
- Information Theory & Applications
- Security in Wireless Networks
- Principles of Telematics
- Cryptography
- Introduction to Machine Learning
- Pattern Recognition
- Image Computing on Wireless Networks
- Advanced Database Design
- Random Processes and Queueing Models

CENTRE FOR EXCELLENCE IN COMPUTATIONAL ENGG & NETWORKING

M.Tech. in Computational Engineering & Networking

The Centre for Excellence in Computational Engineering and Networking was established in the year 2003. The Post Graduate programmes are M.Tech. Computational Engineering and Networking, and M.Tech. Remote Sensing and Wireless Sensor Networks, which offers excellent research opportunities to the students. Computational Engineering is a broad, rapidly growing multidisciplinary area that encompasses applications in science/engineering, applied mathematics, numerical analysis, and computer science. Going from application area to computational results requires domain expertise, mathematical modeling, numerical analysis, algorithm development, software implementation, visualization and validation of results. Computational Engineering makes use of the techniques of applied mathematics and computer science for the development of problem-solving methodologies, which act as building blocks for solutions to scientific engineering problems of ever-increasing complexity. The center is also actively engaged in research related with funded projects from various government agencies like ISRO, DRDO, Ministry of IT (MIT), Ministry of Human Resources Development (MHRD). Project outlay runs into several crores of rupees.

Core Courses
- Computational Linear Algebra and its Applications
- Engineering Modeling and Partial Differential Equations
- Computational Optimization Theory - Linear & Non-Linear Methods
- Advanced Data Structures and Algorithms
- Probability, Statistics and Applications
- Natural Language Processing
- Information Visualization
- Interactive Methods for Sparse Linear Systems

Electives
- Data Mining and Applications
- Computational Chemistry and Molecular Modeling
- Advanced Signal Processing Using Wavelets
- Understanding Molecular Simulation
- Level Set Methods and Applications
- Grid Generation Techniques
- Advanced Image Processing
- Kernel Methods
- PDE Constrained Optimization

- Essentials of Computer Architecture & Software Engg.
- Semiar on Advanced Topics
- Computer Networks & High Performance Computing
- Minor Project
- Dissertation

- Applied Computational Linguistics
- Speech Recognition
- Multiwavelet Theory and Applications
- Parallel Programming For GPUs

M.Tech. in Remote Sensing & Wireless Sensor Networks

Remote sensing is an art of identifying, observing, and measuring an object without coming into direct contact with it. Remote sensing imagery has many applications in mapping land-use and cover, agriculture, soils mapping, forestry, city planning, archaeological investigations, military observation, and geomorphologic surveying, among various other uses. The M.Tech Programme was started in May 2007 with funding from ISRO, Bangalore. This is a two year programme with a total of 65 credits. The students are expected to do a major and minor project by the end of their curriculum. Promising students are given opportunities to contribute and work in live sponsored research projects running in the center. Integrating very diverse technologies like conventional remote sensing through satellite, in-situ remote sensing by the use of wireless sensor networks, wireless communication technology using software defined radio, Geographical Information Systems is the whole work of this multi-disciplinary M.Tech course.

The basic course starts with a strong foundation in mathematics. It is strengthened by courses in image processing, pattern recognition and a specific course on sensor technology, remote sensing, wireless networking and geographical information systems. The Theoretical frame work is supplemented by lab exercises.

Core Courses
- Linear Algebra - Iterative and Direct Methods
- Measurement Techniques in Remote Sensing
- Principles of Remote Sensing
- Advanced Data Structures and Algorithms
- Probability, Statistics and Applications
- Wireless Communication and Sensor Networks
- Deep Space Imaging in the Radio Spectrum
- Remote Sensing and GIS Applications
- Convex and Semi Definite Programming
- Digital Image Processing & Processors
- Seminar on Advanced Topics
- Remote Sensing and WSN Lab
- Minor Project
- Dissertation

Electives
- Image Analysis and Pattern Recognition
- Telematics
- Adaptive Digital Signal Processing Using FPGA
- Wavelets and Multirate Signal Processing
- Computer Vision
- Multimedia Applications
- Remote Sensing Using Chemical Sensors
- Parallel Programming For GPUs
- Wireless Sensor Networks Designs

TIFAC CORE IN CYBER SECURITY

M.Tech. in Cyber Security

The Centre for Cyber Security was identified by TIFAC (Department of Science and Technology, Govt. of India) as a CORE in Cyber Security in September 2005. The TIFAC CORE gives significant thrust to the frontier areas of Cyber Security, including technology, practice, management, and policy issues. Research areas of the TIFAC CORE are organized into four broad categories, namely: Enterprise Wide Security, Data Center Security, Language-Based Security, and Hardware and Embedded Systems Security. These categories represent four horizontal layers of security in a typical information system /network that a practitioner would normally encounter in today's industrial settings and corporate environments. CORE also focuses on theory and practice of authentication, authorization, and access control techniques.

This M. Tech program provides a good blend of theory and industrial practice; necessary theoretical background, insight into general and technical aspects of Cyber Security, analytical methods and management practices in the field of Cyber Security are the areas receiving detailed attention. It aims at moulding the student into an Information Security professional. Practicing industry professionals and enterprise experts with little or no knowledge in Cyber Security too can be benefited from this program.

- Various short and semester long courses in emerging areas of Cyber Security offered by eminent scientists from DRDO (India) and Professors from US and Other Foreign countries.
- Student exchanges as part of European Union East-Web , Erasmus Mundus programs and India4EU
- Govt. sponsored research grants for more than Rs. 3 Crores
- Industry partners: HP and IBM, Symantec, RSA

CORE COURSES

- Discrete Mathematics
- Design and Analysis of Algorithms
- Data Mining and Machine Learning
- Programming Languages and Operating Systems
- Pattern Recognition for Computer Security
- Internetworking - Protocols and Security
- Cryptography
- Cryptographic Protocols and Standards
- Database Security
- Minor Project
- Dissertation

ELECTIVE COURSES

- Mobile & Wireless Networks and Security
- Complexity Theoretic Cryptography
- Image Processing
- Network Security
- Digital Forensics
- Information Theory and Coding
- Information Hiding
- Information Security and Risk Management
- Principles of Security Engineering
- Biometrics
- Security in the Enterprise
- Digital Watermarking
- HDL and Cryptographic Applications
- Cryptographic Boolean Functions
- Cryptanalysis
- Logical Foundations for Access Control

DEPARTMENT: MECHANICAL ENGINEERING
M.Tech. in Integrated Design and Manufacturing

The M.Tech program in Integrated Design and Manufacturing Program focuses on the requirements of the manufacturing practices integrating the areas of Design, Manufacturing and Analysis (CAD, CAM and CAE).The curriculum has been framed drawing course contents from traditional fields such as materials engineering and processes, mechanical engineering, industrial engineering and management.The syllabus for various courses has been designed in general to introduce the application of analytical and quantitative methods in design and manufacturing and expose the students to develop skills in the utilization of tools such as DFMA, FMEA, simulation, optimization, statistical data analysis, finite element analysis. During the course of study, the students will be exposed to solve practical problems encountered in design and manufacturing.

Further, the program provides an opportunity to the students for pursuing their projects in organizations such as NAL, HAL, L&T, ISRO, BHEL, ARCI and in European Universities under Indo-European initiative. In addition, students are encouraged to participate in the funded research projects sponsored by organizations like DRDO, ISRO, and AICTE.

Core courses

- Computational Mathematics
- Materials Science and Engineering
- Theory of Elasticity and Plasticity
- Optimization Techniques in Engineering
- Analysis of Machining Processes
- Advanced Casting Technology
- Theory and Practice of Metal Forming
- Finite Element Methods
- Design for Manufacture and Assembly
- Seminar
- Systems Engineering Lab
- Product Engineering Lab
- Minor Project
- Dissertation

Electives

- Computer Aided Product Development
- Manufacturing Automation
- Advanced Welding Technology
- Statistical Inference and DOE
- Meso and Micro-Manufacturing
- Robotics
- Surface Engineering
- Advanced Metrology and Sensing Systems
- Composite Materials and Processing
- Oil Hydraulics and Pneumatics
- Product Lifecycle Management
- Reliability Methods
- Logistics and Supply Chain Management
- Financial Management
- Lean Manufacturing
- Production and Operations Management
- Embedded Systems
- Mechatronics
- Sustainability and Environmental issues in Product Design and Manufacturing
- Simulation of Manufacturing Systems

M.Tech. in Engineering Design

The M.Tech program in Engineering Design focuses on developing specific capabilities in design, synthesis and analysis of a variety of mechanical engineering systems. The curriculum has been framed drawing course contents from mechanical analysis and design, computational solid mechanics, tribology, vibrations, materials, reliability, optimization and simulation. The syllabus for various courses has been designed in general to introduce the application of analytical and quantitative methods in design and expose the students to develop skills in the utilization of tools such as CAD, CAE, PLM, simulation and optimization. During the course of study, the students will be trained to solve problems relating to product development and analysis commonly encountered in industries. Further, the program provides an opportunity to the students for pursuing their projects in organizations such as NAL, HAL, L&T, ISRO, BHEL, ARCI and in European Universities under Indo-European initiative. In addition, students are encouraged to participate in the funded research projects sponsored by organizations like DRDO, ISRO, and AICTE.

Core courses

- Advanced Engineering Mathematics
- Theory of Elasticity and Plasticity
- Mechanical Vibrations
- Optimization Techniques in Engineering
- Reliability Methods
- Mechanical Analysis and Design
- Fluid Dynamics
- Finite Element Methods
- Mechanical Behaviour of Engineering Materials
- Mechanism Analysis and Synthesis
- Engineering Design Lab-I
- Engineering Design Lab-II
- Minor Project
- Dissertation

Electives

- Theory of Elasticity
- Mechanics of Composite Materials
- Random Vibrations
- Meso- and Micro- Manufacturing
- Design for Manufacture and Assembly
- Plasticity Modeling and Computation
- Nonlinear Vibrations
- Experimental Stress Analysis
- Modelling, Simulation & Analysis of Engineering Systems
- Theory of Plates and Shells
- MEMS (Micro-Electro-Mechanical Systems)
- Machine Condition Monitoring
- Geometric Modelling

- Integrated Design and Manufacturing
- Selection of Materials and Processes
- Product Lifecycle Management (PLM) Systems
- CAD in Product Development
- Tribology
- Boundary Element and Mesh Free Methods
- Bio-MEMS and Medical Micro-devices

M.Tech. in Automotive Engineering

The automotive industry of the twenty first century is poised to advance at a rapid pace with emphasis on lightweight structures, energy efficient powertrains, intelligent control systems with lower emissions, better design and green manufacturing processes. It is a highly competitive industry where engineers require a sound understanding of engineering principles and also be able to demonstrate a clear application of the principles within the automotive domain. Additionally the aspiring automotive engineer should be able to think ahead and work on the future demanding requirements of the society.The M.Tech programme is designed in response to the requirements of the automotive Industry, The objective of the graduate program is to enable the students to learn about advanced technologies and strengthen their ability to solve complex technological problems. This program also aims to develop skills that will prepare the student to work effectively in close collaboration within a multidisciplinary team. Adequate laboratory and computational facilitiesare provided to apply high level analytical tools, develop and design complex assemblies and subsystems. It also facilitates to develop research competency in areas like Vehicle dynamics, NVH, Automotive electronics and encourages providing frugal engineered solutions in all the domains.The program is structured to cover the fundamentals and application areas through a set of core subjects and electives which the students can select based on their area of interest, followed by an application based project during the fourth semester. As India is emerging as the automotive hub, Placements would be available in the Automotive, Off-highway vehicle manufacturing industries and in the Aerospace sector involving Maintenance, repair and overhaul (MRO).

Core Courses
- The Automobile - An Integrated System
- Vehicle Dynamics and Evaluation
- Modeling of Automotive Systems
- Automotive Electronics
- Automotive Manufacturing Processes
- Integrated Vehicle Systems Design
- Design and analysis of Internal Combustion Engines
- Vehicle Aerodynamics and Air Management
- Advanced Power Transmissions
- Computational Fluid Dynamics
- Refinement, NVH and System Measurement
- Automotive Materials
- Computational Laboratory
- Advanced Automotive Engineering Laboratory
- Minor Project
- Dissertation

Electives
- Micromechanics of materials
- MEMS for Automotive application
- Off-Highway Vehicle Design
- Fuels and Combustion Technology
- Solar Vehicle Technology
- Hydrogen Technology
- Electric Vehicle Technology
- Automotive Air Conditioning Systems
- Automotive safety and Regulations
- Vehicle Package Engineering
- New Product and Innovation Management
- Intellectual Property and Information law

M.Tech. in Thermal and Fluids Engineering

As the energy and process sector in India is in a boom, the need of the hour is engineers with strong background in thermal and fluid sciences capable of carrying out conceptual design. The program is aimed at providing sufficient theoretical knowledge in the thermal and fluid sciences combined with simulation and experimental skills applied to aerospace, power plant and gas turbines research. The program aims to equip students to perform design related to linear and non linear steady state/ transient heat transfer, steady and unsteady fluid flow, flow through porous media, open channel flow, multi phase flows, fluid structure interactions viz estimation of thermal and pressure loads and coupled field analysis. The programme provides required numerical simulation techniques for design and analysis of equipments like gas turbines and accessories, steam turbines and reactor pipes, heat exchangers, compressors, turbines, pumps, propellers, rotor stator interactions, flow separators, inlet manifolds, volutes, turbo chargers etc.,. The course also introduces the student to experimental techniques like flow visualisation, combustion diagnostics, particle characterisation and other recent imaging techniques adopted in the field of thermal research.

Core Courses
- Advanced Eng. Mathematics
- Advanced Fluid Dynamics
- Advanced Heat Transfer -I (Conduction and Radiation)
- Advanced Engineering Thermodynamics
- Viscous Fluid Flow
- Experimental methods in Thermal & Fluids Engg (Lab)
- Personality Development
- Computational Fluid Dynamics and Heat Transfer
- Advanced Heat Transfer - II
  (Convective Heat and Mass transfer)
- Power Plant and Thermal Systems Engineering
- Computational Methods in Thermal and
  Fluids Engineering (Lab)
- Seminar on M Tech Project
- Communication Skills and Technical Writing
- Energy Conservation And Power Plant Economics
- Minor Project
- Dissertation

Electives
- Boundary Layer Theory
- Introduction to Turbulence
- Advanced Compressible flow
- Two-phase Flow and Heat Transfer
- Fluid Structure Interaction
- Aero Elasticity
- Hypersonic Flow
- Experimental Fluid Mechanics
- Design of Heat Exchanger Equipments
- Gas Turbine Theory
- Turbomachines
- S.I Engine
- C.I. Engines
- Rocket Propulsion
- Numerical Prediction of Industrial Fluid Flows
- Finite Element Methods in Thermal and Fluids Engineering
- Numerical Simulation and Modelling of Turbulent Flows
- Numerical Methods for Thermal Radiation Heat Transfer
- Combustion Modelling and Simulation
- Modern Energy Sources
- Refrigeration and Air-Conditioning
- HVAC
- Cryogenics

DEPARTMENT: CHEMICAL ENGINEERING & MATERIAL SCIENCE
M.Tech. in Chemical Engineering

The department of chemical engineering and materials science offers a program in M.Tech Chemical Engineering. The curriculum is designed to train Chemical Engineers, keeping in view the challenges that a graduate faces in the Chemical industry, and for providing students a balanced education in various physical, chemical, and engineering subjects relevant to the field of Chemical Engineering. Emphasis is given on honing the skills of the students for research as well as industrial applications. The electives offer a rich choice of topics across the streams of industrial chemical engineering (e.g. pinch technology, process intensification, and multi-component mass transfer), materials science, biotechnology & biochemical engineering, petroleum refining & petrochemicals,

polymers, and renewable energy. A significant practical component involves the innovative use of chemical engineering labs to create, optimize, and run experimental set ups. Graduates of the program would find a variety of career opportunities open, such as, as scientists in R&D labs, as process engineers, product engineers, and quality engineers/managers in chemical and allied industries, as equipment designers for chemical process engineering firms, and as managers for environmental monitoring & clearances.

Core Courses	Electives
• Mathematical Methods in Chemical Engineering	• Process Safety Management
• Modern Separation Methods	• Petroleum Refining
• Process Modeling & Simulation	• Biochemical Process Engineering
• Chemical Reactor Design & Analysis	• Polymer Materials and Structure-Property Relationships
• Thermodynamics of Multi Phase Equilibria	• Computational Systems Biology
• Statistical Design of Experiments	• Spectroscopy
• Computer-Aided Simulation of Process Plants	• Computational Fluid Dynamics
• Transport Phenomena	• Process Intensification
• Chemical Process Control	• Pinch Technology
• Seminar I	• Multicomponent Mass Transfer
• Seminar II	• Catalysis in Refining & Petrochemicals
• Chemical Engineering Lab	• Biomaterials Science
• Minior Project	• Interfacial Science and Engineering
• Dissertation	• Solar Energy
	• Biomedical Polymers
	• Advanced Materials Charatrization Techniques
	• Petro Chemicals Process Testing

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING
Post Graduate Diploma in Wind Power Development (PGDWPD)

Wind energy is a fast developing interdisciplinary engineering sector that involves aerodynamics, electrical machines, electric power system, instrumentation and control engineering. This programme will provide sufficient insight into these key areas imparting knowledge at such levels that match the requirements of wind power industry.

Indian wind power industry needs engineers/managers capable of planning and developing wind power projects. Academic exposures to wind power utilization methods, resource assessment, techno-economic feasibility study, modeling techniques, etc. are the components devised for the capacity building envisaged through this propgramme. The curriculum also involves practical training in wind energy laboratory and dissertation/project work in the field/industry or lab.

This PGD will serve as a significant value addition to basic engineering degrees making the graduates fit for direct employment with windfarm developers, wind mill/generator manufacturers, government and non-government agencies working in energy sector etc. Placement of the out-going students is assured by Indian Wind Turbine Manufacturers Association (IWTMA).

The programme duration is two semesters. The maximum student intake is 15. There is no course/tuition fee applicable to this programme; it is funded by Centre for Wind Energy Technology (C-WET), Chennai, under Ministry of New & Renewable Energy (MNRE), New Delhi.

Courses
• Renewable Energy Resources
• Wind Resource Assessment
• Aerodynamics and Wind Turbines
• Electrical Power System

- Environment and Safety
- Energy Economics
- Wind Power Laboratory I
- Wind farm Development and Operation
- Applied Computational Fluid Dynamics
- Project Planning & Management
- Wind Electric Generators
- Power Electronics and Instrumentation
- Wind Power Laboratory II
- Project

Post Graduate Diploma in Wind Resource Assessment (PGDWRA)

Wind resource assessment is a prerequisite for wind power planning and development. This programme puts emphasis on wind regime analysis and wind resource assessment. Training on related software packages is included in the curriculum. The curriculum also involves practical training in wind energy laboratory besides dissertation/project work in the field under the able guidance of field experts.

There is a high demand for wind analysts globally and nationally today. Placement of the out-going students is assured by Indian Wind Turbine Manufacturers Association (IWTMA).

The programme duration is two semesters. The maximum student intake is 15. There is no course/tuition fee applicable to this programme; it is funded by Centre for Wind Energy Technology (C-WET), Chennai, under Ministry of New & Renewable Energy (MNRE), New Delhi.

Courses
- Renewable Energy Resources
- Wind Resource
- Aerodynamics
- Computer Programming and Modeling
- Electronics and Instrumentation
- Project Planning & Organisation
- Measurements & Survey Practice
- Wind farm Development and Operation
- Applied Computational Fluid Dynamics
- Wind Energy Conversion Systems
- Wind Resource Modeling
- Electrical Power
- Wind Electric Laboratory
- Project

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
Master of Computer Applications

Master of Computer Applications (MCA) emphasizes on the design and application of information systems and provides a solid background in business functions and Information Technology and covers latest developments in areas where commerce and computing and in general,applications and technology blend together successfully and define the state of art.MCA students acquire strength in principles, concepts and foundations of computer science,Information Technology and various applications. They would also have extensive programming and software development experience over a wide variety of platforms and applications. These skills would help them in placement opportunities at various levels in software organizations like CTS, IBM,HP, Honeywell, TCS, Infosys, Accenture etc.

MCA programs at Amrita are structured under credit based continuous assessmente v a l u a t i o n f o l l o w i n g semester pattern.The curriculum also includes the development of soft skills, personality development, and professional communication as per the requirement of the industry. The electives have been categorized into streams like Databases, Networks, Web Technology, Graphical computing, Computational Sciences and System programming, to cater to the latest developments in software.

Core Courses	Electives
• Discrete Mathematics	• Advanced Computer Networks
• English for Professional Communication	• Prevasive Computing
• Computer Organisation & Architecture	• Agent based Intelligent Systems
• Computer Programming	• Advanced Databases
• Financial Accounting	• Data Analytics and Business Intelligence
• Cultural Education	• Management Information Systems
• Numerical Methods and Statistics	• Distributed Databases
• Object Oriented Programming	• Soft Computing
• Data Structures	• Network Management & System Administration
• Database Management System	• Embedded Systems
• Principles of Economics & Management	• Simulation and Modeling
• Computer Networks	• Free and Open Source Software
• Design and Analysis of Algorithms	• Information Retrieval
• Internet Programming	• C# and .NET Programming
• Operating Systems	• Natural Language Processing
• Operations Research	• Principles of Digital Image Processing
• Software Engineering	• Mobile Communications
• Visual Programming	• Software Quality Assurance
• Principles of Compiler Design	• Cryptography and Network Security
• Service Oriented Architecture	• Parallel Computer Architecture & Programming
• Software Project Management	• Data Mining
• Computer Graphics	• Design Patterns
• Minor Project	• Agile Programming
• Major Project	• Multimedia Systems