GANPAT UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Bachelor of Technology	Branch/Spec.	ALL
Semester	II	Version	2.0.0.0
Effective from Academic Year	2018-19	Effective for the batch Admitted in	July 2018
Subject code	2BS102	Subject Name	Mathematics-II

Teaching scheme						Examination scheme (Marks)			
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	03	01	--	--	04	Theory	40	60	100
Hours	03	01	--	--	04	Practical	--	--	--

Pre-requisites:

Basic knowledge of Matrix operations and Vectors

Learning Outcome:

After successful completion of the course, student will be able to

- Understand mathematical basic preliminaries.
- Express physical phenomenon in mathematical formulation.
- Apply Matrix algebra in formal representation of various computing constructs.
- Recognize the importance of vector space & linear transformation for analysis in engineering problems.

Theory syllabus

Unit	Content	Hrs
1.	**Matrix Algebra:** Review of algebra of matrices & elementary transformations Rank of a matrix, inverse of a matrix by Gauss-Jordan method, normal form of a matrix, Solution of system of algebraic simultaneous equations, Linear dependent and Linear independent vectors. Eigen values and Eigen vectors, Eigen values and Eigen vectors of : Symmetric, Skew symmetric, Hermitian, Skew Hermitian, Unitary and Normal matrix, Algebraic and Geometric multiplicity, Diagonalization ,Spectral theorem for real symmetric matrices, Application of Quadratic forms.	**22**
2.	**Vector Space :** Vectors in R^n and its properties ,Dot product ,Norm and Distance properties in R^n, Pythagorean theorem in R^n , Definition and Examples of vector spaces, Vector subspace, Linear Independence and dependence, Linear span of set of vectors, Basis of subspaces, Extension to basis.	**10**
3.	**Linear Transformation :** Definition and basic properties, Types of linear transformation (Rotation, reflection, expansion, contraction, shear, projection), Matrix of linear transformations, Change of basis and similarity, Rank nullity theorem	**09**
4.	**Infinite Series :** Definition, Comparison test, Cauchy's integral test, ratio test, root test, Leibniz's rule for alternating series, power series, range of convergence, uniform convergence.	**05**
	TOTAL	46

Practical content

Text Books

1.	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
2.	D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.

Reference Books

1.	V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East–West press, Reprint 2005.
2.	Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3.	N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.

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FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Bachelor of Technology	Branch/Spec.	ALL
Semester	I / II	Version	2.0.0.0
Effective from Academic Year	2018-2019	Effective for the batch Admitted in	July 2018
Subject code	2ES103	Subject Name	Basic Electrical Engineering

Teaching scheme						Examination scheme (Marks)			
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	40	60	100
Hours	3	0	2	0	3	Practical	30	20	50

Pre-requisites:

-

Learning Outcome:

On successful completion of the subject, students should be able to

- To understand and analyze basic electrical and magnetic circuit.
- Apply basic electric laws in solving circuit problems and able to perform power calculation.
- Identify the types of capacitors and know the practical applications of various types of capacitors.
- Understand the basic concepts of Electromagnetic Induction.
- Understand the working principles of transformer and induction motor.
- To introduce the components of low voltage electrical installation.

Theory syllabus

Unit	Content	Hrs
1	**D.C. Circuits :** Voltage and current Sources, Source Transformation, Star-Delta Transformation, Application of Kirchhoff's Law, Superposition Theorem, Thevenin's Theorem and Norton's Theorem.	**08**
2	**Capacitor :** Types of Capacitor, Capacitance of Multiple Parallel Plate Capacitor, Energy stored in a Capacitor, Charging & Discharging of Capacitor & Time constant.	**04**
3	**Magnetic circuit :** Law of Magnetic Circuit, Series & parallel Magnetic Circuits and Calculation, Comparison of magnetic & Electric Circuit.	**04**
4	**Electromagnetic Induction :** Review of Faraday's Law, Lenz's Law, Self & Mutual Inductance, Inductance of coupled circuits, Rise and Decay of Current in Inductive circuit.	**05**
5	**AC Circuits:** Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (Series and parallel), resonance. Three phase balanced circuits, voltage and current relations in star and delta connections, measurement of power in 3-phase circuits.	**10**
6	**Transformer:** Magnetic materials, BH characteristics, working principle, construction, core and shell type transformer, step up and step down transformer.	**04**
7	**Induction motor:** Classification of A.C. motors, construction and working of three-phase motor, production of rotating field, Synchronous speed, Actual speed, Slip.	**04**

8	**Electrical Installations:** Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of wires and Cables, Types of Batteries, Important Characteristics for Batteries, Elementary calculations for energy consumption and power factor improvement.	**06**
Practical content		
Practicals, assignments and tutorials are based on above syllabus.		
Text Books		
1.	U.A. Patel, “Elements of Electrical & Electronics Engineering”, Atul Prakashan.	
2.	B.L.Thereja,”Electrical Technology “, S. Chand Volume-I.	
3.	B.L.Thereja,”Electrical Technology “, S. Chand Volume-II.	
Reference Books		
1.	V.N. Mittal,” Basic Electrical Engineering”, Tata Mc Graw hill, New Delhi.	
2.	V.K.Mehta,” Principles of Power Systems “, Pub. By Chand.	
3.	D.P. Kothari and I.J. Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill, 2010.	
4.	D.C. Kulshreshtha, “Basic Electrical Engineering”, McGraw Hill, 2009.	
5.	L.S. Bobrow, “Fundamentals of Electrical Engineering”, Oxford University Press, 2011.	
6.	V.D. Toro, “Electrical Engineering Fundamentals”, Prentice Hall India, 1989.	
ICT/MOOCS		
1.	http://www.nptel.ac.in/courses/108105053/(D.C. Circuits, Capacitor, Magnetic circuit Electromagnetic Induction, AC Circuits, Transformer, Induction motor)	
2.	https://www.youtube.com/watch?v=9XOnqmnKYSg(Battrey and cells)	

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Programme	Bachelor of Technology			Branch/Spec.	ALL
Semester	II			Version	2.0.0.0
Effective from Academic Year		2018-19		Effective for the batch Admitted in	July 2018
Subject code	2ES104	Subject Name		Programming for Problem Solving	

Teaching scheme						Examination scheme (Marks)			
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	0	2	0	4	Theory	40	60	100
Hours	2	0	4	0	6	Practical	30	20	50

Pre-requisites:

Basic knowledge of Computer

Learning Outcome:

Upon completion of this course, students will acquire knowledge about:

- Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.
- Demonstrate an understanding of computer programming language concepts.
- Able to develop C programs on Linux and Windows platform.
- Able to define data types and use them in simple data processing.
- Choose the right data representation formats based on the requirements of the problem.
- Able to design and develop Computer programs, analyze, and interprets the concept of operators, branching and loops and their usage.
- Able to define the concept of array, structures, union, pointer, and file management
- Develop confidence for self-education and ability for life-long learning needed for Computer language.
- Able to write the program on a computer, edits, compile, debug, correct, recompile and run it.

Theory syllabus

Unit	Content	Hrs
1.	**Introduction to Programming.** Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.). **Idea of Algorithm**: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudo code with examples. From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.	04
2.	Arithmetic expressions and precedence Conditional Branching and Loops Writing and evaluation of conditionals and consequent branching Iteration and loops	06
3.	**Arrays** Arrays (1-D, 2-D), Character arrays and Strings	03
4.	**Basic Algorithms** Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required)	03
5.	**Function** :Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference	03
6.	**Recursion:** Recursion, as a different way of solving problems. Example programs, such as	02

	Finding Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort.	
7.	**Structure** : Structures, Defining structures and Array of Structures	02
8.	**Pointers:** Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list.	05
9.	**File handling**	02
Practical content		
Experiments/Practical/Simulations would be carried out based on syllabus which includes above topics. ▪ Programming Assignment Manual will be prepared and will be the reference for the questions, assignments, evaluation and the laboratory practices.		
Text Books		
1.	Programming in ANSI C by E Balagurusami –Tata MacGraw-Hill.	
Reference Books		
1.	Let's C, by YashvantKanetkar-BPB Publication	
2.	Programming in C by Ashok Kamthane- Pearson Publication.	
3.	The C Programming Language by Brian W. Kernighan / Dennis Ritchie	
4.	Computer Programming in C by V Rajaraman, PHI.	
5.	C Programming Language by Brian Kernighan and Dennis M. Ritchiz	
6.	Outline of Programming with C by Byron Gottfried, Schaum's , McGraw-Hill	
ICT References		
1.	nptel.ac.in/courses/106104128	
2.	http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-087-practical-programming-in-c-january-iap-2010/Free online lectures (PowerPoint) from MIT.	

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Programme	Bachelor of Technology		Branch/Spec.	ME/MC/Auto/MR/Civil/EE	
Semester	II		Version	2.0.0.0	
Effective from Academic Year	2018-19		Effective from the batch Admitted in	July 2018	
Subject code	2ES105	Subject Name	Elements of Mechanical Engineering		

Teaching scheme						Examination scheme (Marks)			
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	40	60	100
Hours	3	0	2	0	5	Practical	30	20	50

Pre-requisites:

Learning Outcome:

After learning this course, student should be able to:

• Understand about the working, functions and applications of equipments used in daily life.

• Identify the broad context of Mechanical engineering problems, including describing the problem conditions and identifying possible contributing factors

• Understand the fundamental elements of Mechanical engineering systems, system components and processes, with a good understanding of associated safety, quality, schedule and cost considerations.

• Employ mathematics, science, and computing techniques in a systematic, comprehensive, and Rigorous manner to support the study and solution of Mechanical engineering problems.

• Synthesize analysis results to provide constructive and creative engineering solutions that reflect social and environmental sensitivities.

• Exhibit good teamwork skills and serve as effective members of multidisciplinary project teams.

Theory syllabus

Unit	Content	Hrs
1	**Introduction:** I Prime movers, Sources of energy, Types of prime movers, Force and mass, Pressure, Work, Power, Energy, Heat, Temperature, Units of heat, Specific heat capacity, Interchange of heat, Change of state, Mechanical equivalent of heat, Internal energy, Enthalpy, Entropy, Efficiency, Statements of Laws of Thermodynamics, Calorific values **Properties of gases:** Gas laws, Boyle's law, Charle's law, Combined gas law, Gas constant, Internal energy, Relation between Cp and Cv, Enthalpy, Non flow process, Constant volume process, Constant pressure process, Isothermal process, Poly-tropic process, Adiabatic process.	8
2	**Properties of Steam:** Introduction, Steam formation, Types of Steam, Enthalpy, Specific volume of steam and dryness fraction of steam, Internal energy, Steam tables, Non-flow process. Measurement of dryness fraction, Throttling calorimeter, Separating calorimeter, Combined calorimeter.	6
3	**Steam Boilers:** Introduction, Classification, Simple vertical boiler, Cochran boiler, Lancashire boiler, Locomotive boiler, Babcock and Wilcox boiler, Hi-Pressure boiler, functioning of different mountings and accessories.	8

	Internal Combustion Engines: Introduction, Classification, Engine details, otto four-stroke cycle, Diesel-four-stroke cycle, Difference between otto cycle and Diesel cycle, Two-stroke cycle, Difference between two-stroke and four-stroke cycle, indicated power (ip), Brake Power (bp),Efficiencies.	
4	**Air Compressors:** Introduction, Uses of Compressed air, Reciprocating compressors, Operation of a compressor, multistage reciprocating compressors, Rotary compressors	6
5	**Refrigeration & Air Conditioning:** Introduction, Refrigerant, Types of refrigerators, Vapour compression refrigerating system, Vapour absorption refrigerating system, Window and split air conditioners.	8
6	**Important Engineering Materials:** Properties of materials, Ferrous & Nonferrous materials and other important engineering materials such as Timber, Abrasive material, silica.	6
Practical content		
The term work shall be based on experimental and analytical work on topics mentioned above.		
Text Books		
1	S.M. Bhatt, H.G. Katariya "Elements of Mechanical Engineering" Books India publication, 5th Edition 2017	
2	Dr. D.S. Kumar "Thermal Science and Engineering",S. K. Kataria & sons, Publication New Delhi, 4th Eition.	
3	P. S. Desai and S. B. Soni "Elements of Mechanical Engineering", Atul Prakashan, 11th Revised Edition 2010.	
Reference Books		
1	Pravin Kumar "Basic Mechanical Engineering", Pearson Education India, Delhi, 2013	
2	G.S. Sawhney "Fundamental of Mechanical Engineering", PHI Publication New Delhi, 2008.	
3	Sadhu Singh "Elements of Mechanical Engineering", S. Chand Publication, 2010.	
4	B.K. Agrawal "Introduction to Engineering Materials", Tata McgraHill Publication, New Delhi, 1998.	
ICT/MOOCs references		
1	https://www.youtube.com/watch?v=_7tE3W0fmOc (Introduction of EME)	
2	https://www.youtube.com/watch?v=vr3RXIba0D4 (Properties of Steam)	
3	https://www.youtube.com/watch?v=txoEqwSxUrQ (Types of Steam boiler)	
4	https://www.youtube.com/watch?v=9eGgTXfyxbg (Fundamental of IC Engine)	
5	https://www.youtube.com/watch?v=p9eFYGIsaB4 (Basic of Air Compressor)	
6	https://www.youtube.com/watch?v=zqXgmVnI3L8&list=PLB7848E741209987E (Refrigeration & Air Conditioning)	
7	https://www.youtube.com/watch?v=5cjCgqaRJXU (Importance of Engineering Materials)	

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Programme	Bachelor of Technology				Branch/Spec.	ME/MC/Auto/MR/Civil/BME			
Semester	II				Version	2.0.0.0			
Effective from Academic Year	2018-19				Effective for the batch Admitted in	July 2018			
Subject code	2ES107		Subject Name		Engineering Mechanics				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	03	00	01	00	04	Theory	40	60	100
Hours	03	00	02	00	05	Practical	30	20	050

Pre-requisites:

Learning Outcome:

By learning this course student should be able to understand, Fundamentals of engineering principles, concept of centre of gravity and moment of inertia, importance of frictional force in real world problems, advantages of using machines, and effect of forces for different phenomenon when the bodies are in motion.

Theory syllabus

Unit	Content	Hrs
1.	**Introduction** Definition of Statics, Kinetics and Kinematics, Scalar, Vector quantities, Fundamental principle of engineering mechanics, System of units.	02
2.	**Fundamental of Statics:** Force and Effect of forces, Types of force and force systems, Moment, Couple and its characteristics, Law of parallelogram of forces , Law of polygon of forces , Varignon;s principle Types of Supports and Loads, Support reactions and problems related to theories.	08
3.	**Centre of Gravity:** Definition of Centroid centre of gravity, Moment area method for finding out centre of gravity for 1D, 2D and 3D problems, Composite sections, PappusGuldinus theorems I &II.	07
4.	**Moment of Inertia:** Concept of MI, Methods for finding out MI, Theorem of Parallel Axis and Perpendicular axis and related problems.	06
5.	**Equilibrium:** Concept of Free body diagram, Lami's theorem and its applications.	04
6.	**Friction:** Terminology, Friction on inclined smooth and rough surfaces, Ladder friction.	04
7.	**Simple Lifting Machine:** Terminology, Conditions of reversibility of machines, Law of machine, method for finding out velocity ratio of simple wheel and axle, Differential wheel and axle, Single purchase crab winch, Double purchase crab winch, Simple screw jack and differential screw jack, related problems.	06
8.	**Kinematics:** Terminology, Combined motion of rotation and translations, Case of Crank and Shaft, Instantaneous centre and its location, Single degree free vibrations	03
9.	**Kinetics:** Newton's law of motions, De-Alembert's Principle, Motion of connected bodies on plane and inclined surfaces, Related problems.	05

Practical content

This shall consist of experiments based on above content.

Text Books

1.	Mechanics of Solids :P. J. Shah, S.Chand Publication
2.	Engineering Mechanics :S. Ramamarutham, Dhanpatray Publishing House

Reference Books

1.	Engineering Mechanics : A K Thayal, Umesh Publications
2.	Engineering Mechanics(Statics) Beer and Johnston,Tata-McGraw-Hill publications
3.	Applied Mechanics: Junarkar S. B and H.J.Shah,Charotar Publishing House,Pvt Ltd.

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FACULTY OF ENGINEERING& TECHNOLOGY

Programme	Bachelor of Technology		Branch/Spec.	ME/MC/AUTO/CIVIL/EE/BME/MARINE	
Semester	II		Version	2.0.0.0	
Effective from Academic Year	2018-19		Effective from	July 2018	
Subject code	2ES108	Subject Name	Computer Aided Drawing		

Teaching scheme						Examination scheme (Marks)			
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	0	0	1	0	1	Theory	0	0	0
Hours	0	0	2	0	2	Practical	30	20	50

Pre-requisites:

Engineering Graphics

Learning Outcome:

After learning the course, the student should be able to:

- Understand the basics of engineering drafting or engineering drawing.
- Learn various terms used in industrial drawing.
- Create models using various drafting commands of software like AutoCAD – Mechanical, Civil and Electrical engineering etc.
- Implement the practical applications of various concepts of engineering drawing standards in industry.

Practical syllabus

Unit	Content	Hrs
1	**Introduction to computer aided drawing:** Objectives, introduction to drawing using CAD, demonstrating knowledge of the theory of CAD software [such as: the Menu System, toolbars (Standard, object Properties, draw, modify and Dimension), hardware systems requirements, drawing by various drafting packages	2
2	**Basic drawing & editing commands:** line, line types, arc, circle, ellipse, rectangle, spline, etc, different coordinate systems in software, different drawing aids i.e. grid, snap, object snap, Editing tools - move, copy, trim, edit, chamfer, mirror, fillet, extend, stretch etc. commands, various types of array and modifying array, concept of block, inserting block and modify block	4
3	**Multi view drawings& Dimensioning:** Different types of viewing in software, orthographic, auxiliary ad named views, Creating dimensions, editing dimensions, adding leaders, applying styles and modifying them, applying tolerances in drawing.	4
4	**Section views:** Hatch tools, edit hatch, text hatching, different sectional views of part or assembly, use of sectional views of parts or assembly in mechanical engg, sectional view of building-construction drawing in civil engg, sectional view of A.C. / DC machine parts, electrical equipment's cross section	4
5	**Basic symbols:** Applications to various engineering fields like Mechanical, Civil and Electrical engineering, basic component or element symbol used for different engineering fields. i.e spring, shaft, gear, bearing, civil construction symbols, civil	6

	equipment symbols, electrical components symbols etc.	
6	**Content library :**various examples onMechanical - BOMs / Parts & balloons,part references, part lists, Electrical - R-L-C circuits, Earthing and wiring diagrams, Civil - laying a path, ground up surface etc.	8
7	**Layouts and Templates:** Working with different layouts, viewports, working with annotations, plot and plot styles	2
8	**3D modeling :** 3D drawing commands – cone, cylinder, extrude, revolve, sweep, loft tools, editing commands	2

Practical content

The term work to be prepared by the candidates shall consists of technical report of about ten experiments performed by the candidates. Following should be following for considering all branch of students related to experiments.

a. At least two/ three drawing should be based on Mechanical Engineering part/assembly/project.
b. At least two/three drawing should be based on Civil Engineering project/work.
c. At least two/three drawing should be based on Electrical Engineering project/diagrams.

Text Books

1	Sham Tickoo, "AutoCAD 2017 for Engineers & Designers", Dreamtech Press.
2	George Omura, Brian C. Benton , "Mastering AutoCAD 2017 and AutoCAD LT 2017", Sybex.

Reference Books

1	James Leach, "AutoCAD 2017 Instructor (Including unique access code)", SDC Publications.
2	Linkan Sagar, "AutoCAD 2018 Training Guide", BPB Publications.

ICT/MOOCs references

1	https://www.youtube.com/watch?v=EgKc9L7cbKc (Introduction of AutoCAD)
2	https://www.youtube.com/watch?v=pIU6a4ECdlk (Basic drawing & editing commands)
3	https://www.youtube.com/watch?v=a_eVUDEbDWI (Multi view drawings& Dimensioning)
4	https://www.youtube.com/watch?v=5WW8y2e_F8Y (Section View)
5	https://www.youtube.com/watch?v=itvGX6Msgcc (Basic Symbols in AutoCAD)
6	https://www.youtube.com/watch?v=U6fN2wHDYHs (AutoCAD Content library)
7	https://www.youtube.com/watch?v=_qSYW_KE_SU (Layouts and Templates)
8	https://www.youtube.com/watch?v=fHqolQwz93U (3D modelling)