

Sandip University

Neelam Vidya Vihar, Vill.: Sijoul. P.O. : Mailam, Dist.:Madhubani, Bihar -847235

Website : <http://www.sandipuniversity.edu.in>

Toll-Free No.- 1800-313-2714 Ph: 7549991044.

School: Engineering & Technology	Programme: B.Tech (First Year)
Year: First Year	Semester -II
Course: Engineering Mathematics-II	Course Code: 201T
Theory: 3 Hours/Week	Max. University Theory Examination: 60 Marks
Tutorials: 1 Hours/Week	Continuous Internal Assessment: 40 Marks
Max. Time for Theory Exam.: 2.5 Hrs	Credit: 4

Objectives :

1	To become familiar with differential equations of higher order .
2	To study partial differential equations and solution of homogeneous partial differential equations.
3	To be able to solve double and triple integral problems and apply in plane and solid problems .
4	To study Laplace Transforms and Inverse Laplace Transforms.

Unit Number	Details	Hours
1	Linear differential equations with constant coefficients Linear differential equations with constant coefficients: Solutions of second and higher order differential equations - inverse differential operator method, method of undetermined coefficients and method of variation of parameters.	8
2	Differential equations-2 : Linear differential equations with variable coefficients: Solution of Cauchy's and Legendre's linear differential equations. Nonlinear differential equations - Equations solvable for p, equations solvable for y, equations solvable for x, general and singular solutions, Clairaut's equations and equations reducible to Clairaut's form.	8
3	Partial Differential equations: Formulation of Partial differential equations by elimination of arbitrary constants/functions, solution of non-homogeneous Partial differential equations by direct integration, solution of homogeneous Partial differential equations involving derivative with respect to one independent variable only. Derivation of one dimensional heat and wave equations and their solutions by variable separable method.	8
4	Integral Calculus: Double and triple integrals: Evaluation of double and triple integrals. Evaluation of double integrals by changing the order of integration and by changing into polar co-ordinates. Application of double and triple integrals to	8

	find area and volume. Beta and Gamma functions: definitions, Relation between beta and gamma functions and simple problems.	
5	Laplace Transform : Definition and Laplace transforms of elementary functions. Laplace transforms of (without proof) ,periodic functions and unit-step function-problems Inverse Laplace Transform : Inverse Laplace Transform - problems, Convolution theorem to find the inverse Laplace transforms(without proof) and problems,solution of linear differential equations using Laplace Transforms.	8
Total (Hrs)		40

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Course Outcome	
Student Should able to :	
CO1	Students will be able to solve differential equations and apply them on simple problems.
CO2	Students will be able to solve partial differential equations .
CO3	Students will be able to solve the problems on double and triple integrations.
CO4	Students will gain the basic knowledge of Laplace transform and their applicability in solving initial value problems.

Resources	
Recommended Books	1. Erwin Kreyszig, “Advanced Engineering Mathematics”, 9e, (Wiley India). 2.A. B. Mathur and V.P. Jaggi: A text book of Engg. Maths and Advanced Engg Mathematics. 3.B.S. Grewal: Elementary Engg. Maths and Higher Engg. Maths.
Reference Books	1.M. D. Greenberg, “Advanced Engineering Mathematics”, 2e, Pearson Education. 2.Higher Engineering Mathematics By. Dr. B. S. Grewal 3.Higher Engineering Mathematics By. B.V. Ramana. 4.Advanced Engineering Mathematics By- H. K. Das.
E-Resources	http://nptel.ac.in/

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School: Engineering & Technology	Programme: B.Tech (First Year)
Year: First Year	Semester -I/II
Course: Computer Programming with C	Course Code: 203T
Theory : 3 Hrs/Week	Max. University Theory Examination: 60 Marks
Tutorial : 1 Hrs/Week	Continuous Internal Assessment: 40 Marks
Max. Time for Theory Exam.: 2.5 Hrs	Credit: 3

Objectives :

1	This course is designed to enable the students to get a detailed knowledge of all the hardware components that make up a computer and to understand the different interfaces required for connecting these hardware devices.
2	Understand the components on the motherboard
3	Perform system administration tasks.
4	Understand different storage media.
5	Understand system related problems and methods of troubleshooting.

Unit Number	Details	Hours
1	Introduction to Computers, Need for Computer Literacy. Computer: The Definition, Basic Anatomy of Computers, Characteristics of Computers, Evolution of Computers, The Computer Generations Function of a computer , Application of computer, Solution of different problem using Computer	8
2	Basic Computer Organization, Introduction, Components of a Digital Computer. The Input Unit, The Output Unit, The Central Processing Unit, The Control Unit, The Main Memory Unit, Storage Unit. Components of Computer ,CPU, Memory Structure, ALU, Different	8
3	Memory & Processor: Introduction, the Central Processing Unit, Registers, Instruction Sets, Program Interrupts, Different Types of Memory, Architecture of Memory/ Processor Speed Memory, Memory Unit.	8

4	Secondary Storage Devices: Introductions, Need of Secondary Storage Devices, Characteristics of Secondary Storage Devices, Types of Storage Devices .Magnetic Tape Systems, Magnetic Disk, Types of Disks, Optical Disk, Mass Storage Devices, Storage Hierarchy	8
5	Input and Output Devices Introductions, Input Devices, Data Scanning Devices, Digitizer, Electronic Card Reader, Voice Recognition Devices. Vision Input System, Output Devices, Voice Response System, Screen Image Projector.	8
Total (Hrs)		40

Resources	
Recommended Books	1. Behrouz A. Forouzan and Richard F. Gilberg“Computer Science –A structured Programming Approach Using C”,CLanguage Learning, 2007.
Reference Books	1. K. N. King, “C Programming A Modern Approach”, W. W. Norton. 2. Kernighan and Ritche, “The C Programming Language”. 3.P. Dey and M. Ghosh, “Programming in C”, Oxford University Press 1st Edition, 2000.
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School: Engineering & Technology	Programme: B.Tech (First Year)
Year: First Year	Semester -II
Course: Engineering Mechanics	Course Code: 204T
Theory : 4 Hrs/Week	Max. University Theory Examination: 60 Marks
	Continuous Internal Assessment: 40 Marks
Max. Time for Theory Exam.: 2.5 Hrs	Credit: 4

Objectives :

1	To provide the concept of various concepts at introductory level relevant to Engineering Mechanics.
2	To provide an understanding of equilibrium of various types of forces.
3	To give basic concepts of friction and laws governing it.
4	To make students able to calculate moment of inertia of various plane figures.
5	To introduce the concepts of work, energy and laws related to it.

Unit Number	Details	Hours
1	Introduction to Engineering Mechanics: Concept of force, force Characteristics, internal and external force, force system and types of force systems, Principle of Transmissibility of force, Principle of Superposition and physical independence, Idealization of bodies-particle, rigid body, continuum, moment of a force about a point and about an axis, couple, characteristics of couple, Vector notation for forces, addition and multiplication of vectors, vector cross and dot product. Resolution and composition of force, Resultant and Eequilibrant of force system, Parallelogram law, Triangle law, and Polygon law of forces, Varignon's theorem , resultant of coplanar concurrent and non-concurrent force system by method of resolution and Vector approach.	8
2	Equilibrium of Force System : Free body diagram, conditions of equilibrium of concurrent and non-concurrent co planar force system, Lami's Theorem, particle and rigid body equilibrium; statically determinate beams, types of supports; support reactions with different types of loads on determinate beams and frames. Analysis of plane determinate trusses by method of joints and method of sections.	8
3	Friction: Introduction , coefficient of friction, angle of friction, angle of repose; laws of Dry (Coulomb) friction, Problems on single and multi-body	

	system on horizontal and incline planes, Wedge friction, problems on ladder friction, Belt friction and differential band brakes	8
4	Properties of Plane Areas: Centroids and center of gravity, centroid of lines and regular geometrical area including parabola, centroid by integration, centroids of composite Areas and built up sections. Second moment or moment of inertia of an area, moment of inertia of regular shapes by integration method, polar moment of inertia, radius of gyration, Parallel and Perpendicular axis theorem, product of Inertia, moment of inertia of composite areas and built up sections .	8
5	Kinematics: Introduction, types of motion, position vector, velocity and acceleration, Equations of linear motion (no numerical problems), projectile motion. Kinematics of Particles: Introduction, Newton's Second law of motion, D'Alembert's principle and its application to problems on connected bodies, banking of roads. Work, Power, energy and efficiency, Kinetic energy of particle, Work-Energy Principle and its application to particles and system of particles.	8
Total (Hrs)		40

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Course Outcome	
Student Should able to :	
CO1	Understand the basic concepts of engineering mechanics
CO2	Understand the equilibrium of force system and use Lami's theorem in problems.
CO3	Understand friction as a phenomenon and the laws behind it.
CO4	Calculate moment of inertia of different types of plane figures.
CO5	Follow work, energy and understand their role in usual phenomena.

Resources	
Recommended Books	<ol style="list-style-type: none">1. Mechanics for Engineers, Statics and Dynamics by Ferdinand Beer and E Russell Johnston, McGraw Hill Company, New York2. Engineering Mechanics by Nelson , McGraw Hill Publishers
Reference Books	<ol style="list-style-type: none">1. Engineering Mechanics by Timoshenko and Young; McGraw Hill Book Company , New Delhi2. Engineering Mechanics , Statics and Dynamics by Meriam JL Kraige, Wiley Publishers, New Delhi3. Applied Mechanics by I B Prasad
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School: Engineering & Technology	Programme: B.Tech (First Year)
Year: First Year	Semester -II
Course: Basic Mechanical Engineering	Course Code: 205T
Theory : 3 Hrs/Week	Max. University Theory Examination: 60 Marks
	Continuous Internal Assessment: 40 Marks
Max. Time for Theory Exam.: 2.5 Hrs	Credit: 3

Objectives :

1	Students will learn certain fundamental topics related to mechanical engineering.
2	Students will have a minimum understanding of mechanical systems, equipment and process.

Unit Number	Details	Hours
1	Energy Resources : Basic concept of Non-renewable and renewable energy resources	8
2	Turbines and IC Engines and Pumps Steam turbines: Classification, Principle of operation of Impulse and reaction turbines, Delaval's turbine, Parson's turbine. (No compounding of turbines). Gas turbines :Classification, Working principles and Operations of Open cycle and closed cycle gas turbines. Water turbines :Classification, Principles and operations of Pelton wheel, Francis turbine and Kaplan turbine Internal Combustion Engines :Classification, I.C. Engines parts, 2 Stroke and 4 stroke Petrol engines, 4 stroke diesel engines. P-V diagrams of Otto and Diesel cycles. Problems on indicated power, brake power, indicated thermal efficiency, brake thermal efficiency, mechanical efficiency, and specific fuel consumption,	8
3	Machine Tools and Automation Machine Tools Operations : Turning, facing, knurling, Thread cutting, Taper Turning by swivelling the compound rest, Drilling, Boring, Reaming, Tapping, Counter Sinking, Counter Boring, -Plane milling, End milling, Slot milling. (No sketches of Machine tools, sketches to be used only for explaining operations. Students to be shown the available machine tools in the Machine Shop of the college before explaining the operations)	8
4	Engineering Materials and Joining Processes : Engineering Materials :Types and applications of Ferrous & Nonferrous metals and alloys, Composites :Introduction: Definition, Classification and applications (Air	8

	craft and Automobiles) Soldering, Brazing and Welding : Definitions, classification and method of soldering, Brazing and welding. Differences between soldering, Brazing and Welding. Description of Electric Arc Welding and Oxy-Acetylene Welding.	
5	Refrigeration, Air-Conditioning : Refrigerants ;properties of refrigerants, list of commonly used refrigerants. Refrigeration –Definitions – Refrigerating effect, Ton of Refrigeration, Ice making capacity, COP, Relative COP, unit of Refrigeration. Principle and working of vapor compression refrigeration.	8
Total (Hrs)		40

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Course Outcome	
Student Should able to :	
CO1	Understand Various Energy sources, Boilers, Prime movers such as turbines and IC engines, refrigeration and air-conditioning systems
CO2	Know metal removal process using Lathe, drilling, Milling Robotics and Automation.
CO3	Get a fair understanding of application and usage of various engineering materials.

Resources	
Recommended Books	<ol style="list-style-type: none"> 1. V.K.Manglik, “Elements of Mechanical Engineering”, PHI Publications, 2013. (Module-1,2,4,5) 2. MikellP.Groover, “Automation, Production Systems & CIM”, 3rd Edition, PHI (Module -3)
Reference Books	<ol style="list-style-type: none"> 1. S.TrymbakaMurthy, “A Text Book of Elements of Mechanical Engineering”, 4th Edition 2006, Universities Press (India) Pvt Ltd, Hyderabad. 2. K.P.Roy, S.K.HajraChoudhury, Nirjhar Roy, “Elements of Mechanical Engineering”, Media Promoters & Publishers Pvt Ltd,Mumbai,7th Edition,2012 3. Pravin Kumar, “Basic Mechanical Engineering”, 2013 Edition, Pearson.
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School: Engineering & Technology	Programme: B.Tech (First Year)
Year: FirstYear	Semester -II
Course: Computer Programming with C Lab	Course Code: 206P
Practical : 4 Hrs/Week	Max. University Practical Examination: 20 Marks

	Lab Continuous Internal Assessment: 30 Marks TW : 25 Marks
Max. Time for Exam.: 2 Hrs	Credit: 1

Objectives :	
1	This course is designed to enable the students to get a detailed knowledge of all the hardware components that make up a computer and to understand the different interfaces required for connecting these hardware devices.
2	Understand the components on the motherboard
3	Perform system administration tasks.
4	Understand different storage media.
5	Understand system related problems and methods of troubleshooting.

Unit Number	Details	Hours
1	Introduction to Computers, Need for Computer Literacy. Computer: The Definition, Basic Anatomy of Computers, Characteristics of Computers, Evolution of Computers, The Computer Generations Function of a computer , Application of computer, Solution of different problem using Computer	8
2	Basic Computer Organization, Introduction, Components of a Digital Computer. The Input Unit, The Output Unit, The Central Processing Unit, The Control Unit, The Main Memory Unit, Storage Unit. Components of Computer ,CPU, Memory Structure, ALU, Different	8
3	Memory & Processor: Introduction, the Central Processing Unit, Registers, Instruction Sets, Program Interrupts, Different Types of Memory, Architecture of Memory/ Processor Speed Memory, Memory Unit.	8
4	Secondary Storage Devices: Introductions, Need of Secondary Storage Devices, Characteristics of Secondary Storage Devices, Types of Storage Devices .Magnetic Tape Systems, Magnetic Disk, Types of Disks, Optical Disk, Mass Storage Devices, Storage Hierarchy	8
5	Input and Output Devices Introductions, Input Devices, Data Scanning Devices, Digitizer, Electronic Card Reader, Voice Recognition Devices. Vision Input System, Output Devices, Voice Response System, Screen Image Projector.	8
Total (Hrs)		40

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Course Outcome	
Student Should able to :	
CO1	To obtain the knowledge about the number systems this will be very useful for bitwise operations.
CO2	Write, compile and debug programs in C language.
CO3	Use different data types in a computer program
CO 4	To develop programs using the basic elements like control statements, Arrays and Strings.

Resources	
Recommended Books	1. Behrouz A. Forouzan and Richard F. Gilberg“Computer Science –A structured Programming Approach Using C”,CLanguage Learning, 2007.
Reference Books	1. K. N. King, “C Programming A Modern Approach”, W. W. Norton. 2. Kernighan and Ritche, “The C Programming Language”. 3.P. Dey and M. Ghosh, “Programming in C”, Oxford University Press1st Edition, 2000.
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School: Engineering &Technology	Programme: B.Tech (First Year)
Year: FirstYear	Semester -II
Course: Communication Skills lab	Course Code: 208P

Practical : 2 Hrs/Week	TW : 25 Marks
	Credit: 1
Practical Objectives :	
1	Students should be able to use basic tools used in the workshop and understand their applications.
2	Students should practice different tools to produce simple jobs and get a basic idea of industrial work.

Unit Number	Details	Hours
1	Communication Theory: Concept and Meaning, Communication cycle, Objectives, Barriers to communication (linguistic and semantic, psychological, physical, mechanical, cultural), Methods of communication (verbal and non-verbal), Networks of communication (formal and informal), Language skills (listening, speaking, reading, writing), Corporate communication: Digital Content Creation.	10
2	Business Correspondence: Principles of Business Correspondence, Parts of a business letter, Formats (Complete block and Modified block), Types of letters: Enquiry, Reply to enquiry, Claim, Adjustment and Sales letter.	10
3	Grammar and Vocabulary: Common errors, Concord (subject- verb agreement), Pairs of confused words, Lexicon (Enriching vocabulary through one-word substitutes, synonyms, antonyms, etc.)	9
Total (Hrs)		29

Course Outcome

Student Should able to :

CO1	Understand and evaluate information they listen to and express their ideas with greater clarity
CO2	Speak and respond effectively along the various channels of communication in a business organization
CO3	Speak convincingly before an audience with the help of an expanded vocabulary and enhanced digital content
CO4	Read and summarize effectively.
CO5	Communicate through result oriented writing both within and outside the organization.
CO6	Write a set of effective and easy to understand technical description, instructions and convey the same using global information technology

Resources

Recommended Books	<ol style="list-style-type: none"> 1. Communication in Organizations by Dalmar Fisher, Jaico Publishing House 2. Communication Skills by Meenakshi Raman & Sangeeta Sharma, Oxford University Press. 3. Oxford University Press. 4. Business Correspondence & Report-writing by R.C. Sharma & Krishna Mohan, Tata McGraw-Hill Education.
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Reference Books	<ol style="list-style-type: none">1. Effective Technical Communication by Ashraf Rizvi, Tata McGraw-Hill.2. Technical Writing & Professional Communication for non-native speakers of English by Thomas N. Huckin & Leslie A. Olsen, McGraw –Hill.
E-Resources	http://nptel.ac.in/