



Program : Mechatronics Engineering

First Year : Semester - I

Course Code: FEC101

Course Name: Engineering Mathematics-I

FEC101.1	Illustrate the basic concepts of Complex numbers.
FEC101.2	Apply the knowledge of complex numbers to solve problems in hyperbolic functions and logarithmic function.
FEC101.3	Illustrate the basic principles of Partial differentiation.
FEC101.4	Illustrate the knowledge of Maxima, Minima and Successive differentiation.
FEC101.5	Apply principles of basic operations of matrices, rank and echelon form of matrices to solve simultaneous equations.
FEC101.6	Illustrate SCILAB programming techniques to the solution of linear and simultaneous algebraic equations.

Course Code: FEC102

Course Name: Engineering Physics-I

FEC102.1	Illustrate the fundamentals of quantum mechanics and its application.
FEC102.2	Explain peculiar properties of crystal structure and apply them in crystallography using X-ray diffraction techniques.
FEC102.3	Comprehend the concepts of semiconductor physics and applications of semiconductors in electronic devices.
FEC102.4	Employ the concept of interference in thin films in measurements.
FEC102.5	Discuss the properties of Superconductors and Supercapacitors to apply them in novel applications.
FEC102.6	Compare the properties of engineering materials for their current and futuristic frontier application.

Course Code: FEC103

Course Name: Engineering Chemistry-I

FEC103.1	Explain the concept of microscopic chemistry in terms of atomic and molecular orbital theory and relate it to diatomic molecules.
FEC103.2	Describe the concept of aromaticity and interpret it with relation to specific aromatic systems.
FEC103.3	Illustrate the knowledge of various types of intermolecular forces and relate it to real gases.
FEC103.4	Interpret various phase transformations using thermodynamics.
FEC103.5	Illustrate the knowledge of polymers, fabrication methods, conducting polymers in various industrial fields.
FEC103.6	Analyze the quality of water and suggest suitable methods of treatment.



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Course Code: FEC104

Course Name: Engineering Mechanics

FEC104.1	Explain the concept of microscopic chemistry in terms of atomic and molecular orbital theory and relate it to diatomic molecules.
FEC104.2	Describe the concept of aromaticity and interpret it with relation to specific aromatic systems.
FEC104.3	Illustrate the knowledge of various types of intermolecular forces and relate it to real gasses.
FEC104.4	Interpret various phase transformations using thermodynamics.
FEC104.5	Illustrate the knowledge of polymers, fabrication methods, conducting polymers in various industrial fields.
FEC104.6	Analyze the quality of water and suggest suitable methods of treatment.

Course Code: FEC105

Course Name: Basic Electrical Engineering

FEC105.1	Apply various network theorems to determine the circuit response / behavior.
FEC105.2	Evaluate and analyze 1- Φ circuits.
FEC105.3	Evaluate and analyze 3- Φ AC circuits.
FEC105.4	Understand the constructional features and operation of 1- Φ transformer.
FEC105.5	Illustrate the working principle of 3- Φ machine.
FEC105.6	Illustrate the working principle of 1- Φ machines.

Course Code: FEL101

Course Name: Engineering Physics-I Lab

FEL101.1	Perform the experiments based on interference in thin films and analyze the results.
FEL101.2	Verify the theory learned in the module crystallography.
FEL101.3	Perform the experiments on various semiconductor devices and analyze their characteristics.
FEL101.4	Perform simulation study on engineering materials.

Course Code: FEL102

Course Name: Engineering Chemistry-I Lab

FEL102.1	Determine Chloride content and hardness of water sample.
FEL102.2	Determine free acid ph of different solutions.
FEL102.3	Determine metal ion concentration.
FEL102.4	Synthesize polymers, biodegradable plastics.
FEL102.5	Determine Viscosity of oil.



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Course Code: FEL103

Course Name: Engineering Mechanics Lab

FEL103.1	Verify equations of equilibrium of coplanar force system.
FEL103.2	Verify law of moments.
FEL103.3	Determine the centroid of plane lamina.
FEL103.4	Evaluate co-efficient of friction between the different surfaces in contact.
FEL103.5	Demonstrate the types of collision/impact and determine corresponding coefficient of restitution.
FEL103.6	Differentiate the kinematics and kinetics of a particle.

Course Code: FEL104

Course Name: Basic Electrical Engineering Lab

FEL104.1	Interpret and analyse the behaviour of DC circuits using network theorems.
FEL104.2	Perform and infer experiment on single phase AC circuits.
FEL104.3	Demonstrate experiment on three phase AC circuits.
FEL104.4	Illustrate the performance of single-phase transformer and machines.

Course Code: FEL105

Course Name: Basic Workshop Practice-I

FEL105.1	Develop the necessary skill required to handle/use different fitting tools.
FEL105.2	Develop skill required for hardware maintenance.
FEL105.3	Able to install an operating system and system drives.
FEL105.4	Able to identify the network components and perform basic networking and crimping.
FEL105.5	Able to prepare the edges of jobs and do simple arc welding.
FEL105.6	Develop the necessary skill required to handle/use different plumbing tools.
FEL105.7	Demonstrate the turning operation with the help of a simple job.



Program : Mechatronics Engineering

First Year : Semester - II

Course Code: FEC201

Course Name: Engineering Mathematics-II

FEC201.1	Solve various types of First Order differential equations.
FEC201.2	Solve various types of Higher Order Differential equations.
FEC201.3	Illustrate the concepts of Beta and Gamma function, DUIS and rectification.
FEC201.4	Apply the concepts of Double integral.
FEC201.5	Apply the concept of Triple integral.
FEC201.6	Apply the principles of Numerical Method for solving differential equation and numerical integration analytically and using Scilab also.

Course Code: FEC202

Course Name: Engineering Physics-II

FEC202.1	Describe the diffraction through slits and its applications.
FEC202.2	Apply the foundation of laser and fiber optics in development of modern communication technology.
FEC202.3	Relate the basics of electrodynamics which is prerequisite for satellite communications, antenna theory etc.
FEC202.4	Explain the fundamentals of relativity.
FEC202.5	Assimilate the wide scope of nanotechnology in modern developments and its role in emerging innovative applications.
FEC202.6	Interpret and explore basic sensing techniques for physical measurements in modern instrumentations.

Course Code: FEC203

Course Name: Engineering Chemistry-II

FEC203.1	Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.
FEC203.2	Illustrate the concept of emission spectroscopy and describe the phenomena of fluorescence and phosphorescence in relation to it.
FEC203.3	Explain the concept of electrode potential and nernst theory and relate it to electrochemical cells.
FEC203.4	Identify different types of corrosion and suggest control measures in industries.
FEC203.5	Illustrate the principles of green chemistry and study environmental impact.
FEC203.6	Explain the knowledge of determining the quality of fuel and quantify the oxygen required for combustion of fuel.



Program : Mechatronics Engineering

First Year : Semester - II

Course Code: FEC204

Course Name: Engineering Graphics

FEC204.1	Apply the basic principles of projections in Projection of Lines and Planes.
FEC204.2	Apply the basic principles of projections in Projection of Solids.
FEC204.3	Apply the basic principles of sectional views in Section of solids.
FEC204.4	Apply the basic principles of projections in converting 3D view to 2D drawing.
FEC204.5	Read a given drawing.
FEC204.6	Visualize an object from the given two views.

Course Code: FEC205

Course Name: C - Programming

FEC205.1	Formulate simple algorithms for arithmetic, logical problems and translate them to programs in C language.
FEC205.2	Implement, test and execute programs comprising of control structures.
FEC205.3	Decompose a problem into functions and synthesize a complete program.
FEC205.4	Demonstrate the use of arrays, strings and structures in C language.
FEC205.5	Understand the concept of pointers.

Course Code: FEC206

Course Name: Professional Communication and Ethics- I

FEC206.1	Eliminate barriers and use verbal/non-verbal cues at social and workplace situations.
FEC206.2	Employ listening strategies to comprehend wide-ranging vocabulary, grammatical structures, tone and pronunciation.
FEC206.3	Prepare effectively for speaking at social, academic and business situations.
FEC206.4	Use reading strategies for faster comprehension, summarization and evaluation of texts.
FEC206.5	Acquire effective writing skills for drafting academic, business and technical documents.
FEC206.6	Successfully interact in all kinds of settings, displaying refined grooming and social skills.



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First Year : Semester - II

Course Code: FEL201

Course Name: Engineering Physics-II

FEL201.1	Perform the experiments based on diffraction through slits using Laser source and analyze the results.
FEL201.2	Perform the experiments using optical fibre to measure numerical aperture of a given fibre.
FEL201.3	Perform the experiments on various sensors and analyze the result.

Course Code: FEL202

Course Name: Engineering Chemistry-II

FEL202.1	Determine moisture and ash content of coal.
FEL202.2	Analyze flue gas.
FEL202.3	Determine saponification and acid value of oil.
FEL202.4	Determine flash point of a lubricating oil.
FEL202.5	Synthesize a drug and a biofuel.
FEL202.6	Determine na/k and emf of cu-zn system.

Course Code: FEL203

Course Name: Engineering Graphics

FEL203.1	Apply the basic principles of projections in 2D drawings using a CAD software.
FEL203.2	Create, Annotate, Edit and Plot drawings using basic AutoCAD commands and features.
FEL203.3	Apply the concepts of layers to create drawing.
FEL203.4	Apply basic AutoCAD skills to draw different views of a 3D object.
FEL203.5	Apply basic AutoCAD skills to draw the isometric view from the given two views.

Course Code: FEL204

Course Name: C programming

FEL204.1	Translate given algorithms to a program.
FEL204.2	Correct syntax and logical errors.
FEL204.3	Write iterative as well as recursive programs.
FEL204.4	Represent data in arrays, strings and structures and manipulate them through a program.
FEL204.5	Declare pointers and demonstrate call by reference concept.



Program : Mechatronics Engineering

First Year : Semester - II

Course Code: FEL205

Course Name: Professional Communication and Ethics- I

FEL205.1	Listen and comprehend all types of spoken discourse successfully.
FEL205.2	Speak fluently and make effective professional presentations.
FEL205.3	Read large quantities of text in a short time to comprehend, summarise and evaluate content.
FEL205.4	Draft precise business letters, academic essays and technical guidelines.
FEL205.5	Dress finely and conduct themselves with panache in social, academic and professional situations.

Course Code: FEL206

Course Name: Basic Workshop Practice-II

FEL206.1	Develop the necessary skill required to handle/use different carpentry tools.
FEL206.2	Identify and understand the safe practices to adopt in electrical environment.
FEL206.3	Demonstrate the wiring practices for the connection of simple electrical load/ equipment.
FEL206.4	Design, fabricate and assemble pcb.
FEL206.5	Develop the necessary skill required to handle/use different masons tools.
FEL206.6	Develop the necessary skill required to use different sheet metal and brazing tools.
FEL206.7	Able to demonstrate the operation, forging with the help of a simple job.