

BSC: Environmental Engineering

	1. Year	Credits
	Writing and Rhetoric/University Seminar	3
	MATH : Calculus I	4
	Chemistry: Fundamental	4
	Arts and Letters	3
	Moreau First Year Experience/ROTC/Seminar	1
	Intro. Eng. Systems	3
	Writing and Rhetoric/University Seminar	3
	Math : Calculus II	4
	Chemistry: Biological or Substitute	3
	General Physics 1	4
	Experience/ROTC/Seminar	1
	Intro. Eng. Systems	3
	2. Year	
	MATH : Calculus III	3,5
	Planet Earth	3
	Planet Earth lab	1
	Intro Env. Eng.	3
	Intro Env. Eng. Lab	1
	Statics	3
	Global Change, Water and Energy	3
	Physics II	4
	Lin. Alg. & Diff. Equations	3,5
	Environmental Aquatic Chemistry	3
	Probability and Statistics	3
	Programming	1
	Challenges & Innovations Seminar	0
	Arts and Letters 1	3
	3. Year	
	Environmental Hydrology	3
	Environmental Microbiology	3
	Computational Methods	3
	Water Chemistry & Treatment	3
	Fluid Mechanics	3
	Hydraulics	3
	Environmental Mineralogy	4
	Technical Elective	3
	Arts and Letters 2	3
	Challenges & Innovations Seminar	0
	Arts and Letters 3	3
	4. Year	

	Groundwater Hydrology	4
	Reactive Transport	3
	Biological Processes Design	3
	Technical Elective	3
	Geochemistry	3
	Senior Design	3
	Water Disease and Global Health	3
	Environmental Fluid Dynamics	3
	Technical Elective	3
	Principles of Practice	1
	Challenges & Innovation Seminar1	0
	Challenges & Innovation Seminar2	0
	Arts and Letters 4	3
	Arts and Letters 5	3
BSC : Environmental Earth		
Environmental Earth Sciences		
	1. Year	Credit
	Writing and Rhetoric/University Seminar	3
	Writing and Rhetoric/University Seminar	3
	Calculus I	4
	Calculus II	4
	Chemistry: Fundamental	4
	Chemistry: Biological or Substitute	3
	Arts and Letters 1	3
	General Physics 1	4
	Moreau First Year Experience/ROTC/Seminar	0
	Moreau First Year Experience/ROTC/Seminar	0
	Intro. Eng. Systems I	3
	Intro. Eng. Systems II	3
	2. Year	
	Calculus III	3
	Lin. Alg. & Diff. Equations	3
	Planet Earth	3
	Environmental Aquatic Chemistry	3
	Planet Earth lab	1
	Probability and Statistics	3
	Intro Env. Eng.	3
	Programming	1
	Intro Env. Eng. Lab	1
	Challenges & Innovations Seminar	0
	Physics II	4
	Global Change, Water and Energy	3

	Challenges & Innovations Seminar	0
	Arts and Letters 2	3
	3.year	
	Environmental Hydrology	3
	Petrology/Earth Materials	4
	Computational Methods	3
	Dynamic Earth	4
	Surficial Processes	3
	Environmental Mineralogy	4
	Technical Elective	3
	Arts and Letters 3	3
	Challenges & Innovations Seminar 1	0
	Challenges & Innovations Seminar 2	0
	Arts and Letters 4	3
	4.Year	
	Groundwater Hydrology	4
	Elective 1	3
	Technical Elective1	3
	Environmental Microbiology	3
	Geochemistry	3
	Elective 2	3
	Technical Elective 2	3
	Challenges & Innovation Seminar 1	0
	Challenges & Innovation Seminar	0
	Arts and Letters 5	3
	Arts and Letters 6	3

BSC: Bio-environmental Engineering

Bio-environmental Engineering		
	1.Year	Credit
	General chemistry 1	3
	Introduction to experimentation	1
	Expository writing 1	3
	Calculus I	4
	Engineering Orientation lect	1
	Human / social elective 1	3
	General chemistry 2	3
	Calculus 2	4
	Analytical Physics laboratory 1	2
	Analytical Physics laboratory 2	2
	Human / social elective 2	3
	2. Year	

	Principles of Biology	4
	Multivariable calculus	4
	Analytical Physics IIa	3
	Analytical Physics Lab IIa	1
	Engineering Graphics	1
	Mechanics of solids	3
	Elementary Organic Chem,	3
	Differential Equations	4
	Intro Env. Eng. Lab	1
	Physical Principles of env sciences	3
	Element of elect Eng	3
	Element of mech Eng: Dynamics	3
	General Elective	3
	3.year	
	Elementary Organic Chemistry lab	1
	Biological principle of environmental science	3
	Chemical principle of environmental science	3
	Numerical Methods	3
	Fluid Mechanics	3
	Fluid Mechanic Laboratory	1
	Micro Economics	3
	Solid waste treatment	3
	Environment Fate Transport	3
	Challenges & Innovations Seminar 1:Technical	3
	Challenges & Innovations Seminar 2:Social	3
	4. Year	
	Unit Process Biological Environmental Engineering I	3
	Biological Environmental Engineering Lab I	1
	Air pollution Engineering	3
	Biological Environmental Engineering Design	2
	Energy Technology	3
	Unit Process Biological Environmental Engineering II	3
	Biological Environmental Engineering Lab I	1
	Biological Environmental Engineering Lab II	1
	Challenges & Innovation Seminar	0
	Challenges & Innovations Seminar 3:Technical	3
	Challenges & Innovations Seminar	3

	4:Social	
--	----------	--

BSC:Biomedical Engineering

Biomedical Engineering		
	1. Year	Credit
	Gen Chem for Engrs 1	3
	Gen Chem for Engrs 2	3
	Intro to Experiment.	1
	Intro Comp for Engrs	3
	Expository Writing I	3
	Calculus II: Math/Phys	4
	Calculus I: Math/Phys	4
	Analytical Physics Ib	2
	Analytical Physics Ia	2
	Eng'g Mech: Statics	3
	Eng'g Orient Lecture	1
	Hum/Soc Elective 1	3
	Hum/Soc Elective 2	3
	2. Year	Credit
	Intro to Biomed Eng	3
	System Physiology	3
	Multivariable Calculus	4
	Diff Eqs Eng'g & Phys	4
	Analytical Physics IIa	3
	Analytical Physics IIb	3
	Analytical Phys IIa Lab	1
	Analytical Phys IIb Lab	1
	Biology I	4
	Biology II	4
	Hum/Soc Elective	3
	Biology Lab	2
	MicroEconomics	3
	3. Year	Credit
	Biomed Trans Phenom	3
	Biomaterials	3
	Num Model in Bio Sys	3
	Bio Kinetics & Thermo	3
	Biomechanics	3
	BME Meas/Analy Lab	2
	BME Devices/Systems	3
	Technical Elective	3
	BME Dev/Sys Lab	1
	Life Science Elective	3
	Technical Elective	3
	Senior Year	Credit

	Senior Design I Lecture	1
	Senior Design II Lecture	1
	Senior Design I Project	2
	Senior Design II Project	2
	Departmental Elective 1	3
	Departmental Elective 2	3
	Departmental Elective 3	3
	Departmental Elective 4	3
	Technical Elective 1	3
	Technical Elective 2	3
	Hum/Soc Elective	3
	General Elective	3

BSC: Physics Engineering

Physics Engineering		
	Year 1	
	Mathematics	4
	Introduction to Engineering Physics	2
	Computer Programming	4
	Physical Chemistry BSC	4
	Ethics and Self Awareness	2
	Introduction to Environmental Studies	3
	Communication Skills (Basic /Advanced)	2
	Optimization Techniques	4
	Electromagnetic Theory	4
	Analog and Digital Electronics	4
	Thermal and Statistical Physics	4
	Electrical Science	4
	Organic and Inorganic Chemistry	4
	Year 2.	
	Engineering Analysis and Design	4
	Mechanics and Relativity	4
	Mathematical Physics	3
	Quantum Physics	3
	Elective Course1	3
	Electrical and Electronics Materials	4
	Atomic Molecular and Laser Physics	3
	Elements of Condensed Matter Physics	3
	Nuclear Physics and Applications	3
	Microprocessors and Peripheral Devices	5
	Applied Optics	4
	Year 3	
	Numerical Analysis and	3

	Computational Physics	
	Signals and Systems	4
	Laser and Photonics	3
	Plasma Physics and Applications	3
	Technical Communication	2
	Departmental Elective I	4
	Applied Instrumentation	4
	Semiconductor Devices	4
	Departmental Elective II	4
	Industry-oriented Problem / Lab-based Project /	4
	Software Engineering-based Project	4
	Open Elective Course/Management Studies Elective	4
	Year4	
	Departmental Elective III	4
	Departmental Elective IV	4
	Training Seminar	2
	B.Tech. Project	4
	- 2 (optional)	4
	MSC3/DHC3 MSC - 3 / DHC - 3 (optional) MSC/DHC	4
	MSC4/DHC4 MSC - 4 / DHC - 4 (optional) MSC/DHC	4
	MSC5/DHC5 MSC - 5 / DHC - 5 (optional) MSC/DHC	4

*DEC - Departmental Elective Course

**MSC - Minor Specialization Course

***DHC - Departmental Honours Course

Departmental Core Courses (DCC)

1. Electromagnetic Theory
2. Analog and Digital Electronics
3. Thermal and Statistical Physics
4. Engineering Analysis and Design
5. Mechanics and Relativity
6. Mathematical Physics
7. Quantum Physics
8. Atomic , Molecular and Laser Physics
9. Elements of Condensed Matter Physics
10. Nuclear Physics and Applications
11. Microprocessors and Peripheral Devices
12. Applied Optics
13. Numerical Analysis and Computational Physics
14. Signals and Systems
15. Laser & Photonics
16. Plasma Physics and Applications

17. Technical Communication
18. Applied Instrumentation
19. Semiconductor Devices

Departmental Electives (DEC)

1. Digital Image Processing
2. Fabrication and Measurement Techniques
3. Radiation Detection and Measurements
4. Atmospheric Physics and Climate Dynamics
5. Physics of Nanosystems
6. Superfluidity and Superconductivity
7. Nuclear Astrophysics
8. Principles of Digital Communication
9. Nanotechnology
10. Properties of Matter and Acoustics
11. Data Structures
12. Atomic and Molecular Collision Physics
13. Fiber and Nonlinear Optics
14. Modern Particle Physics
15. Principles of Remote Sensing
16. Superconducting Materials
17. Digital Signal Processing
18. Quantum Information & Computing
19. Nuclear Science & Engineering
20. Weather Forecasting
21. Introduction to Superstring theory
22. Advanced Characterization Techniques
23. A Primer in Quantum Field Theory
24. Biophysics and Applications
25. Emerging Phenomenon in Materials
26. Optoelectronics
27. Space Technology
28. Advanced Electroceramics Technology
29. Solar Terrestrial Physics
30. Computational Nuclear Physics(

List of Minor Specialization courses of Physics for other Departments

- 1 Mechanics and Relativity
- 2 Quantum Physics Autumn
- 3 Atomic Molecular and Laser Physics
- 4 Elements of Condensed Matter Physics
- 5 Nuclear Physics and Applications

Department Honor Courses (B. Tech - Engineering Physics)	
Elective-Group-I (VI Semester: One paper to be chosen)	
Advanced Condensed Matter Physics DHC	4

Advanced Atmospheric Physics	4
Advanced Laser Physics	4
Advanced Nuclear Physics	4
Advanced Atomic and Molecular Physics	4
Elective- Group-II(VII Semester: One paper to be chosen)	
Experiments in Condensed Matter Physics	3
Experiments in Atmospheric Physics	3
Experiments in Laser Physics	3
Experiments in Nuclear Physics	3
Elective- Group-III (VII Semester: One paper to be chosen)	
Advanced Characterization Techniques	3
A Primer in Quantum Field Theory	3
Astrophysics	3
General Relativity	3
Particle Physics	3
Quantum Theory of Solids	3
Weather Forecasting	3
Nuclear Instrumentation	3
Physics and Technology of Thin Films	3
Advanced Nuclear reactions	3
Semiconductor Photonics	3
Elective- Group-IV (VIII Semester: Two papers to be chosen)	
Nuclear Astrophysics	3
Physics of Nanosystems	3
Superfluidity and Superconductivity	3
Fiber and Nonlinear Optics	3
Quantum Optics DHC	3
Advanced topics in Mathematical Physics	3
Introduction to Superstring theory	3
Advanced Electroceramics Technology	3
Atomic and Molecular Collision Physics	3
Advanced Quantum Field Theory	3
Solar Terrestrial Physics	3
Computational Nuclear Physics	3

BSC: Biotechnology

B.Tech. (Biotechnology)		
	Year 1	Credit
	Mathematics-I	4
	Modern Physics	4
	Introduction to Environmental Studies	3
	Communication Skills (Basic)	2
	Communication Skills (Advance)	4

	Ethics and Self Awareness	2
	Introduction to Biotechnology	2
	Computer Programming	4
	Mathematical Methods	4
	Process Calculations	4
	Cell Biology	4
	Biochemistry	4
	Organic and Inorganic Chemistry	4
	Basic Manufacturing Processes	4
	Year 2	Credit
	Engineering Thermodynamics	4
	Genetics and Molecular Biology	4
	Microbiology	4
	Bioinformatics	4
	Immunotechnology	4
	Elective Course	3
	Fluid Mechanics	4
	Genetic Engineering	4
	Structural Biology	4
	Heat and Mass Transfer Operations	4
	Biotechnology Laboratory - I	4
	Chemical Kinetics and Reactor Design	3
	Year 3	Credit
	Bioprocess Engineering	4
	Plant Biotechnology	4
	Animal Biotechnology	4
	Department Elective Course - I	4
	Management Studies 1 / Open Elective Course	3
	Technical Communication	2
	Industry Oriental Problem /Case Study Lab Based Project/Practical Problem	4
	Bioseparation Engineering	4
	Biotechnology Laboratory - II	4
	Department Elective Course - II	4
	MSC1/DHC1	4
	Minor Specialization Course-I	3
	Departmental Honours Course-I	1
	Management Studies 2 / Open Elective Course	3
	Year 4	Credit
	B.Tech. Project	4
	Department Elective Course -III	4
	Department Elective Course -IV	4

	Minor Specialization Course-II	4
	Departmental Honours Course-II	3
	Minor Specialization Course-III	4
	Departmental Honours Course-III	3
	Training Seminar	2
	B.Tech. Project	8

Department Minor Specialization Courses	Credit
Fundamentals of Biotechnology	4
Introduction to Biophotonics tools and techniques	4
Computational Biology	4
Recombinant DNA Technology	4
Environmental Biotechnology	4
Fermentation Technology	4
Fundamentals of Food Biotechnology	4
NMR Techniques	4
Honours Specialization Courses:	
Structure Based Drug designing	4
Stem Cell Technology	4
Chemical Genetics	4
Phytomedicine	4
Advanced Virology	4
Biomolecular Interactions	4
Drug Discovery	4
Enzyme Technology	4
Protein Crystallography	4
Biomedical Optics and Biophotonics	4
Protein NMR	4
Biodiversity, Bioprospecting, and Organic-farming	4
Molecular Biophysics	4
Gene Regulation	4
Instrumental Methods of Analysis	4
Genomics and Proteomics	4
Metabolic Engineering	4
Protein Engineering	4
Structural Analysis by NMR	4
Diagnostics	4
Biomolecular Modelling	4
Cell and Tissue Engineering	4
Bioreactor design and analysis	4
Genetically Modified Organisms	4
Vaccine Biotechnology	4

Drug Designing	4
Industrial Biotechnology	4
X-Ray Crystallography	4
Nanobiotechnology	4
Bioprocess Modeling and Simulation	4
Separation and Analysis of Biomolecules	4
Advanced Transfer Processes	4
Food Biotechnology	4
Biological Spectroscopy	4
Bioprocess Economics and Plant Design	4
Biomolecular NMR	4

BSC: Chemical & Biochemical Engineering

Chemical & Biochemical Engineering		
	1. Year	
	Gen. Chemistry for Eng.	3.0
	Expository Writing	3.0
	Eng. Orientation Lectures	1.0
	Calculus I	4.0
	Analytical Physics I	2.0
	Hum./Soc. Science Elective	<u>3.0</u>
	Gen. Chemistry for Eng.	3.0
	Intro. Experimentation	1.0
	Intro. Computers for Eng.	3.0
	Calculus II	4.0
	Analytical Physics I	2.0
	Eng. Mechanics Statics	3.0
	Hum./Soc. Science Elective	<u>3.0</u>
	2. Year	
	Analysis I	3.0
	Professional Skills Devel	1.0
	Organic Chemistry I*	4.0
	Multivariable Calculus	4.0
	Analytical Physics II	3.0
	Analytical Physics II Lab	<u>1.0</u>
	Thermodynamics I	3.0
	Organic Chemistry II	4.0
	Diff. Eqns. Engineering & Physics	4.0
	Microeconomics	3.0

	3. Year	
	Transport Phenomena I	3.0
	Analysis II	3.0
	Thermodynamics II	3.0
	Organic Chemistry Lab^	2.0
	Advanced Calc. for Eng.	3.0
	Hum./Soc Science Elective	3.0
	Transport Phenomena II	3.0
	Separations Processes	3.0
	Kinetics	3.0
	Processing & Prop. Mats.	3.0
	Physical Chemistry II	4
	Hum./Soc. Science Elective 1	3.0
	4. Year	
	Process Engineering I	4
	Intro Biochem. Eng.	3.0
	Process Engineering II	4.0
	Process Simul. & Control	3
	Design & Econ. I	3.0
	General Elective 1	3.0
	Technical Elective	3.0
	General Elective 2	3.0

BSC: Civil Engineering 1

Civil Engineering		Credits
	1. Year	
	Mathematics-I	4
	Mechanics	4
	Introduction to Environmental Studies	3
	Communication Skills (Basic)	2
	Communication Skills (Advance)	5
	Ethics and Self Awareness	2
	Introduction to Civil Engineering	4
	Numerical Methods and Computer Programming	4
	General Chemistry - III	4
	Probability and Statistics	4
	Solid Mechanics	4
	Water Supply Engineering	4
	Geomatics Engineering - I	4
	Fluid Mechanics	4

	2. Year	
	Electrical Sciences	4
	Geomatics Engineering -	5
	Channel Hydraulics	4
	Structural Analysis - I -	4
	Engineering Graphics	4
	Elective Course	3
	Waste Water Engineering -	4
	Engineering Hydrology -	4
	Structural Analysis-II	4
	Design of Reinforced Concrete Elements	4
	Highway and Traffic Engineering	4
	Basic Manufacturing Processes	4
	3. Year	
	Soil Mechanics	4
	Design of Steel Elements	4
	Railway Engineering and Airport Planning	4
	Department Elective Course - I	4
	Open Elective Course/ Management Studies Elective Course 1	3
	Technical Communication	2
	Industry Oriented Problem/ Case Study/Lab based Project/ Practical Problem	2
	Foundation Engineering	4
	Design of Structural Systems	5
	Department Elective Course - II	4
	Minor Specialization Course-I / Department Honours Course - I	
	Open Elective Course/ Management Studies Elective Course 2	3
	4. Year	
	B. Tech. Project	1
	Department Elective Course-III	4
	Department Elective Course-IV	4
	Minor Specialization Course-II / Department Honours Course - II	4
	Minor Specialization Course-III / Department Honours Course - III	4
	Training Seminar	2
	B. Tech. Project	8
	Department Elective Course-V	4
	Department Elective Course-VI	4
	Minor Specialization Course-IV / Department Honours	4

	Course - IV	
	Minor Specialization Course-V / Department Honours Course - V	4

B.Tech. (Chemical Engineering)

B.Tech. (Chemical Engineering)		
	Year 1	Credit
	Mathematics-I	4
	Physical Chemistry	4
	Introduction to Environmental Studies	3
	Communication Skills (Basic)	3
	Communication Skills (Advance)	5
	Ethics and Self-awareness	2
	Introduction to Chemical Engineering	4
	Computer Programming and Numerical Methods	4
	Organic and Inorganic Chemistry	4
	Mathematical Methods	4
	Material and Energy Balance	4
	Fluid Dynamics	4
	Thermodynamics and Chemical Kinetics	4
	Electrical Science	4
	Year 2	
	Heat Transfer	4
	Mechanical Operations	4
	Chemical Engineering Thermodynamics	4
	Transport Phenomena	4
	Mechanical Engineering Drawing	4
	Elective Course 1	3
	Mass Transfer -I	3
	Reaction Engineering	5
	Chemical Technology	3
	Industrial Instrumentation -	2
	Energy Engineering ESC	4
	Equipment Design	4
	Year 3	
	Mass Transfer-II	5
	Process Dynamics and Control	4
	Process Equipment Design	4
	Departmental Elective Course-1	4

	Open Elective Course 2	3
	Technical Communication	2
	Industry Oriented Problem/Case	3
	Study/Lab Based Project/Practical Problem	3
	Engineering Analysis and Process Modeling	4
	Process Economics and Plant Design	4
	Process Utilities and Safety	3
	Departmental Elective Course-II	4
	Minor Specialization Course-I/	4
	Any one Elective course from 'Management Studies'	3
	Year 4	
	B. Tech. Project 1	4
	Department Elective Course- III	4
	Department Elective Course- IV	
	Minor Specialization Course-II/	
	Departmental Honours Course-II/7 Minor Specialization Course-III/	4
	Departmental Honours Course-III	4
	Training Seminar	2
	B. Tech. Project 2	8
	Department Elective Course- V	4
	Department Elective Course- VI	4
	MSC4/DHC4	
	Minor Specialization Course-IV/	
	Departmental Honours Course-IV	4
	Minor Specialization Course-V/	
	Departmental Honours Course-V	4

BSC: Civil Engineering 2

Civil Engineering Curriculum		Credits
	1.Year	
	Writing and Rhetoric/University Seminar	3
	Writing and Rhetoric/University Seminar	3
	Calculus I	4
	Calculus II	4
	Chemistry: Fundamental	4
	Technical Elective	3
	Arts and Letters	3
	General Physics 1	4
	Experience/ROTC/Seminar 1	1
	Experience/ROTC/Seminar 2	1

	Intro. Eng. Systems.	3
	2.year Year	
	Calculus III	3
	Lin. Alg. & Diff. Eq	3
	Planet Earth	3
	Solid Mechanics	4
	Intro to CAD	2
	Probability and Statistics	3
	Engineering Programming	1
	Materials (with Lab)	4
	Statics	3
	Challenges & Innovations Seminar 1	0
	Physics II	4
	Arts and Letters 1	3
	Challenges & Innovations Seminar 2	0
	3. Year	
	Intro to Structural Engineering	3
	Reinforced Concrete Design	4
	Intro to Environmental Engineering	3
	Arts & Letters 2	3
	Computational Methods	3
	Hydraulics	3
	Fluid Mechanics	3
	Hydraulics Lab	0.5
	Differential Equations	3
	Dynamics and Modeling	3
	Challenges & Innovations Seminar 1	0
	Challenges & Innovations Seminar 2	0
	Arts and Letters 3	3
	4. Year	
	Transportation	3
	Environmental Fluid Dynamics	3
	Senior Design	3
	Steel Design	3
	Groundwater Hydrology	4
	Structural Analysis	2
	Reactive Transport	3
	CE Elective 1	3
	CE Elective 2	3
	Geotechnical Engineering with lab	3
	Technical Elective1	3
	Arts and Letters1	3
	Challenges & Innovation Seminar	0
	Principles of Practice	1
	Arts and Letters 2	1

BSC: Computer Science and Engineering

Computer Science and Engineering		
	Year 1	
	Mathematics-I	4
	Electrodynamics and Optics	4
	Introduction to Environmental Studies	3
	Communication Skills (Basic)	2
	Communication Skills (Advance)	5
	Ethics and Self Awareness	2
	Introduction to Computer Science and Engineering	2
	Fundamentals of Object Oriented Programming	4
	Optimization Techniques	4
	Quantum Mechanics and Statistical Mechanics	4
	Digital Logic Design	4
	Data Structures	4
	Discrete Structures	4
	Fundamentals of Electronics	4
	Year 2	
	Engineering Thermodynamics	4
	Signals and Systems	4
	Computer Architecture and Microprocessors	4
	Data Structures Laboratory	2
	Object Oriented Analysis and Design -	4
	Elective Course -1	3
	Electrical and Electronic Materials -	4
	Design and Analysis of Algorithms	4
	Operating Systems	4
	System Software	3
	Software Engineering	4
	Digital Electronic Circuits Laboratory	2
	Elective Course - 2	3
	Year 3	
	Computer Networks	4
	Data Base Management Systems -	4
	Theory of Computation -	4
	Computer Networks Laboratory	2
	Departmental Elective Course	4

	Open Elective Course/Management Studies Elective Course*	3
	Studies Elective Course*	3
	Industry-oriented Problem / Lab-based	4
	Project / Software Engineering-based	4
	Principles of Programming Languages	3
	Compiler Design	4
	Compiler Laboratory	2
	Departmental Elective Course-II -	4
	Open Elective Course/Management	3
	Minor Specialization Course-I /Departmental Honours Course-I	4
	Year 4	
	Departmental Elective Course-III-	4
	Departmental Elective Course-IV	4
	Training Seminar	2
	B.Tech. Project	4
	Minor Specialization Course-II	4
	Departmental Honours Course-II	4
	Minor Specialization Course-III /Departmental Honours Course-III	4
	Departmental Elective Course-V	4
	Departmental Elective Course-VI	4
	B.Tech. Project	8
	Minor Specialization Course-IV /Departmental Honours Course-IV	4
	Departmental Honours Course-IV (optional)	4
	Minor Specialization Course-V /Departmental Honours Course-V(Optional)	4

BSC: Electronic and Communication Engineering

Electronics and Communication Engineering		Credit
	Year 1	
	Mathematics-I	4
	Electrodynamics and Optics	3
	Introduction to Environmental Studies	3
	Communication Skills (Basic)	2

	Communication Skills (Advance)	2
	Introduction to Electronics and Communication Engineering	2
	Fundamentals of Object Oriented Programming	4
	Mathematical Methods	4
	Quantum Mechanics and Statistical Mechanics	4
	Data Structures	4
	Digital Logic Design	4
	Semiconductor Devices	4
	Electrical Science	4
	Year 2	
	Mechanical Engineering Drawing	4
	Signals and Systems	4
	Analog Circuits	4
	Computer Architecture and Microprocessors	4
	Electronic Network Theory (Engineering Analysis and Design course)	4
	Elective Course	3
	Electrical and Electronic Materials	4
	Probability and Statistics	4
	Principles of Digital Communication	4
	Automatic Control Systems	4
	Engineering Electromagnetics	4
	Digital Electronic Circuits Laboratory	2
	Year 3	
	Communication Systems and Techniques -	4
	Antenna Theory	3
	Microwave Engineering	3
	Microelectronic Devices, Technology and circuit	2
	IC Application Laboratory	2
	Departmental Elective Course- -	3
	Management Studies Elective Course	3
	Technical Communication	2
	Industry-oriented Problem / Case study /Lab-based Project / Practical Problem	3
	Digital Signal Processing	3
	RF and Mixed Signals Circuits -	3
	Communication Systems Laboratory	2
	Microwave Laboratory	2
	Departmental Elective Course	4
	OEC Open Elective Course	3
	Minor Specialization Course-I/Departmental Honours Course-I	3
	Year 4	

	Departmental Elective Course-	3
	Departmental Elective Course-IV	3
	MSC2/DHC2 Minor Specialization Course-II/Departmental Honours Course-II	4
	MSC3/DHC3 Minor Specialization Course-III/Departmental Honours Course-II	4
	Training Seminar	2
	Departmental Elective Course-V	3
	Departmental Elective Course-VI -	3
	MSC4/DHC4 Minor Specialization Course-IV/Departmental Honours Course-IV	4
	MSC5/DHC5 Minor Specialization on Course-V/Departmental Honours Course-V	4
	B.Tech. Project 2	8

BSC :Electrical Engineering 1

Electrical Engineering		Credit
	Year 1	
	Mathematics-I	4
	Electromagnetic Field Theory	4
	Introduction to Environmental Science	3
	Communication Skills (Basic) Communication Skills (Advanced)	2
	Ethics and Self-Awareness	2
	Introduction to Electrical Engineering	2
	Programming in Java	4
	Mathematics-II	4
	Modern Physics	4
	Engineering Thermodynamics	4
	Network Theory	4
	Electrical Measurement and Measuring Instruments	4
	Analog Electronics	4
	Year 2	
	Electrical Machines-I	5
	Digital Electronics and Circuits	4
	Design of Electronic Circuits	4
	Control Systems	4
	Humanities and Social Sciences Elective Course	3
	Engineering Analysis and Design	3
	Electrical and Electronic Materials	4
	Electrical Machines-II	5
	Microprocessors and Peripheral Devices	5

	Power Transmission and Distribution	4
	Applied Instrumentation	4
	Year 3	
	Power System Analysis & Control	4
	Power Electronics	4
	Advanced Control Systems	5
	Departmental Elective Course-I	4
	Open Elective Course	3
	Technical Communication Industry Oriented Problem	3
	Electric Drives	4
	Protection & Switchgear	4
	General Viva	3
	Departmental Elective Course-II	4
	Management Studies Elective Course	3
	Minor Specialization Course - I Departmental Honour Course - I	4
	Year 4	
	Departmental Elective Course-III	4
	Departmental Elective Course-IV	4
	Minor Specialization Course -II Departmental Honour Course - II	4
	Minor Specialization Course -III Departmental Honour Course - III	4
	Training Seminar	2
	B.Tech. Project (Contd.)	8
	Minor Specialization Course-IV Departmental Honour Course - IV	4
	Minor Specialization Course-V Departmental Honour Course - V	4

List of Departmental Electives Departmental Elective Courses for Undergraduate Students in Category-I	Credit
Artificial Neural Networks	4
Digital Image Processing	4
Digital Design with VHDL	4
Digital Control Systems	4
Digital Signal Processing	4
Signals and Systems	4
Advanced Microprocessors and Interfacing	4
Data Structures	4
Single Chip Microcontroller and Its	4

Applications	
Embedded Systems	4
Optimization Techniques	4
Fuzzy Logic Systems	4
Utilization and Traction	4
Digital Signal Processors	4
-	

M.Tech. CORE Courses Open to Undergraduate Students as Departmental Electives in Category-II	Credit
Advanced Industrial and Electronic Instrumentation	4
Biomedical Instrumentation	4
Intelligent Sensors and Instrumentation	4
Advanced Power Electronics	4
Analysis of Electrical Machines	4
Advanced Electric Drives	4
FACTS Devices	4
Computer Aided Power System Analysis	4
Power System Operation and Control	4
Distribution System Analysis and Operation	4
EHV AC Transmission Systems	4
HVDC Transmission Systems	4
Advanced Linear Control Systems	4
Advanced System Engineering	4
Non Linear and Robust Control	4

Departmental Elective Courses for Undergraduate Students in Category-II	Credit
Process Instrumentation and Control	4
Noise and Interference in Instrumentation	4
Power System Instrumentation	4
Measurement Errors and Statistical Analysis	4
Telemetry and SCADA	4
Virtual Instrumentation	4
Advances in Signal and Image Processing	4
Ultrasonic and Laser Instrumentation	4
Medical Imaging	4
Bioelectric Signals and Processing	4
Computer Applications in Medical Engineering	4

Microprocessor Based Medical Instruments	4
Hospital Informatics and safety Measures	4
Clinical Engineering	4
Microcontroller and Its Applications to Power Converters	4
DSP Controlled Electric Drives	4
Electric Drives for Hybrid Vehicles	4
Design of Electric Drives	4
Instrumentation in Electric Drives	4
Drive System in Electric Traction	4
Control Techniques in Power Electronics for AC Drives	4
Pulse Width Modulation for Power Converters	4
Enhanced Power Quality AC-DC Converters	4
Switch Mode Power Supply	4
Power Quality Improvement Techniques	4
CAD of Power Apparatus	4
Selected Topics in Machines and Transformers	4
Synchronous Machines and System Stability	4
Special Machines	4
Testing and Commissioning of Electrical Equipment	4
High Voltage Technique	4
Power System Planning	4
Power System Harmonics	4
Flexible AC Transmission Systems	4
Wind Energy	4
Relaying and Switchgear	4
Distribution System Automation	4
Power System Reliability	4
Digital Protection of Power Systems	4
Power System Dynamics	4
Substation Automation	4
Power System Deregulation	4
Machine Learning	4
Wide Area System Monitoring Control	4
Advanced Digital System Design	4
Robotics	4
System Reliability	4
Stochastic Systems	4
Optimal Systems	4
Operation Research	4
Interval Systems	4
Modeling and Simulation	4
Advanced Computer Controlled Systems	4
Data Structure	4
Graph Theory and Applications	4

List of Open Elective Courses (OEC)	Credit
Artificial Neural Network and Applications	3
Digital Signal Processing	3
Digital Image Processing	3

Departmental Elective Courses

Category-I: Common Electives

Artificial Neural Networks
Digital Image Processing
Digital Design with VHDL
Digital Control Systems
Digital Signal Processing
Signals and Systems
Advanced Microprocessors and Interfacing
Data Structures
Single Chip Microcontroller and Its Applications
Embedded Systems
Optimization Techniques
Fuzzy Logic Systems
Utilization and Traction
Digital Signal Processors
a) Power Apparatus and Electric Drives

Category-II: Research Area Specific Courses

Analysis of Electrical Machines
Advanced Electric Drives
Electric Drives for Hybrid Vehicles
Design of Electric Drives
Instrumentation in Electric Drives
Drive System in Electric Traction
CAD of Power Apparatus
Selected Topics in Machines and Transformers
Synchronous Machines and System Stability
Special Machines
Testing and Commissioning of Electrical Equipment
b) Power Electronics and Electric Drives
Advanced Power Electronics
Advanced Electric Drives
FACTS Devices
Microcontroller and Its Applications to Power Converters
DSP Controlled Electric Drives
Electric Drives for Hybrid Vehicles
Control Techniques in Power Electronics for AC Drives

Pulse Width Modulation for Power Converters
Enhanced Power Quality AC-DC Converters
Switch Mode Power Supply
Power Quality Improvement Techniques
Advanced Computer Controlled Systems
c) Transmission and Distribution
Computer Aided Power System Analysis
Distribution System Analysis and Operation
Power System Operation and Control
EHV AC Transmission Systems
HVDC Transmission Systems
High Voltage Technique
Power System Planning
Flexible AC Transmission Systems
Wind Energy
Solar Energy
Biogas plant
Relaying and Switchgear
Distribution System Automation
Power System Reliability
Digital Protection of Power Systems
Power System Dynamics
Substation Automation
Power System Deregulation
FACTS Devices
Power Quality Improvement Techniques
Wide Area System Monitoring Control
d) Instrumentation and Signal Processing
Advanced Industrial and Electronic Instrumentation
Biomedical Instrumentation
Intelligent Sensors and Instrumentation
Process Instrumentation and Control
Noise and Interference in Instrumentation
Power System Instrumentation
Measurement Errors and Statistical Analysis
Telemetry and SCADA
Virtual Instrumentation
Advances in Signal and Image Processing
Ultrasonic and Laser Instrumentation
Medical Imaging
Bioelectric Signals and Processing
Computer Applications in Medical Engineering
Microprocessor Based Medical Instruments
Hospital Informatics and safety Measures
Clinical Engineering
e) Systems & Control
Advanced Linear Control Systems

Advanced System Engineering
Non Linear and Robust Control
Machine Learning
Wide Area System Monitoring Control
Advanced Digital System Design
Introduction Robotics
System Reliability
Stochastic Systems
Optimal Systems
Operation Research
Interval Control Systems
Modeling and Simulation
Advanced Computer Controlled Systems
Graph Theory and Applications
Courses for Minor Specialization in Electrical Engineering
Electrical Measurement and Measuring Instruments
Electrical Machines -I
Electrical Machines-II
Power Transmission and Distribution
Applied Instrumentation
Control Systems
Electric Drives
Power Electronics
Protection and Switchgear
Advanced Control Systems

BSC: Electrical Engineering

Electrical Engineering		
	Year 1	Credits
	General Chemistry for Engineers	3
	Introduction to Experimentation 1	1
	Expository Writing	3
	Engineering Orientation	1
	Calculus I Math/Physics	1
	Analytical Physics IA	2
	Intro to Computers for Engineers	3
	Engineering Mechanics	3
	Calculus II Math/Phy	4
	Introduction to Microeconomics	3

	Year 2	
	Principles of E.E. I Lab 1	3
	Principles of E.E. I Lab 2	1
	Digital Logic Design	3
	Digital Logic Design Lab	1
	Multivariable Calculus	4
	Analytical Physics IIA	3
	Analytical Physics II Lab	2
	Principles of Electrical Engg. II	3
	Principles of E.E. II Lab	1
	Probability & Random Processes	3
	Programming Methodology I	3
	Programming Method. I. Lab	1
	Differential Equations for Engg/Phy	4
	Year 3	
	Computer Arch.& Asmb. Lang	3
	Computer Arch. Lab	1
	Linear Systems & Signals	3
	Linear Systems & Signals Lab	1
	Electronic Devices	3
	Electronic Devices Lab	1
	Hum/Soc elective	3
	Technical elective	3
	Discrete Mathematics	3
	Digital Signal Processing	3
	Digital Signal Processing Lab	1
	Professionalism/Ethics	
	Digital Electronics	3
	Digital Electronics Lab	1
	Year 4	
	Electrical elective	3
	Electrical elective	3
	Science Math Engg elective	3
	Technical elective	3
	Design elective	3
	Electrical elective	2
	General elective	1
	Hum/Soc elective	3

Departmental Elective Courses

Programming Methodology II
Virtual Reality
Electromagnetic Fields
Sustainable Energy: Choosing among options
Electrical Energy Conversion
Introduction to Automatic Control Theory
Introduction to Control System Design
Wireless Communication Systems
Computer and Communication Networks
Introduction to Information and Network Security
Introduction to Computer Systems
Communication System Design
Digital System Design
Digital Signal Processing Design
Introduction to Parallel and Distributed Programming
Software Engineering
Mobile App Engineering and User Experience
Network-Centric Programming (Usually offered only in alternate years)
Power Electronics
Analog Electronics
RF Integrated Circuits
Physical Electronics
Opto-Electronic Devices
Microelectronic Processing
Robotics and Computer Vision
Introduction to Computer Graphics (
Electromagnetic Waves
Deep Submicron VLSI Design for Electrical and Computer Engineering
Topics in Electrical and Computer Engineering
Introduction to Imaging and Multimedia
Principles of Information and Data Management
Design and Analysis of Computer Algorithms
Distributed Systems: Concepts and Design
Modeling and Simulation of Continuous Systems
Introduction to Artificial Intelligence
Engineering Economics
Intellectual Property
Linear Programming
Energy Systems Modeling and Optimization
Electronic Optical and Magnetic Properties of Materials
Solar Cell Design and Processing
Introductory Linear Algebra
Advanced Calculus I
Advanced Calculus II
Introduction to Abstract Algebra I

Introduction to Abstract Algebra II
Linear Optimization
Topics in Applied Algebra
Numerical Analysis I
Numerical Analysis II
Introduction to Theory of Functions of a Complex Variable
Elementary Partial Differential Equation
Stochastic Models in Operations Research
Combinatorics
Mathematical Theory of Probability II
Thermodynamics
Alternative Energy Systems (Credit cannot be given for both 332:402 and 650:474)
Heat Transfer
Modern Physics I
Modern Physics II
Thermal Physics I
Thermal Physics II
Introductory Solid State Physics
Intermediate Quantum Mechanics
Fluid and Plasma Phenomena
Mathematical Physics
Regression Methods
Applied Multivariate Analysis
Basic Applied Statistics
Science Math and Engineering Elective: A
Electromagnetic Fields
Wireless Communication Systems
Computer and Communication Networks
Introduction to Information and Network Security
Introduction to Parallel and Distributed Programming
Mobile App Engineering and User Experience
Network-Centric Programming
Robotics and Computer Vision
Intro to Computer Graphics
VLSI Design
Deep Submicron VLSI Design for Electrical and Computer Engineering
Introduction to Imaging and Multimedia
Principles of Information and Data Management
Design and Analysis of Computer Algorithms
Digital Signal Processing
Sustainable Energy: choosing among options
Introduction to Automatic Control Theory
Introduction to Digital Signal Processing Design
Analog Electronics
Physical Electronics
Opto-Electronic Devices
Electromagnetic Waves
Introductory Linear Algebra

Linear Algebra
Numerical Analysis and Computing
Distributed Systems: Concepts and Design
Modeling and Simulation of Continuous Systems
Introduction to Artificial Intelligence
Advanced Web Applications: Design and Implementation
Optoelectronics (Required course, Fall Semester of Senior year)
Electromagnetic Waves

BSC: Integrated Geological Technology Engineering

INTEGRATED GEOLOGICAL TECHNOLOGY		
	Year 1	Credits
	Mathematics-I	4
	Mechanics	4
	Introduction to Environmental Studies	3
	Communication Skills (Basic)	2
	Communication Skills (Advance)	
	Ethics and Self Awareness	2
	Introduction to Earth Sciences	2
	Computer Programming	4
	General Chemistry-III	4
	Numerical Methods	4
	Physical Geology	4
	Crystallography and Mineralogy	4
	Engineering Thermodynamics	4
	Year 2	
	Material Science	4
	Basic Petrology	4
	Paleontology	4
	Structural Geology-I	4
	HSS Elective Course*	3
	Engineering Hydrology	4
	Sedimentology	4
	Stratigraphy	4
	Igneous Petrology	4
	Field Training-I	4
	Elective Course	3
	Year 3	

	Structural Geology-II	4
	Metamorphic Petrology	4
	Economic Geology	4
	Departmental Elective Course-I	4
	Open Elective Course	3
	Technical Communication (Advanced)	2
	Mineral Exploration	4
	Ore Geology	4
	Geomorphology	3
	Field Training-II	4
	Departmental Elective Course-II	4
	Year 4	
	Principles of Remote Sensing	2
	Principles of Geographic Information Systems	3
	Hydrogeology	3
	Engineering Geology	3
	Petroleum Geology	3
	Seminar-I	2
	Geophysical Prospecting	4
	Well Logging	4
	Plate Tectonics	3
	Departmental Elective Course-III	4
	Departmental Elective Course-IV	4
	Year 5	
	Comprehensive Viva Voce	2
	Department Elective Course-V	4
	Department Elective Course-VI	4
	DEC	
	Seminar-II	2
	Dissertation	18

DEPARTMENTAL ELECTIVE COURSE-I (DEC-I)
Carbonate Sedimentology
Rock and Soil Mechanics
DEPARTMENTAL ELECTIVE COURSE-II (DEC-II)
Advanced Stratigraphy and Facies Modelling
Basin Analysis
Applied Geochemistry
DEPARTMENTAL ELECTIVE COURSE-III & IV

(DEC-III & IV)
Mineral Economics
African Mineral Deposits
Precambrian Tectonics
Advanced Remote Sensing
Advanced Geographic Information Systems
Advanced Engineering Geology
Marine Geology
DEPARTMENTAL ELECTIVE COURSE-V & VI (DEC-V & VI)
Mineral Technology
Isotope Geology
Coal Geology
Micropaleontology and Paleoceanography
Global Environment
Shear Zone Metasomatism
Theory and application of Mohr Circle
Advance stress and strain analysis
Quaternary Geosciences
Fluid Inclusions: Methods & Applications
Structural Geology for Petroleum Exploration

BSC Applied Mathematics

Applied Mathematics		Credits
	Year 1	
	Mathematics-1	4
	Mechanics	4
	Introduction to Environmental Studies	3
	Communication Skills (Basic)	2
	Communication Skills (Advance)	2
	Ethics and General Awareness	2
	Introduction to Mathematical Sciences	2
	Introduction to Computer Programming	4
	Numerical Methods	4
	Electromagnetic Theory	4
	Linear Algebra	4
	Real Analysis I	4
	Data Structures	4
	Fundamental of Electronics	4
	Year 2	

	Solid Mechanics	4
	Complex Analysis I	4
	Discrete Mathematics	4
	Ordinary and Partial Differential Equations	4
	Design and Analysis of Algorithms	3
	HSS Elective Course	4
	Fluid Mechanics	4
	Transform Techniques	4
	Database Management System	4
	Graph Theory	4
	Number Theory	4
	Year 2	
	Abstract Algebra I	4
	Mathematical Statistics	4
	Linear Programming	4
	Department Elective I	3
	Management Elective Course	3
	Technical Communication	2
	Math. Modeling & Simulation	4
	Theory of Computation	4
	Department Elective II	3
	Open Elective-I	3
	Minor Specialization Course	3
	Year 4	
	Theory of Ordinary Differential Equations	3
	Real Analysis II	3
	Topology	3
	Statistical Inference	3
	Department Elective III	3
	Open Elective II	3
	Minor Specialization Course	3
	Advanced Numerical Analysis	4
	Abstract Algebra II	3
	Nonlinear Programming	4
	Theory of Partial Differential Equations	3
	Complex Analysis II	3
	Department Elective IV	3
	Minor Specialization Course	3
	Year 5	
	MA-601	

	Fluid Dynamics	3
	Tensors and Differential Geometry	3
	Functional Analysis	3
	Seminar	2
	Department Elective V	3
	Department Elective VI	3
	Dissertation	12
	Minor Specialization Course	3
	Minor Specialization Course	3

BSC: Production and Industrial Engineering

Production and Industrial Engineering		Credits
	Year 1	
	Mathematics-I	4
	Mechanics	4
	Introduction to Environmental Studies	3
	Communication Skills (Basic)	2
	Communication Skills (Advance)	
	Ethics and Self Awareness	2
	Introduction to Production and Industrial Engineering	2
	Programming and Data Structure	4
	Probability and Statistics	4
	Electromagnetic Theory	4
	Manufacturing Technology-I	4
	Engineering Drawing	4
	Fluid Mechanics	4
	Material Science	4
	Year 2	
	Solid Mechanics	4
	Manufacturing Technology-II	4
	Thermal Engineering	4
	Theory of Machines	4
	Engineering Analysis and Design	4
	Elective	3
	Electrical Science	4
	Production Planning and Control-	4
	Machine Design	4
	Engineering Economy	4
	Theory of Production Processes	4
	Elective Course	3

	Year 3	
	Technical Communication	2
	Theory of Production Processes - II	4
	Operations Research	4
	Work System Design	4
	Departmental Elective Course-I	4
	Management Studies /Open Elective Course*	3
	Industry Oriented Problem/Case Study/ Lab based project/ Practical Problem	4
	Quality Management	4
	Operations Management	4
	Departmental Elective Course-II	4
	Minor Specialization Course - I/	4
	Departmental Honours Course - I	
	Management Studies /Open Elective Course*	3
	Year 4	
	B.Tech. Project 1	4
	Departmental Elective Course-III	4
	Departmental Elective Course-IV	4
	Minor Specialization Course- II/	4
	Departmental Honours Course - II	4
	Minor Specialization Course- III/	4
	Departmental Honours Course - III	4
	Training Seminar	2
	B.Tech. Project 2	8
	Departmental Elective Course-V	4
	Departmental Elective Course-VI	4
	Minor Specialization Course- IV/	
	Departmental Honours Course - IV	4
	Minor Specialization Course- V/	4
	Departmental Honours Course - V	

BSC: Material Science

Material Science		
	Years 1	Credits
	Chemistry I for Engineers	3
	Chemistry II for Engineers	3
	Intro to Experimentation	1
	Calculus II Math/Phys	4
	Expository Writing	3
	Analytical Physics IB	2

	Calculus I Math/Phys	4
	Intro Computers for Eng'g	3
	Analytical Physics IA	2
	Eng Mechanics:Statics	3
	Engineering Orientation Lec	1
	Hum/SocSci Elective	3
	Hum/SocSci Elective	3
	Years 2	
	Multivariable Calculus	4
	Differential Equations	4
	Analytical Physics IIA	3
	Materials Processing	3
	Analytical Physics IIA Lab	1
	Mat. Thermodynamics	4
	Statistics	3
	Physics of Materials	3
	Intro to MSE	3
	Laboratory I	2
	Crystal Chem & Struct	3
	Year 3	
	Materials Microprocessing	3
	Microeconomics	3
	Kinetics of Mat'l Processing	3
	EOM Properties of Mat'l	3
	Characterization of Materials	3
	Laboratory III	2
	Strength of Materials	3
	Senior MSE Lab I	3
	Laboratory II	2
	Elective (Dept/Tech)	3
	MSE Eng Design I	3
	Elective (Dept/Tech)	3
	Year 4	
	Senior MSE Lab II	3
	MSE Seminar	1
	Elective (Dept/Tech)	3
	MSE Eng Design I	3
	Elective (Dept/Tech)	3
	MSE Seminar	1
	Hum/SocSci Elective	3

	(300+)	
	Elective (Dept/Tech)	3
	General Elective	3
	Elective (Dept/Tech)	3
	Elective (Dept/Tech)	3
	Hum/SocSci Elective (300+)	3

Electives

Aside from the Humanities/Social Science electives, the Materials Science and Engineering (MSE) program contains eight elective slots (4 Department, 3 Technical, and 1 General) that can be used to tailor your degree. You can concentrate in specific areas of MSE, dual major, or prepare for specialized professional training after graduation. Talk to us about your interests and we will help you identify the best possibilities. See Professor Wenzel for advice.

Department Electives (4)

Take two from this list...

Glass Engineering

Ceramics Engineering

Materials Science and Engineering of Polymers

Physical Metallurgy

...and two from this list:

- Glass Engineering
- Introduction to Nanomaterials
- Structural, Mechanical & Chemical Applications of Nanostructures & Nanomaterials
- Photonic, Electronic & Magnetic Applications of Nanostructures & Nanomaterials
- Ceramics Engineering
- Materials Science & Engineering of Polymers
- Physical Metallurgy
- Solar Cell Design & Processing
- Mechanical Properties of Materials
- Biological Applications of Nanostructures & Nanomaterials
- Materials Science & Engineering: Venture Analysis
- Physical & Chemical Properties of Glass
- Optical Materials
- Electrochemical Materials and Devices

Technical Electives (3)

The remaining three technical electives are selected from the following list. If you wish to take a course not on this list (e.g. graduate courses or courses in other

fields), apply to Professor Wenzel in writing explaining your rationale.
• Biological Sciences
• Cell Biology & Neurosciences
• Chemistry
• Computer Sciences
• Genetics & Microbiology
• Geological Sciences
•Mathematics
• Molecular Biology & Biochemistry
• Physics
• Statistics
• Biochemistry
• Biotechnology
• Bio-resource Engineering
• Environmental Sciences
• Food Sciences
• Marine Sciences
• Meteorology
• Biomedical Engineering
• Chemical & Biochemical Engineering
• Civil & Environmental Engineering
• Electrical & Computer Engineering
• Packaging
• Industrial Engineering
• Materials Science and Engineering
• Mechanical & Aerospace Engineering
Statistics
One of the following courses must be taken to satisfy the statistics requirement:
• Statistics I
• Intermediate Statistical Analysis
• Basic Statistics for Research
• Introduction to Experimental Design
The MSE curriculum is quite flexible and permits double majoring in certain instances for students with AP credits or transfer credits.
• General Biology I
• General Biology II
• Organic Chemistry I
• Introduction to Molecular Biology Research
• Introduction to Biomaterials
• Biological Applications of Nanomaterials(3)
Electronic and Optical -- Faculty coordinators
• Photonic, Electronic and Magnetic Applications of Nanostructures and Nanomaterials
• Solar Cell Design and Processing
• Solar Technology Venture Analysis
• Optical Materials
• Opto-Electronic Devices
• Modern Optics

• Introductory Solid State Physics
Energy Conversion and Storage – Faculty coordinators
• Energy Technology and its Environmental Impact
• Solar Cell Design and Processing
• Sustainable Energy: Choosing Among Options
• Electrochemical Devices
• Electronic Devices (pre-requisite is Principles of Electrical Engineering)
• Power Electronics (pre-requisite is Electronic Devices)
• Introduction to Nanomaterials
• Photonic, Electronic, and Magnetic Properties of Nanomaterials.
• Biological Applications of Nanomaterials
• Introduction to Nanoscience and Nanotechnology
• Structural, Mechanical, and Chemical Properties of Nanomaterials.
• Organic Chemistry I
• Materials Science and Engineering of Polymers
• Polymer Science and Engineering
• Introduction to Packaging
• Polymer Engineering or Science Elective (TBD)
Packaging Materials
• Glass Engineering
• Polymer Engineering
• Physical Metallurgy
• Intro to Packaging
• CAD in Packaging
• Other Packaging Engineering or Science Elective (TBD)

BSC: Tech Metallurgical and Materials Engineering

B.Tech. (Metallurgical and Materials Engineering)		Credits
	Year	1
	Mathematics-I	4
	Modern Physics	4
	Introduction to Environmental Studies	3
	Communication Skills (Basic)	2
	Communication Skills (Advance)	
	Ethics and Self Awareness	2
	Introduction to Metallurgical and Materials Engineering	2
	Computer Programming -	4
	General Chemistry-II	4
	Mathematical Methods	4

	Metallurgical Thermodynamics and kinetics	4
	Structural Metallurgy	4
	Metallography Lab	2
	Mechanical Engineering Drawing	4
	Year 2	
	Electrical Science	4
	Transport Phenomena	4
	Phase Transformation and Heat Treatment	4
	Mechanical Behaviour of Materials	4
	Electrical and Electronic Materials	4
	HSS Elective course*	3
	Fundamentals of Electronics	4
	Metal Casting and Joining	4
	Non-ferrous Metallurgy	4
	Engineering Polymers and Composites	4
	Engineering Analysis and Design	4
	HSS Elective course*	3
	Year 3	
	Mechanical Working of Metals	4
	Iron and Steel Making	4
	Materials Testing Lab	2
	Materials Characterization	4
	Departmental Elective Course - I	4
	Management Studies / Open Elective Course	4
	Technical Communication	2
	Industry Oriented Problem/ Case Study/ Lab based project/ Practical Problem	4
	Environmental Degradation of Materials	4
	Ceramics and Metal Powder Processing	4
	Departmental Elective Course - II	
	Minor Specialization Course - I/	
	Departmental Honours Course - I	4
	Management Studies / Open Elective Course	3
	-	
	Year 4	
	B.Tech. Project 1	4
	Departmental Elective Course - III	4
	Departmental Elective Course - IV	4
	Minor Specialization Course - II/	
	Departmental Honours Course - II	4
	Minor Specialization Course - III/	4
	Departmental Honours Course - III	
	Practical Training/ Internship	2
	B.Tech. Project 2	8

	Departmental Elective Course - V	4
	Departmental Elective Course - VI	4
	Minor Specialization Course - IV/	
	Departmental Honours Course - IV	4
	Minor Specialization Course - V/	4
	Departmental Honours Course - V	

Category I	
Principles of Solidification	
Any two, designated as DEC - I (Autumn) and DEC - II (Spring)	
Non-destructive Testing (MT)	
Semiconductor Materials and Devices	
Physics of Nanosystems	
Functional Materials and Devices	
Science, Technology and Society	
Psychological Basis of Behaviour	
Gender and Cultural Studies	
Category II	
Thin Film Technology	
Micro-fabrication Technology	
Microsensor, MEMS and Smart Devices	
High Temperature Materials	
Electro-Ceramics	
Materials for Renewable Energy	
Powder Metallurgy	
Principles of Materials Selection	
Failure Analysis	
Corrosion Protection Methods	
Physical Metallurgy of Light Metals and Alloys	
Crystallographic Texture	
Energy Storage Materials	
DEPARTMENTAL HONOURSS COURSES	
X-ray Diffraction Techniques	
Electron Microscopy	
Nanomaterials and Applications	
Biomaterials	
Tribology of Engineering Materials	
MINOR SPECIALIZATION COURSES	
Structural Metallurgy	
Phase Transformation and Heat Treatment	
Metal Casting and Joining	
Mechanical Behaviour of Materials	
Mechanical Working of Metals	
Environmental Degradation of Materials	
Iron and Steel Making	
Ceramics and Metal Powder Processing	
Engineering Polymers and Composites	

Non Destructive Testing	
-------------------------	--

BSC Polymer engineering

Polymer engineering		
	Year 1	Credit
	Mathematics-I	4
	General Chemistry	4
	Introduction to Environmental Studies	3
	Communication skills (Basic)	2
	Communication skills (Advanced)	
	Ethics and Self-Awareness	2
	A Introduction to Polymer Engineering 2	2
	Introduction to Computer Programming	4
	Mathematics-II	4
	Applied Physics	4
	Structure and Properties of Polymers	4
	Material and Energy Balance	4
	Fluid Mechanics	4
	Engineering Thermodynamics	4
	Year 2	Credit
	Materials Science	4
	Polymer Chemistry	4
	Polymer Blends and Composites	4
	Engineering Analysis and Design	3
	Heat Transfer	4
	Elective Course 1	3
	Electrical Science	4
	Polymer Properties and Characterization	4
	Polymer Rheology	4
	Chemical Reaction Engineering	4
	Mass Transfer	4
	Elective Course 2	3
	Year 3	
	Polymer Product Technology	4
	Polymer Reaction Engineering	4
	Polymer Processing	4
	Departmental Elective-I	4
	Courses from Management Studies /Open elective course*	3
	Technical Communication	2
	Lab Based Project	4
	Rubber Material and Chemistry	4
	Process System Analysis and Control	4

	Departmental Elective-II	4
	Minor Specialization Course-I/Departmental Honours Course-I	4
	Departmental Honours Course-I	
	Courses from Management Studies /Open elective course*	3
	Year 4	
	B. Tech. Project 1	4
	Departmental Elective-III	4
	Departmental Elective-IV	4
	Minor Specialization Course-II/Departmental Honours Course-II	4
	Minor Specialization Course-III/Departmental Honours Course-III	4
	Training and Seminar	2
	B. Tech. Project 2	8
	Departmental Elective-V	3
	Departmental Elective-VI	
	Minor Specialization Course-IV/Departmental Honours Course-IV	4
	Minor Specialization Course-V/Departmental Honours Course-V	4

BSC Petroleum Engineering

Petroleum Engineering		Credits
	Year 1	
	General Chemistry I	3
	Rhetoric & Composition	3
	Intro to Petroleum Engineering	1
	Calculus I	4
	History elective	3
	General Chemistry II	3
	General Chemistry II Lab	2
	ENGL Composition & Literature	3
	Physical Geology	4
	Calculus II	4
	Year 2	
	Fundamentals of Economics	3
	Structural Geology	4
	Differential Equations	3
	General Physics I	4

	Biology elective	3
	Statics & Mechanics	3
	Technical Writing	3
	Electrical Circuits	3
	Drilling Fluids	3
	Drilling Fluids Lab	1
	Literature elective	3
	Year 3	
	Thermodynamics	3
	Transport Phenomenon	3
	Phase Behavior	3
	Drilling Engineering	3
	Drilling Engineering Lab	1
	History or Literature elective	3
	MATH/STAT elective	3
	Industrial Economics & Finance	3
	Reservoir Fluid Flow	3
	Reservoir Fluid Flow Lab	1
	Petroleum Formation Evaluation	3
	Petroleum Formation Evaluation Lab	1
	Arts elective	3
	Year 4	
	Senior Design I	1
	Well Planning & Construction	3
	Production Engineering	3
	Production Engineering Lab	1
	Reservoir Engineering	3
	Reservoir Engineering Lab	1
	PETE/GEOL elective	3
	Senior Design II	1
	Natural Gas Engineering	3
	Imp. Petroleum Recovery	3
	Risk Analysis	3
	Well Comp; P&R	3
	PETE elective	3

BSC: Automotive Engineering

B.TECH. Automotive ENGINEERING	Year 1	
		Credi

		ts
	SOFT SKILLS	1
	CALCULUS AND SOLID GEOMETRY	3
	PHYSICS 3	3
	PHYSICS LABORATORY	2
	PRINCIPLES OF ENVIRONMENTAL Science	2
	ADVANCED CALCULUS AND COMPLEX ANALYSIS	2
	COMPLEX ANALYSIS	3
	MATERIALS SCIENCE	2
	CHEMISTRY	3
	CHEMISTRY LABORATORY	2
	ENGINEERING MECHANICS	3
	P ARTIFACT DISSECTION	
	VALUE EDUCATION	1
	PROGRAMMING USING MATLAB	2
	BIOLOGY FOR ENGINEERS	2
	BASIC CIVIL ENGINEERING	2
	BASIC MECHANICAL ENGINEERING	2
	BASIC ELECTRICAL ENGINEERING	2
	BASIC ELECTRONICS ENGINEERING	2
	WORKSHOP PRACTICE	2
	E ENGINEERING GRAPHICS	4
	Year 2	
	GERMAN LANGUAGE PHASE I /	2
	FRENCH LANGUAGE PHASE I/	2
	JAPANESE LANGUAGE PHASE I /	2
	SPANISCH LANGUAGE PHASE I /	2
	MANDARIN LANGUAGE PHASE I	2
	FOURIER SERIES, PARTIAL	3
	DIFFERENTIAL EQUATIONS AND IST APPLICATIONS	3
	MANUFACTURING TECHNOLOGY	3
	FLUID MECHANICS	2
	THERMODYNAMICS & ENGINEERING	3
	INSTRUMENTATION FOR AUTOMOBILE ENGINEERS	3
	FLUID DYNAMICS LABORATORY	1
	MANUFACTURING AND ASSEMBLY	3
	DRAWING	3
	MANUFACTURING LABORATORY FOR AUTOMOBILE ENGINEERS	3
	GERMAN LANGUAGE PHASE II /	2
	FRENCH LANGUAGE PHASE II/	2
	JAPANESE LANGUAGE PHASE II /	2
	SPANISCH LANGUAGE PHASE II /	2
	MANDARIN LANGUAGE PHASE II	2
	NUMERICAL METHODS	4
	MECHANICS OF SOLIDS	3
	MATERIALS TECHNOLOGY	3
	MACHINES AND MECHANISMS	3

	AUTOMOTIVE ENGINES	3
	STRENGTH OF MATERIALS LABORATORY	1
	MATERIALS TECHNOLOGY	3
	B PROBABILITY AND STATISTICS	4
	DESIGN OF AUTOMOTIVE COMPONENTS	3
	AUTOMOTIVE CHASSIS	2
	AUTOMOTIVE ENGINE SYSTEMS	3
	ENGINE AND FUEL TESTING LABORATORY	3
	AUTOMOTIVE COMPONENTS LABORATORY	3
	INDUSTRIAL TRAINING I	3
	Year 3	
	AUTOMOTIVE ELECTRICAL AND ELECTRONIC SYSTEMS	3
	METROLOGY AND QUALITY CONTROL	3
	AUTOMOTIVE TRANSMISSION	2
	METROLOGY AND QUALITY CONTROL LABORATORY	1
	AUTOMOTIVE ELECTRICAL AND ELECTRONICS LABORATORY	1
	ELECTRONICS LABORATORY	1
	Elective III	3
	Open Elective II	
	Open Elective III	3
	ALTERNATIVE FUELS AND POLLUTION CONTROL	2
	VEHICLE DYNAMICS	3
	VEHICLE BODY ENGINEERING AND AERODYNAMICS	3
	VEHICLE PERFORMANCE AND TESTING	3
	VEHICLE DYNAMICS LABORATORY	1
	VEHICLE TESTING LABORATORY	1
	DESIGN FOR SAFETY AND COMFORT	3
	ENGINE AND DRIVE LINE DESIGN	3
	NEW PRODUCT DEVELOPMENT	3
	AUTOMOTIVE SYSTEM DESIGN	3
	COMPUTER AIDED VEHICLE DESIGN	3
	FINITE ELEMENT ANALYSIS	3
	OPTIMIZATION FOR ENGINEERING DESIGN	3
	QUALITY CONTROL AND RELIABILITY ENGINEERING	3
	ENGINEERING MANUFACTURING	3
	PRODUCT DEVELOPMENT AND COSTING	3
	MODERN MANUFACTURING PROCESSES	3
	COMPUTER INTEGRATED MANUFACTURING	3
	ROBOTICS AND ROBOT APPLICATIONS	3
	THEORY AND DESIGN OF JIGS AND FIXTURES	3
	NON-DESTRUCTIVE TESTING METHODS	3
	COMPOSITE MATERIALS AND STRUCTURES	3
	CAD/CAM TECHNOLOGY IN AUTOMOTIVE ENGINEERING	3
	AUTOMOTIVE ENGINEERING WELDING AND JOINING TECHNOLOGIES	3
	PRODUCT LIFE CYCLE MANAGEMENT AM-Engg	3

Major Requirements	Credits
Manual Transmission-Drivelines	4
Automotive Brake Systems	4
Auto Electricity - Electronics	4
Automotive Engines	4
Suspension-Steering-Alignment Serv	4
Electronic Fuel Mgmt Systems	4
Service Area 1	6
Chassis Electrical-Electronics	4
Engine Air Flow Analysis	3
Dynamometer Testing	3
Automotive Fuels and Lubes	3
Emissions Systems	3
Alternate Fuel and Vehicle Sys	3
Internship	4
Intro to Material Science	4
Material Selection Metals	3
Kinematics of Mechanisms	2
Metrology	3
Major Requirements	
Major	
Technical Related	
Quality Science Statistics	3
Statistical Proc Engineering	3
Design of Experiments	3
Model - Prototype Development	2
Applied Fluids - Thermodynam	3
Advanced Solid Modeling CAD	2

BSC: Food Technology Engineering

Food_Technology		Credits
	Year 1	
	Mathematics 1	2
	Introduction to Animal Agriculture	3
	Agricultural Botany and Plant Physiology	3
	Plant Microbiology	3
	Introductory Food Science & Technology	2
	Biochemistry 1	3
	Introductory Micro-economics	3
	Principles of Human Nutrition	2
	Introductory Food Science	2
	Introduction to Computer Application	2
	Principles of Agriculture and introductory	3

	Ag	
	Introduction to Entomology & Nematology	3
	Introduction to Statistics	2
	Biochemistry II	3
	FSFood Chemistry 1	3
	Food Microbiology 1	3
	Physical Properties of Food	3
	Introductory Food Science and human Nutrition	3
	Introductory Macro-economics	3
	Agricultural Extension/Educ Practical Skills	2
	Food Technology & Nutritional Practical Skills 3	3
	Food Technology and Nutrition	3
	Molecular Biology	3
	Animal Production	3
	Crop production Practical Skills	3
	Mathematics 2	2
	YEAR 2	
	Basic Electrical Tech. & Mechanics	3
	Fish Farming Biometrics	3
	Introduction to Agric. Extension	2
	Food Engineering I	3
	Food Microbiology II	3
	Postharvest Technology	3
	Production Economics	3
	Introductory Livestock Management	3
	Principles of Food Preservation	3
	Food Processing and Preversation	3
	Rural Sociology	2
	Dietetics	2
	Food Analysis I	3
	Food Chemistry II	3
	Research Methods	2
	Sensory Evaluation	2
	Industrial Training	5
	YEAR 3	
	Poultry Nutrition and Management	3
	Dairy Production Systems	3
	Introduction to Communication and Ext. Methods	3
	Food Engineering II	3
	Poultry Management I	2
	Food Analysis	4
	Sanitation and Waste Management	3
	Community Nutrition	3
	Food Quality Assurance	3

	Cereal Chemistry and Technology	3
	Food Additives & Legislation	3
	Food Fermentation	3
	Sensory Evaluation	3
	Agricultural Communication	4
	Introduction to Communication & Ext. Methods	4
	Post-harvest Technology	2
	Packaging and Packaging Materials	3
	Food Plant Economics & Product Marketing	3
	Food Analysis	3
	Sanitation & Waste Management	3
	Food Production Development	3
	Community Nutrition	3
	Food Biotechnology	3
	Food Quality Control and Assurance	3
	Food Science for Engineers	3
	Social Research Methods 1	2
	Animal Feeds and Feeding	3
	Visual Aids and Presentations	3
	Pilot Plant Processing skills	5
	Special Project	5
	YEAR 4	
	Social Research Methods II	3
	Fruits and Vegetable Processing Technology	3
	Dairy Science and Technology	4
	Meat, Poultry & Fish Technology	4
	Roots and Tuber Crops Technology	3
	Food Product Development	3
	Dietetics	3
	Industrial Case Study	3
	Intermediate Macro Economics	2
	Poultry Management II	3
	Programme Development & Evaluation II	2
	Agricultural Communication	2
	Fats and Oils Technology 3	3
	Plantation and Estates Crop Technology	3
	Food and Nutrition Security	3
	Special Project Report	5
	Cereals, Legumes & Root Crop Technology	4
	Child Nutrition and Development	3
	Special Project Report	3
	Land Use Policy and Law	3
	Electives (At least one relevant course)	
	Agribusiness Management	3

	Agro-forestry	3
	Agricultural Communication	3
	Group Dynamics	2

BS Mechatronic

MS Specialization Areas in Computer Engineering

The course listings for the various MS *specialization areas* in Computer Engineering are given below. Please consult the ECE Department for the most current updates to these listings.

MS in Hardware and Computer Architecture

• Computer Architecture
• High-Performance Programming with Multicore and GPUs
• Introduction to Embedded Systems
• Advanced Digital Design with Verilog and FPGA
• Error-Control Codes
• VLSI Principles and Applications
• Modern Active Circuit Design
• RF/Analog IC Design Fundamentals
• Parallel Computer Architecture
• Interconnection Networks for Multicomputers
• Theory of Computer Hardware Testing
• Fault-Tolerant Computing
• Advanced Microprocessor Design
• VLSI Graduate Design Project

- RF/Analog IC Design

MS :Computer Communications and Networks

• Stochastic Processes
• Wireless Communications
• Digital Communication
• Cybersecurity
• Optimization Theory and Methods
• Discrete Stochastic Models
• Computer Communication Networks
• Networking the Physical World
• Error-Control Codes
• Wireless Communications
• Advanced Optimization Theory and Methods
• Queuing Systems
• Advanced Coding Theory
• Discrete Event and Hybrid Systems
• Randomized Network Algorithms
• Ad Hoc Networking and Computing
• Interconnection Networks for Multicomputers

MS Software

• Advanced Data Structures
• Software Systems Design

• Enterprise Client-Server Software Systems Design
• Cybersecurity
• High-Performance Programming with Multicore and GPUs
• Introduction to Embedded Systems
• Networking the Physical World
• Advanced Software for Computer Engineers
• Information-Theoretical Design of Algorithms

MS Cyber Security

• Advanced Data Structures
• Cybersecurity
• Computer Communication Networks
• Fundamentals of Cryptography
• Advanced Cryptography
• Computer Networks Security

Course in MS

Introduction to Machine Learning
Multimedia Systems
Introduction to Machine Learning
Embedded Systems and Applications
Computer Communication
Networks
Multimedia Systems
Multimedia Systems
Embedded Systems and Applications
Introduction to Machine Learning
Computer Communication Networks

Course

Mathematical Foundations of Computer Technology
Software Fundamentals for Computer Technology
Computer Architecture
Operating Systems
Minor Project
Major Project Part 1
Programme Electives (PE): General
Course# Title LTP
Major Project Part 2
Special Topics in Computers 1
Special Topics in Computers 2
Special Module in Computers
Independent Study
Programme Electives (PE): Stream: Cognitive and Intelligent Systems (CIS)
Course Title LTP
Introduction to Machine Learning
Multimedia System
Computer Communication Networks
Embedded Systems and Applications
Advanced Robotics
Information Retrieval
Intelligent Systems
LargeScale Machine Learning
Natural Computing
Signals and Systems in Biology
Systems Biology
Computational Perception and Cognition
Computational Linguistics
Big Data Systems
Cloud Computing
Neuromorphic Engineering
Neural Systems and Learning Machines
Advanced Machine Learning
Computer Vision
Digital Image Processing
Agent Technology
Swarm Intelligence
HumanComputer interface
CyberPhysical systems
Embedded Intelligence
Machine Learning for Computational Finance
Computational Neuroscience
Programme Electives (PE): Stream: Embedded Intelligent Systems (EIS)
Course# Title LTP

Introduction to Machine Learning
Embedded Systems and Applications
Computer Communication Networks
Multimedia Systems
Software Lab
Digital Systems Lab
Advanced Robotics
Analog Integrated Circuits
MOS VLSI
System on Chip Design and Test
Mixed Signal Circuit Design
Synthesis of Digital Systems
Digital Hardware Design
Advanced Digital Signal Processing
System Level Design and Modelling
Testing and Fault Tolerance
Adaptive and Learning Control
Mechatronics
Appliance Systems
Pervasive Computing
Cloud Computing
Optoelectronic Instrumentation
Embedded Intelligence
Neural Systems and Learning Machines
Energy Efficient Computing
Digital ASIC Design
IEC Laboratory I
Programme Electives (PE): Stream: Computer Communication and Networks (CCN)
Course
Computer Communication Networks
Multimedia Systems
Introduction to Machine Learning
Embedded Systems and Applications
Software Lab
Computer Networks Lab
Digital Systems Lab
Signal Theory
Network Performance Modeling and Analysis
Protocol Engineering
Internet Technologies
Network Security
Mobile Computing
Network Management
Broadband Communication Systems
Basic Information Theory
Advanced Information Theory
Telecommunication Switching and Transmission
Coding Theory

Digital Communications
Satellite Communication
Telecom Technologies
Access Networks
Wireless Communication
Wireless Communication Lab
Optical Communication Systems
Photonic Switching and Networking
Telecommunication Networks Laboratory
Advanced Telecommunication Networks Laboratory
Network Software Laboratory
Pervasive Computing
Cloud Computing
EnergyEfficient computing
Programme Electives (PE): Stream: Multimedia Information Processing (MIP)
Course
Multimedia Systems
Embedded Systems and Applications
Introduction to Machine Learning
Computer Communication Networks
Digital Image Processing
Advanced Digital Signal Processing
Computer Graphics
Human and Machine Speech Communication
Computer Vision 300
Computational Perception and Cognition
Large Scale Machine Learning
Signal Theory
Detection and Estimation Theory
Statistical Signal Processing
Basic Information Theory 3
Advanced Information Theory
Coding Theory
Programme Electives (PE): Stream: Internet Technologies (IT)
Course
Introduction to Machine Learning
Computer Communication Networks
Multimedia Systems
Embedded Systems and Applications
Digital Systems Lab
Telecommunicaiton Systems Lab
Internet Technologies
Software Lab
Computer Networks Lab
Agent Technologies
Mobile Computing
Information Retrieval

Pervasive Computing
Appliance Systems
Network Security
Smart Grid Technology
Planning and Operation of a Smart Grid
Smart Grids Lab
Broadband Communication Systems
Cloud Computing
EnergyEfficient computing

MS : Electrical engineering

Introduction to Electrical Engineering

Courses

Solid State, Microwave and Fiber Optics Lab
 Circuit Analysis Laboratory
 Digital Systems Laboratory
 Electronic Circuits Laboratory
 Signals and Systems Laboratory
 Solid-State Devices and Materials
 Circuit Analysis
 Electronic Circuits
 Electronic Circuit Design Laboratory
 Electromagnetics
 Classical Control Systems
 Introduction to Communication Systems
 Signals and Systems
 Fundamentals of Computer Systems
 History of Telecommunications: From the Telegraph to the Internet
 Introduction to Genomic Information Science and Technology
 Introduction to Semiconductor Devices
 Analog Electronic Circuits
 Communication Circuits
 Digital VLSI Circuits
 Computer Hardware Design
 Wave Transmission and Fiber Optics
 Classical Nonlinear Optics
 Fundamentals of Photonics
 Electromagnetic Devices and Energy Conversion
 Sensors, Actuators and Electromechanical Systems
 Digital Control Systems
 Communication Theory
 Wireless Communications
 Digital Signal Processing

Random Signals and Noise
 Advanced Logic Design
 Computer Architecture
 Digital Systems Design
 Digital Image Processing
 Embedded Systems
 Music Signal Processing
 Advanced Projects in Electrical Engineering
 Modeling and Performance Evaluation
 Linear Systems Theory
 Advanced Analog Integrated Circuits
 Advanced Communication Circuits
 Microwave Circuit Designs
 Advanced Digital Electronic Circuits
 Principles of Semiconductor Physics, I
 Principles of Semiconductor Physics, II
 Semiconductor Device Physics
 Classical Electromagnetic Theory
 Lightwave Devices
 Lightwave Systems
 Introduction to Control Theory
 Modern Control Theory
 Optimal Control Theory
 Control of Nonlinear Dynamic Systems
 Stochastic Models in Information Systems
 Communication Theory, I
 Communication Theory, II
 Information Theory
 Algebraic Coding Theory
 Computer Communications Networks, I
 Computer Communications Networks, II
 Topics in Modeling and Analysis of Random
 Phenomena
 Speech and Audio Processing and Recognition
 Visual Information Systems
 Advanced Digital Signal Processing
 Topics in Signal Processing
 Topics in Electrical and Computer Engineering
 Device Nanofabrication
 Wireless and Mobile Networking, I
 Wireless and Mobile Networking, II
 Advanced Topics in Control Theory

Railway Track & Structures Engineering (BSc, MSc, PhD)

The following SRE laboratories are
 employed for education and research by the
 Railway Track

for education and research by the Railway
Track
& Structures Department staff and
students:

- Track Components. For static and dynamic tests on the track, sleepers and fastenings
- Track Materials. For tests on various track

materials, specially concrete and concrete sleepers.

- Track Substructures. For different tests on

mechanical and physical characteristics of the ballast.

- Soil and Rock Mechanics. For standard tests

on the physical and mechanical properties of

soil and rock.

- Track Maintenance Workshop. Equipped

with different machines and devices for rail welding and maintenance of tracks.

- Route Design, Railway
- Substructure, Railway
- Track Mechanics, Tunneling,
- Track Maintenance,
- Ballast Mechanics,
- Railway Substructures,
- Railway Bridges

MSC :Railway Transportation

- Train scheduling
- Traffic management and control
- Maintenance planning
- Railway projects management
- Railway systems analysis

MSC:Electric Railways Engineering

- AC and DC Traction Drive Control
- Traction Substation Analysis & Design
- Overhead Contact System
- Modern Control Systems
- SCA DA
- Neuro-Fuzzy Control

MSC Railway Safety

This program two-year master program was started in 2005, in collaboration with the Birmingham University and A.D. Little company in England.

The graduates would be qualified to work in the railway safety departments as managers, or as safety experts in consultant engineers companies.

Students would pass the following courses as a part of the requirements for graduation, on a full

time or modular basis:

- Risk and Safety Management
- Human Factors and Ergonomics
- Accident Investigation and Reporting
- Railway Safety Standards and Regulations
- Maintenance and Reliability Engineering

Railway Control and Signaling(MSc)

- Electronic and Relay Interlocking
- Advanced Railway Signaling Systems
- Computer System's Reliability and Safety
- Railway Communication Systems
- Railway Traffic Control
- Railway Operation and Control

Research Focus

- Dynamics of Railway

Track

- Track Construction & Maintenance
- Track Safety
- Train-Track Interaction
- Contact Mechanics
- Railway Electrification
- Railway Signaling

Systems

- Train Scheduling & Planning

- Railway Transportation Demand Modelling
- Railway Management

System

- Train-Bridge Interaction
- Design of Railway

Machineries

- Rail Vehicle Dynamics

- Railway Noise and Vibration
- Railway Risk and Safety Management Workshops and Research Laboratories
- Bogie and Wagon (L)
- Locomotive (W)
- Train Brakes (L)
- Railway Machinery Condition Monitoring (L)
- Track Substructure (L)
- Track Maintenance (W)
- Control and Signaling (L)
- Rock & Soil Mechanics (L)
- Traction (L)
- Non-Destructive Testing (L)
- Infrastructure Dynamics (L)
- Railway Structural Dynamics (L)
- Intelligent Computations in Rail Transportation (L)
- Transportation Systems and Logistics (L)
- Railway Noise and Vibration (L)

MS: Mechanical Engineering

Master Automotive		
	Compulsory Modules	
	Mathematical Modelling and Simulation	5
	CAX-Techniques in Automotive Engineering	5
	Power Train	5
	Vehicle Dynamics	5
	Automotive Electronics	5
	Group Project	5
	Seminar for Master's thesis	
	Core Area `Vehicle Electronics	
	Automotive Control Engineering	5
	Power Supply and Energy Distribution	5
	Automotive Communication Systems	5

	Development Methodologies for Automotive Systems	5
	Core Area `Vehicle Safety`	
	Vehicle Crash Mechanics and Biomechanics	5
	ated Safety and Assistance Systems	5
	Sensor Technology and Signal Processing	5
	Testing and Simulation Methods for Vehicle Safety Systems	5

MS Mechanical Eng Courses

Nanoscale Science and Technology
Advanced Mechanics of Matls
Advanced Mechanics of Matls
Experimental Stress Analysis
Finite Element and Variational Methods in Engineering
Mechanics of Composite Matls
Advanced Fluid Mechanics
Computational Fluids Engineering
Fuel Cell Technology
Advanced Power System and Pollution Control
Advanced Heat Transfer
Comp Fluid Dynamics for Engg
Internal Combustion Engines II
Advanced Powertrain Instrumentation and Experimental Methods
Advanced Combustion
Energy Storage Systems
Phase-Change & Two-Phase Flows

Principles of Energy Conversion
Advanced Propulsion Systems for Hybrid Electric Vehicles
Powertrain Integration in HEV
Magnetic Levitation Train design
Advance Vehicle Dynamics
Discover.Design.Delight
Advanced Machining Processes
Precision Manuf and Metrology
Micromanufacturing Processes
Advanced Quality Engineering
Introduction to Lean Manufacturing
Data Based Modeling & Control
Experimental Design in Engg
Optimization I
Enviroronmental Responsible Design and Manufacturing
Dynamic Measurement/Signal Analysis
Intermediate Dynamics
Analytical Vibroacoustics
Graduate Seminar
Engineering Research Communications
Advanced Continuum Mechanics
Dynamic Behavior of Materials
Engineering Fracture Mechanics
Advanced Acoustics
Nonlinear Sys Analy & Control

Advanced Dynamic

Research Areas

Discipline	Broad Area of Research
School of Aeronautical Engineering	<ul style="list-style-type: none">• Aero Dynamics• Avionics / Aero Space / Launch Vehicle• GPS and Local Area Augmentation Systems• Joint Precision Approach and Landing Systems• Automatic Dependent Surveillance Broadcast• Dual Airborne Laser Scanner• Composites• Aircraft Maintenance Engineering (with NDT)

School of Building Sciences

Structural Engineering

- Cold formed Steel
- Concrete, Composite & Dynamics of structures
- Sustainable concrete & Steel structures
- Earthquake engineering
- Retro fitting of structures

Environmental Engineering

- Advanced oxidation Technologies for Water, Waste gas, Wastewater Treatment and Hydrogen Production
- Air Quality Modelling and Waste Management

Water Resources

- CO2 Sequestration
- Maintenance Optimization in Water Distribution Networks
Performance Evaluation of pipe networks
- Sustainable Water Management Integrated
- Water Resources Management
- Urban Planning
- PERI – URBAN, Energy Efficient Architecture
- Landscape Architecture
- Smart Building
- Construction Engineering
- Highway Engineering
- Civionics
- Transportation Engineering

School of Electrical Sciences

ECE

- Communication Network security
- Signal Processing
- Wireless Sensor Network
- Wireless Communication Networks-Mobile
- Photonics

EEE

- Process Control
- Renewable Energy

- SignalProcessing
- Power system
- High Voltage Engineering
- Power Electronics

- Friction, Wear and Lubrication (Tribology)
- Industrial Office Ergonomics
- Heat Exchangers and Heat Transfer
- Thermal Energy Systems
- Materials and Metallurgy
- Nano Materials
- Composites
- Ceramics
- Renewable Energy
- CAD/CAM/CAE
- Mechatronics
- Robotics&Pneumatics
- Machine Vision
- Metal Cutting
- Cylindrical / Surface Grinding
- Welding Technology
- Alternate Fuels&Bio Diesel
- Vehicle Dynamics
- Autotronics

School of Mechanical
Engineering

School of Computing
Sciences

- Big Data
- Network Security
- Machine Intelligence
- Advanced Computing
- Adhoc Networks
- Internet of Things
- Cloud Computing
- Image Processing

School of
Management Studies

- Media Management
- Business Analytics
- Logistic and Supply Chain Management
- Social Entrepreneurship
- Resource Management and Sustainable Development
- Hospitality Management
- Healthcare Management
- Information Systems

Bio Technology

- Tissue Engineering
- Stem Cell Research
- Stress Biology
- Genetic Engineering
- Microbial Technology
- Toxicology

	<ul style="list-style-type: none"> Cancer Biology
	<ul style="list-style-type: none"> Graph Theory
	<ul style="list-style-type: none"> Differential Equation
	<ul style="list-style-type: none"> Numerical Methods
Mathematics	<ul style="list-style-type: none"> Fuzzy Graphs
	<ul style="list-style-type: none"> Quantitative Techniques & Statistics
	<ul style="list-style-type: none"> Fluid Dynamics
	<ul style="list-style-type: none"> Operation Research\
	<ul style="list-style-type: none"> Topology
	<ul style="list-style-type: none"> Inorganic Materials
Chemistry	<ul style="list-style-type: none"> Catalysis
	<ul style="list-style-type: none"> Targeted drug delivery
	<ul style="list-style-type: none"> Organic synthesisComplexes
	<ul style="list-style-type: none"> Materials Science
	<ul style="list-style-type: none"> Conducting Polimers
Physics	<ul style="list-style-type: none"> Nanocomposites
	<ul style="list-style-type: none"> Magnetic Materials
	<ul style="list-style-type: none"> Thin Films
