GOVERNMENT COLLEGE OF ENGINEERING, JALGAON

Syllabus of First Year Courses of Revised Curriculum as per National Education Policy 2020

(From Academic Year 2023-24 and onwards)

IKS103N ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

Teaching Scheme: 2L 0T 0PR **Credit:** 02

Evaluation Scheme: 10 ISA 30 MSE 60 ESE **Total Marks:** 100

COURSE DESCRIPTION

This course is intended to provide basic understanding of Indian traditional knowledge. This course introduces students to the fundamental concept of basic & modern Indian knowledge system as well as Indian tradition.

DESIRABLE AWARENESS

Basic structure of Indian knowledge system & various Indian traditions

COURSE OUTCOMES

Students are able to –

1. remember & apply Indian knowledge system in their personal as well as academic life.
2. apply Indian perspective of modern scientific world view.
3. analyzing basic principles of yoga and holistic health care system.
4. evaluate and explain basics of Indian traditional knowledge.
5. understand basic knowledge about Indian philosophical tradition.

RELEVANCE OF PROGRAM OUTCOMES (POS) AND STRENGTH OF CO-RELATION

CO	PO											
	1	2	3	4	5	6	7	8	9	10	11	12
1						2						3
2						2						3
3						2						3
4						2				3		3
5						2				3		3

1-Weakly correlated 2 – Moderately correlated 3 – Strongly correlated

COURSE CONTENT

Basic structure of Indian Knowledge System:

Ashtadashavidya – [03 Hrs]

Types of vedas - rigveda, yajurveda, samveda, atharvveda, types of upaved- ayurveda, dhanurveda, gandharvaveda, stapatyaveda, limbs of vedang, types of upanga

Modern Science and Indian Knowledge System: [03 Hrs]

Logic, mathematics, phonetics, life sciences, physics, military science

Yoga and Holistic Care: [03 Hrs]

General introduction to yoga, aims and objectives of yoga , psychological aspects and mythological concepts of yoga

Philosophical Tradition (Sarvdarshan): Various Indian Philosophical Tradition (Heterodox): [03 Hrs.]

jain, buddhist, ajivika, ajnana, carvaka

Indian Linguistic Tradition: **[03 Hrs.]**
phonology, morphology, syntax, semantics

Indian Artistic Tradition: Understanding key terms in art appreciation: art, craft:

Sculpture: **[03 Hrs.]**
iconography: hindu, buddhist and jaina, modern sculpture

Architecture: **[03 Hrs.]**
temple architecture -nagara, dravida and vesara, mosques and mausoleums -tajmahal (any one)

Painting: **[01 Hrs.]**
mural painting – ajanta, mughal and rajput- miniature styles, modern and contemporary artists

Music: **[02 Hrs.]**
traditional music**:** classical, folk, bhajan, thumri, dadra,sufi, modern music **:** bhangra, blues, dance, jazz, rock

Dance: **[01 Hrs.]**

classical, semi-classical, folk, tribal, shiva and natraja, bharatanatyam, kathak

TEXT BOOK

1. An Introduction to Indian Philosophy, S.C. Chaterjee& D.M. Datta, University of Calcutta, 1984.
2. Arts of India, Krishna Chaitanya, Abhinav Publications, 1987.
3. Cultural Heritage of India-course material, Sivaramakrishnan (Ed.), Bharatiya Vidya Bhavan,
   Mumbai. 5th Edition, 2014.

REFERENCES

1. Foundations of Indian Art, R. Nagaswamy, Tamil Arts Academy, 2002.
2. The Wave of life, Fritzof Capra.
3. Ed. RN Jha, GN Jha (Eng. Trans.), Yoga-darshanam with Vyasa Bhashya, Vidyanidhi Prakashan, Delhi 2016
4. India Arts, Pramod Chandra, Howard Univ. Press, 1st Edition, 1983

SH101N: ENGINEERING MATHEMATICS-I

For F. Y. B. Tech. (All Programmes)

Teaching Scheme : 03 L + 01 T Credits: 04

Evaluation Scheme: 10 ISA + 30 MSE + 60 ESE Total Marks: 100

ESE Duration : 3 Hrs.

COURSE DESCRIPTION

SH101N: Engineering Mathematics-I is a compulsory course for the First Year Engineering students of all six discipline of the Institute. The main objective of this course is to enable the student to demonstrate, communicate, present, and apply the acquired skills in the language of Applied Mathematics in their respective fields of Engineering as well as to motivate and prepare for GATE and higher studies.

DESIRABLE AWARENESS / SKILLS

NCERT/Maharashtra State board syllabus of mathematics for 11^{th} and 12^{th} (Science)

COURSE OUTCOMES

On the successful completion of this course, student shall be able to

1. apply various tools and techniques of **Linear algebra (Matrix algebra) and Complex** Numbers. required for analytical studies in their respective disciplines
2. apply various tools and techniques of **Differential calculus** of function of single variable required for mathematical calculations and analytical studies in their respective disciplines
3. apply the various mathematical tests for **convergence analysis of Infinite Series** required for mathematical calculations and analytical studies in their respective disciplines
4. approximate periodic functions in **trigonometric Fourier Series** required for analytical studies in their respective disciplines

Relevance of COURSE OUTCOMES (COs) WITH POs AND PSOs (WITH strength of co-relation)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	1	1	1	1	3	1	2	1	2			
2	3	2	1	1	1	1	1	3	1	2	1	2			
3	3	2	1	1	1	1	1	3	1	2	1	2			
4	3	2	1	1	1	1	1	3	1	2	1	2			

1-Weakly correlated **2 – Moderately correlated** **3 – Strongly correlated**

COURSE CONTENT

Complex Numbers **[08 L + 02 T]**

Powers and Roots of complex numbers, Functions of a Complex Variable, Exponential and Logarithmic Functions, Trigonometric and Hyperbolic Functions, Inverse Trigonometric and Hyperbolic Functions

Linear algebra **[08 L + 02 T]**

Special matrices with Complex elements, Rank of a matrix, Systems of linear algebraic equations, Linear transformation, Orthogonal transformation, Orthogonal Matrix, Characteristic Polynomial, Cayley- Hamilton theorem, Powers of Matrices, The Matrix exponential, Function of Matrix, Eigen values, Eigen vectors.

Differential Calculus of Single variable **[08 L + 02 T]**

n^{th} order differentiation of some elementary functions, Leibnitz's theorem, Taylor's and Maclaurin's series expansion/approximation of function of single variable and Indeterminate forms of limits

Convergence of Infinite series **[08 L + 02 T]**

Comparison test, D'Alembert's ratio test, Raabe's Test, Absolute and conditional convergence of a infinite series; Uniform convergence of a infinite series;

Fourier series **[08 L + 02 T]**

Dirichlet's conditions; Fourier series approximation in intervals $[c, c+2L], [0, 2L], [-L, L], [0, 2\pi]$, $[-\pi, \pi]$, Half range Fourier series, Complex form of Fourier series

Text Books

1. "Calculus", Gregory Hartman et al. Virginia Military Institute, LiberTexts
2. "Higher Engineering Mathematics", John Bird, 6th edition and onwards, Elsevier
3. "Higher Engineering Mathematics", B.S. Grewal, 9th edition and onwards, Khanna Publication
3. "Higher Engineering Mathematics", N.P. Bali, Manish Goyal, 8th edition and onwards, Laxmi Publication, New Delhi
4. "Engineering Mathematics", Ravish R Singh, Mukul Bhatt, 2nd edition Mc Graw Hill Edu.
5. "Engineering Mathematics", A Foundation for Electronic, Electrical, Communications and Systems Engineers Anthony Croft, Robert Davison, James Flint, 5th edition Mary Attenborough," Newness
6. "Mathematics for Electrical Engineering and Computing", 20th edition onwards, H. K. Das, S Chand Publication

Reference Books

1. "Advance Engineering Mathematics", Erwin Kreyszig, John Wiley & Sons, Inc
2. "Advance Engineering Mathematics", Micheal D. Greenberg, Prentice Hall
3. "Advance Engineering Mathematics", K.A. Stroud, Dexter J. Booth, Palgrave Macmillan
4. "Advance Modern Engineering Mathematics", Glyn James and David Burley, Dick Clements, Phil Dyke, John Searl, Nigel Jerry Wright, Pearson
5. "Advance Engineering Mathematics", Dean G. Duffy, CRC press, and Taylor & Francis

group
6. “Advance Engineering Mathematics”, S.S. Sastry, PHI Learning Education, Eastern Economy Edition 2009 onwards
7. “Advance Engineering Mathematics”, B.S. Grewal, Khanna Publication
8. “Advance Engineering Mathematics”, H.K. Dass, S. Chand Publication
9. “Advanced Engineering Mathematics”, Dennis G. Zill, Loyola Marymount University.

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Evaluation Methodology:

MSE: Mid Semester Examination will be based on 40 % of the syllabus

ESE: End Semester Examination will be based on 100 % syllabus

ISA: ISA will be based on any one or combination of following components-

1) Declared test
2) Surprise test
3) MCQ Test
4) Performance in Tutorial
5) Assignments/ Tutorial / Punctuality/ Attendance

However, apart from above components, the Course Coordinator can choose any other component and shall declare method of evaluation at beginning of course

SH151N: ENGINEERING MATHEMATICS-II

For F. Y. B. Tech. (All Programmes)

Teaching Scheme: 03 L 01 T **Credits:** 04
Evaluation Scheme: 10 ISA + 30 MSE + 60 ESE **Total Marks:** 100
ESE Duration: 3 Hrs.

COURSE DESCRIPTION

SH151N: Engineering Mathematics-II is a compulsory course for the First Year Engineering students of all six discipline of the Institute. The main objective of this course is to enable the student to demonstrate, communicate, present, and apply the acquired skills in the language of Applied Mathematics in their respective fields of Engineering as well as to motivate and prepare for GATE and higher studies.

DESIRABLE AWARENESS / SKILLS

NCERT/Maharashtra State board syllabus of mathematics for 11^{th} and 12^{th} (Science), SH101N: Engineering Mathematics-I

COURSE OUTCOMES

On the successful completion of this course, student shall be able to

1. apply the concepts of differential geometry required for analytical studies in their respective disciplines;
2. apply the tools of Integral Calculus to required for analytical studies in their respective disciplines;
3. apply the various tools and techniques of Multi variable Differential Calculus required for analytical studies in their respective disciplines
4. apply the various tools and techniques of Vector Differential Calculus required for analytical studies in their respective disciplines

Relevance of COURSE OUTCOMES (COs) WITH POs AND PSOs (WITH strength of co-relation)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	1	1	1	1	3	1	2	1	2			
2	3	2	1	1	1	1	1	3	1	2	1	2			
3	3	2	1	1	1	1	1	3	1	2	1	2			
4	3	2	1	1	1	1	1	3	1	2	1	2			

1-Weakly correlated **2 – Moderately correlated** **3 – Strongly correlated**

COURSE CONTENT

Coordinate Systems and Differential geometry **[(08 L + 02 T]**

Relations between Cartesian coordinate system, spherical polar coordinate system, and cylindrical polar coordinate system, Curvature, angle between radius vector and Tangent,

Asymptotes, Curve tracing of plane curves (Simple Cartesian curves, parametric curves and polar curves)

Multivariable Differential Calculus: **[10 L + 02 T]**

Partial derivatives, Homogeneous functions and Euler's theorem, Composite Functions, Total derivative, Jacobian and Chain rule of Jacobian, Maximum and minimum points of a function of two variables, Maxima and Minima problems, Lagrange's multipliers

Vector Differential Calculus: **[06 L + 02 T]**

Scalar and vector point functions, Gradient of scalar point function, Directional Derivatives, Curl and Divergence of vector point functions. Solenoidal and irrotational force fields, properties of the vector differential operator ∇

Multivariable Integral Calculus **[08 L + 02 T]**

Double integration (Cartesian and Polar coordinates), Change of order of double integration. Triple integration (Cartesian, spherical polar, cylindrical polar coordinates).
Change of order of Integration, The Average Value of function over the region R, Area bounded by plane curves, Volume Between the surfaces

Calculus of Special Functions **[08 L + 02 T]**
Some integral functions: Gamma function, Beta function, Error function; Rule of differentiation under integral sign; Reduction formulae

TEXT BOOKS

1. Calculus, Gregory Hartman et al. Virginia Military Institute, LiberTexts
2. Higher Engineering Mathematics, John Bird, 6th edition and onwards, Elsevier
3. Higher Engineering Mathematics, B.S. Grewal, 9th edition and onwards, Khanna Publication
4. Higher Engineering Mathematics N.P. Bali, Manish Goyal, 8th edition and onwards, Laxmi Publication, New Delhi
5. Engineering Mathematics, Ravish R Singh, Mukul Bhatt, 2nd edition Mc Graw Hill Edu.
6. Engineering Mathematics, A Foundation for Electronic, Electrical, Communications and Systems Engineers Anthony Croft, Robert Davison, James Flint, 5th edition, Mary Attenborough," Newness
7. Mathematics for Electrical Engineering and Computing, 20th edition onwards,
8. Higher Engineering Mathematics,H. K. Das, S Chand Publication

REFERENCE BOOKS

1. "Advance Engineering Mathematics", Erwin Kreyszig, John Wiley & Sons, Inc
2. "Advance Engineering Mathematics, Micheal" D. Greenberg, Prentice Hall
3. "Advance Engineering Mathematics", K.A. Stroud, Dexter J. Booth, Palgrave Macmillan
4. "Dick Clements, Phil Dyke, John Searl, Nigel Jerry Wright, Pearson
5. "Advance Engineering Mathematics", Dean G. Duffy, CRC press, and Taylor & Francis
6. "Advance Engineering Mathematics", S.S. Sastry, PHI Learning Education, Eastern Economy Edition 2009 onwards
7. "Advance Engineering Mathematics", B.S. Grewal, Khanna Publication
8. "Advance Engineering Mathematics", H.K. Dass, S. Chand Publication
9. "Advanced Engineering Mathematics", Dennis G. Zill, Loyola

10. "Advanced Engineering Mathematics", Peter V. O'Neil, CENGAGE LEARNING

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EVALUATION METHODOLOGY:

MSE: Mid Semester Exam will be based on 40-50% of the syllabus

ISA: ISA will be based on any one or combination of following components-

1. Declared test
2. Surprise test
3. MCQ Test
4. Performance in tutorial

ASSIGNMENTS/TUTORIAL/PUNCTUALITY/ATTENDANCE

However, apart from above components, the course coordinator can choose any other component and shall declare method of evaluation at beginning of course

SH102N: ENGINEERING CHEMISTRY

For F. Y. B. Tech. (All Programmes)

Teaching Scheme: 03 L 00 T **Credits:** 03
Evaluation Scheme: 10 ISA + 30 MSE + 60 ESE **Total Marks:** 100
ESE Duration: 3 Hrs.

COURSE DESCRIPTION

Engineering Chemistry is a one semester compulsory course for the B. Tech first year students of this institute.

The course is aimed for introducing the fundamentals of engineering chemistry to undergraduate students. The course provide knowledge to understand, remember and apply basic principles of engineering chemistry and their applications in different branches of engineering to solve engineering problems and to support their concurrent and subsequent engineering studies.

DESIRABLE AWARENESS / SKILLS

Knowledge of concepts and theory of basic Chemistry.

COURSE OUTCOMES

The concepts developed in this course will aid in the quantification of several concepts in chemistry. After completion of this course students will able to

1. Able to identify chemical behavior, mechanism, proportion and application of various lubricant.
2. Able to interpret various ways of corrosion to find remedy to overcome it.
3. Develop the synthesis, properties and applications of polymers for domestic and industrial application.
4. Identify various watesr sources. Know problems related to impurities in water to find out water softening processes. Find various energy sources and their properties.

Relevance of COURSE OUTCOMES (COs) WITH POs AND PSOs (WITH strength of co-relation)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2														
2		2													
3							1								
4							2								

1- Weakly correlated 2 – Moderately correlated 3 – Strongly correlated

Course Content

Water Treatment **[08 Hrs.]**

Definition of hard and soft water, Sources of water, classification of impurities, Hardness and its types, Units of hardness, Numericals, Determination of hardness of water by EDTA method, Numerical, Scale & Sludge formation in boiler, Priming & Foaming, Caustic Embrittlement. Water softening process – Zeolite process, Ion exchange and soda lime method numerical on soda lime method.

Corrosion **[08 Hrs.]**

Definition, causes and consequences, corrosion prevention method. Cathodic and anodic protection, Design and material selection, protective surface coating hot dipping, cladding, electroplating, powder coating,

Lubricants **[08 Hrs.]**

Introduction, Mechanisms of lubrication - Fluid film, Boundary film & Extreme pressure. Types of lubricants – Solid lubricants – Molybdenum disulphide, Graphite.
Liquid lubricants – Vegetable, Animal, Mineral & Synthetic oils. Semi solid lubricants – Greases, Lubricating Emulsions – Oil in water, Water in oil.
Properties of lubricants & its significance – Physical properties – Viscosity & Viscosity Index. Determination of viscosity by Redwood viscometer, Flash & Fire point by Pensky-Marten's apparatus, Cloud & Pour point.
Chemical properties – Acid value, Saponification value, Steam emulsification number

Polymers **[08 Hrs.]**

Introduction, Classification of polymers, Mechanism of addition polymerization by free radical method. Preparation, properties & applications of – Polyethylene, Polystyrene, PVC, Nylon 66, Teflon. Polycarbonate, Polyurethane. Synthetic Rubber – preparation, properties & applications of – Styrene butadiene rubber (SBR), Nitrile rubber, Butyl rubber.

Fuels **[08 Hrs.]**

Definition, Classification of fuels, Calorific value – Gross calorific value, Net calorific value, Different units of Calorific value & their inter-relation, Numerical. Types of fuels – Solid fuel – Coal – Proximate & Ultimate analysis of coal, Determination of calorific value by Bomb calorimeter, Numerical. Liquid fuel – Petroleum – origin, refining & Fractional distillation, Catalytic cracking – Fixed bed and Moving bed type. Gaseous fuel - preparation, properties and applications of – Coal gas, Water gas. Advantages and Disadvantages of solid, liquid and gaseous fuels.

TEXT BOOKS

1. "Engineering Chemistry", P.C. Jain & M. Jain, Jain & Jain Publication 16th Edition 2015.
2. "A Text Book of Engineering Chemistry", S S Dara, S Chand & Co. Ltd.
3. Krishna, "Engineering Chemistry", B K Sharma, Prakashan Media (P) Ltd.
4. "Engineering Chemistry", B Sivasankar, Tata Mc Graw Hill (P) Ltd.
5. "Engineering Chemistry", B S Chauhan, University Science Press 2009, Third

Edition.
6. "A Text book of Engineering Chemistry", Shashi Chawla, Dhanpat Rai Publishing Co.
7. "Engineering Chemistry", first Edition Sunita Rattan, S.K. Kataarina and Sons 2012.
8. Advanced Polymer Chemistry, M, Chanda 2nd Edition 2013

REFERENCE BOOKS

1. "Polymer Science", V R Gowariker, New Age International.
2. "Fundamentals of organic chemistry", John Wiley & Sons Inc, Graham - Soloman T W,
3. "Physical Chemistry", Alberty & Sibley, John Wiley & Sons Inc.
4. "Organic Chemistry", Morrison & Boyd, Prentice Hall of India, 6th Edition.
5. "Laboratory manual on Engineering chemistry", S K Basin, Sudha Rani, Dhanpat Rai Publishing Co.
6. "A Textbook on Experiment and calculation in Engineering Chemistry" S S Dara, S. Chand Publication

SH152N ENGINEERING PHYSICS

For F. Y. B. Tech. (All Programmes)

Teaching Scheme: 03 L + 00 T; Total: 03 hours/week **Credits:** 03
Evaluation Scheme: 10 ISA + 30 MSE + 60 ESE **Total Marks:** 100
ESE Duration: 3 Hrs.

COURSE DESCRIPTION

Engineering Physics is a one semester compulsory course for the B. Tech first year students of this institute. The course is aimed for introducing the fundamentals of engineering Physics to undergraduate students. The course provides knowledge to understand, remember and apply basic principles of Physics and their applications in different fields of engineering to solve the engineering problems and to support their concurrent and subsequent engineering studies.

DESIRABLE AWARENESS / SKILLS

Knowledge of concepts and theory of basic Physics.

COURSE OUTCOMES

The concepts developed in this course will aid in the quantification of several concepts in physics.

After completion of this course students will able to

1. Analyze the intensity distribution and to apply optical phenomenon to design advanced optical instruments.
2. Apply Laser technology for engineering applications and LASER-material interactions.
3. Implement the concepts of quantum mechanics to nano-dimensional systems.
4. Employ the knowledge of semiconductors and magnetic materials to establish the structure-property relationship for material's engineering.

Relevance of COURSE OUTCOMES (COs) WITH POs AND PSOs (WITH strength of co-relation)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2														
2		2													
3			2												
4		2													

1-Weakly correlated **2 – Moderately correlated** **3 – Strongly correlated**

COURSE CONTENT

Interference and Diffraction **[08 Hrs.]**

Interference due to thin film of uniform thickness; conditions of minima maxima, Newton's rings, Applications of interference.

Fraunhoffer diffraction at a single slit; condition of maxima and minima, Plane diffraction grating (Diffraction at multiple slits) and applications based on diffraction.

Polarization **[08 Hrs.]**

Polarization of light, linear, elliptical and circular polarization, quarter and half wave plate, Polarization by selective absorption; dichroism, Polarization by double refraction, Nicol prism, Optical activity and specific rotation, Fresnel's theory of optical rotation.

LASER **[08 Hrs.]**

Introduction to laser, Laser and ordinary light, Laser beam characteristics, Spontaneous and stimulated emission of radiations, Population inversion, Pumping (Three level and four level pumping), Optical resonator, He-Ne Laser, Semiconductor Laser, Nd-YAG Laser, Engineering applications of Laser (Fiber optics, Laser material interaction).

Quantum Mechanics **[08 Hrs.]**

Matter waves, de-Broglie's concept of matter waves, Properties of matter waves, Heisenberg's Uncertainty principle, Schrödinger's time dependent and time independent wave equations, Physical significance of wave function and expectation values. Applications of Schrödinger's equation; Motion of a free particle, Electron in an infinite deep potential well (rigid box), Electron in a finite deep potential well (non-rigid box), Concept of quantum tunneling, Linear Harmonic oscillator

Physics of Semiconductor and Magnetic materials **[08 Hrs.]**

Band theory of solids, classification of solids on the basis of band theory, Femi level and Fermi energy, band structure of p-n junction diode, conductivity of semiconductors, Hall effect. Applications of semiconductors

Introduction to magnetism, Magnetization and hysteresis curve, Magnetic materials and types (qualitative discussion), Ferrites; Hard and soft ferrites. Applications of magnetic materials.

TEXT BOOKS

1. "A text book of Engineering physics", Avadhanulu and Kshirsagar, S. Chand Pub.
2. "A Text Book of Optics", N. Subramanyam & Brijlal; (Vikas Publishing House Pvt. Ltd).
3. "LASERS Theory and Applications", K. Thyagarajan, A. K. Ghatak; Macmillan India Ltd.

REFERENCE BOOKS

1. "Fundamentals of Optics", Francis A. Jenkins and Harvey E. White; Mc-Graw Hill International Edition.
2. "Concepts of Modern Physics", Arthur Beiser; Tata McGraw – Hill Edition.

3. “Modern Physics”, Jeremy Bernstein, Paul M. Fish bane, Stephen Gasiorowics; Pearson Education.
4. “Quantum Mechanics”, L. J. Schiff; Mc-Graw Hill International Edition.
5. “PHYSICS”, (Volume I & II), Resnick Halliday and Krane; Willey India 5th Edition.

CE151N ENGINEERING MECHANICS

Teaching Scheme : 03 L + 00 T; Total: 03 hours/week **Credits** : 03
Evaluation Scheme : 10 ISA + 30 MSE + 60 ESE **Total Marks** : 100
ESE Duration : 3 Hrs.

COURSE DESCRIPTION

This course provides the elementary level knowledge of Engineering and Engineering mechanics which includes study of forces and force systems, Resultant and equilibrium of coplanar force systems, friction, Kinematics and kinetics of bodies.

DESIRABLE AWARENESS / SKILLS

Knowledge of basics of material science and mathematics.

COURSE OUTCOMES

On the successful completion of this course; student shall be able to -

1. Compute the rectangular components of a force and Identify and/or list the different types of force systems. .
2. Define and calculate the resultant of coplanar force systems and Understand condition of equilibrium for coplanar forces.
3. Calculate the centroid and moment of inertia of composite plane figures.
4. Define friction, friction force, static friction, kinetic friction, normal force, coefficient of friction, angle of friction, and angle of repose.
5. Analyze beams and trusses.

RELEVANCE OF COURSE OUTCOMES (COs) WITH POs AND PSOs (WITH STRENGTH OF CO-RELATION)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3			3		3	2						1		1
2	2			2		3	2						1		1
3	2					3	1						2		1
4	2					3	1						1		2
5	3			3		3	2						1		1

1-Weakly correlated **2 – Moderately correlated** **3 – Strongly correlated**

COURSE CONTENT

Introduction to Engineering Mechanics **[03 L]**

Objectives of Engineering Analysis and Design, Idealization of Engineering Problems Principles of Mechanics, Basic concept and fundamental laws

Equilibrium of coplanar force system **[08 L]**

Force types and Force System, composition and Resolution of forces, Resolution of Concurrent force System in Plane, Moment of forces/ Couple, Meaning of equilibrium, free body diagrams, Equations of equilibrium, Varignon's theorem, Equivalent Force system, Resultant of Non-Concurrent Force System in plane, Introduction to Space forces, Resultant of Concurrent Forces system in Space.

Equilibrium of Force System **[06 L]**

Introduction, body constraints, type of supports, beams & loads, free body diagram, conditions of equilibrium, equilibrium of two, three forces in plane, Lami's theorem, equilibrium of forces in plane, reaction of determinate beam.

Center of Gravity **[03 L]**

Introduction, center of Gravity / centroid of simple figures / composite sections, center of gravity and its implications.

Moment of Inertia **[05 L]**

Introduction, definition, moment of inertia of plane sections / standard sections /composite sections, theorem of moment of Inertia, mass moment of inertia of circular plate, cylinder, cone, sphere and hook.

Trusses **[04 L]**

Definitions, assumptions, types, Analysis of simple plane perfect trusses by method of joints and method of section.

Friction **[05 L]**

Introduction, Types of Friction, Co-efficient of Friction, Angle of Friction, Cone of Friction, Coulomb's Laws of Friction, Angle of Repose, Equilibrium of a Body Lying on a Rough Inclined Plane, wedge friction, screw jack / differential screw jack.

Kinematics of Particles **[02 L]**

Motion related to Cartesian coordinates.

Kinetics of Particles **[02 L]**

Newton's second law, energy principles, Impulse momentum principle.

Virtual Work and Energy Method **[02 L]**

Virtual displacements, principle of virtual work for particle and ideal system of rigid bodies.

Text Books:

1. Engineering Mechanics, Bhavikatti S.S, 4th edition, New Age International Publications, 2013
2. Vector Mechanics for Engineers Vol I-Statics, Vol. II-Dynamics, F. P. Beer and E. R. Johnston, 9th Edition, , Tata McGraw Hill, 2011
3. A Text Book of Engineering Mechanics, R. K. Bansal, 6th edition, Laxmi Publication New Delhi, 2013

Reference Books

4. Engineering Mechanics, Irving H. Shames, 4th Edition, Prentice Hall, 2006
5. Engineering Mechanics, R. C. Hibbler, 4th edition, Pearson Press, 2006
6. Introduction to Statics and Dynamics, Andy Ruina and Rudra Pratap, Oxford University Press, 2011

Useful Links

1. NPTEL, www.nptel.ac.in
2. www.sasi.ac.in/mech
3. myengineeringmechanics.com

EE101N: BASIC ELECTRICAL ENGINEERING

Teaching Scheme : 03 L + 00 T; Total: 03 hours/week **Credits:** 03
Evaluation Scheme : 10 ISA + 30 MSE + 60 ESE **Total Marks:** 100
ESE Duration : 3 Hrs.

COURSE DESCRIPTION

This is the basic course in Electrical Engineering which introduces the basic concepts, differenttheorem and laws, Electrical circuits to students

COURSE OUTCOMES

On the successful completion of this course, the students shall be able to -

1. Apply various basic laws and theorems to electric circuits
2. Apply the basic magnetic laws to magnetic circuits
3. Differentiate single and three phase AC system and the relationship of various ACcircuits parameters
4. Explain the principle, working and applications of various electrical machines liketransformer, DC motor, generator and induction motor
5. Identify the electrical wiring installations aspects and accessories

RELEVANCE OF COURSE OUTCOMES (COS) WITH POS AND PSOS (WITH STRENGTH OF CO-RELATION)

Course outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	1				2	1	1	2	2		2			
CO2	2	2				2	1	1	2	2		2			
CO3	3	1				1	2	1	1	1		1			
CO4	2	2				2	1	2	2	1		2			
CO5	2	2				2	2	2	2	2		2			

1-Weakly correlated **2 – Moderately correlated** **3 – Strongly correlated**

COURSE CONTENT

D.C. Circuit: **[08 L]**

Kirchhoff current and voltage laws, Source conversion, series and parallel circuit, current and voltage division rule, Delta-Star and Star-Delta conversion, Node Analysis and Mesh Analysis methods Network Theorem: Superposition theorem, Thevenin's and Norton's theorems Maximum power transfer theorem (Numerical limited to two sources)

Capacitor: Charging and discharging of capacitor, Time constant for RC circuit Introduction of circuit active and passive parameter of electrical circuit

Electromagnetic Induction: **[08 L]**

Faraday's laws, statically and dynamically induced emf, self and mutual inductance, coefficients of coupling, inductance in series and parallel, Magnetic Circuits: Terms related with magnetic circuits, Magnetization curve, Magnetic leakage and fringing, Leakage coefficient, Series and parallel circuits, magnetic hysteresis, and eddy current loss,Rise and decay of current in inductive circuit, Time constant for RL circuit

Single phase and Three phase AC Circuits: **[08 L]**

Concept of single phase supply, terms related with A.C. quantities, pure resistive, inductive and capacitive circuits, complex and phasor representation of AC quantities, R-L-C series and parallel circuits, resonance in series and parallel circuits, Q-factor of coil

Three phase AC Circuits: Concept of Three phase supply, star and delta connections, line and phase values, phasor diagram, three phase balance star and delta loads and their phasor diagrams.

Introduction to Electrical Machines: **[08 L]**

Principle of operation, construction, working and applications of- DC generator, DC motor, single phase and three phase transformers: EMF equation and transformation ratio, single phase and three phase Induction motors (Numerical treatment not expected)

Electrical Wiring and Accessories: **[08 L]**

Electrical Wiring Installations: Accessories used for electrical wiring, types of insulated wires & wiring systems, detail study of concealed conduit electrical wiring systems, concept of fuses,MCBs, ELCBs in wiring installations, concept of earthing, power rating of different domestic appliances, kWh (Unit) / Energy consumption calculations, study and comparison of Light Emitting Diode (LED) lamps and Compact Fluorescent Lamps (CFL), Solar lamps.

Text Books

D.P.Kothari, I.J.Nagrath, "Basic Electrical Engineering", Tata McGraw Hall

M.S.Naidu,S.Kamakshaia, "Introduction to Electrical Engineering", Tata McGraw Hall

J.P.Tiwari, "Basic Electrical Engineering", New Age Publication

D. P. Kothari , I. J. Nagrath, "Electrical Machines", Fifth Edition, McGraw Hill, 2017.

Ashfaq Husain,Haroon Ashfaq,"Electric Machines" Third Edition, Dhanpat Rai &Co.,2015

Reference Books

7. Leonord Bobrow, “Fundamentals of Electrical Engineering”, Oxford University Press
8. Vincent Del Toro, “Principles of Electrical Engineering”, Prentice Hall
9. Joseph Administer, “Schaum’s outline of Electric circuits”, Tata McGraw Hill
10. A. E. Fitzgerald, C. Kingsley and S. D. Umans, “Electric Machinery”, 6th Edition, McGraw Hill, 2003
11. M. G. Say, “Alternating Current Machines”, Pitman Publications, 5th Edition, 1984
12. J.B.Gupta, “Theory and performance of Elctrical Machines”, S.K.Kataria and Sons,14th Edition, 2014

EVALUATION METHODOLOGY

- **ISA –** ISA will be based on any one or two of the following component-
  - Declared test
  - Surprise test
  - MCQ Test
  - Assignments
  - PPT presentation
  - Quiz
  - Fabrication of working model

Apart from the above components, the course coordinator may suggest any other component of evaluation, if any. However, the course coordinator shall declare the same at the beginning of thecourse.

- **MSE-** Mid Semester Exam will be based on 50% of the syllabus
  ESE- End Semester Exam will be based on 100% of the syllabus

ET151N BASIC ELECTRONICS ENGINEERING

Teaching Scheme: 03 L
Credit: 03
Evaluation Scheme: 30 MSE + 10 ISA + 60 ESE
Total Marks: 100
Duration of ESE: 03 Hrs.

Course Description:
This course provides knowledge about basic analog electronics components to familiarize students with construction, their working, operation, performance and applications. This course also provides knowledge about fundamentals of measurement and active and passive electronic components used in measuring circuits.

Course Outcomes:
Upon successful completion of this course the students will be able to

1. analyze resistive circuit using network fundamentals.
2. reveal operating principles of basic semiconductor devices like diodes and transistors.
3. determine important parameters and component values of various diode circuits.
4. describe the operating principles of multi-meter and CRO
5. select a suitable sensor or transducer for given application.

The relevance of POs and strength of correlation

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	1									1	1	
2	3	3	3	1									1	2	
3	3	3	3	1									1	2	
4	3	3	2	2									1	2	
5	3	3	2	1									1	2	

Course Content

Network Fundamentals (DC analysis): (04 Hours)
Ohm's law, Kirchoff's Current Law (KCL), Kirchoff's Voltage Law (KVL), Node and Mesh analysis. Network Theorems: superposition theorem, Thevenin's theorem, Norton's theorem, maximum power transfer theorem.

P N junction Diodes: (06 Hours)
p-n junction diode – construction, operation, current components and V – I characteristics in forward and reverse bias, temperature dependence of V – I characteristics, junction capacitances, specifications of a typical p-n junction diode. Zener diode – construction, operation, V – I characteristics, specifications of a typical zener diode. varactor diode.

Diode Circuits: (06 Hours)
Rectifiers – concept, important parameters, operation, and analysis of half wave, full wave and bridge rectifier. Filters – necessity, types (capacitive, inductive, L section and π type) and their operation. Zener diode as voltage regulator. Wave shaping circuits – clippers and clampers. Voltage multipliers.

Transistor: **(12 Hours)**
Definition and types, Bipolar Junction Transistors (BJT): Basic concept, construction, working, current components, BJT as an amplifier and switch. BJT configurations (CB, CE and CC) and their V-I characteristics, alpha, beta & gamma and their inter-relation, DC load line analysis, Q-point and its significance, specifications/data sheet of a typical BJT, biasing methods - fixed and voltage divider bias. Field Effect Transistor (FET) - Construction, working, parameters of JFET, drain characteristics and transfer characteristics of JFET, parameters of JFET, MOSFET – depletion and enhancement type.

Measurement System and Measuring Instruments: (08 Hours)
Block diagram of measurement system, types of errors, significance of electrical measurement system, various electrical effects employed in measuring instruments, static and dynamic characteristics of measuring instruments, classification of measuring instruments. Measuring instruments - analog and digital instruments, voltmeter, current meter and multi-meter, Cathode Ray Oscilloscope (CRO) - block diagram and operation.

Transducers: (05 Hours)
Definition - transducer and sensor, classification of transducers, characteristics and selection criteria, RTD, thermistor, LVDT, potentiometer, strain gauge transducers, transducers useful for agricultural and communication applications.

Text Books

1. Electronic Principles, A. Malvino, D. J. Bates, 9th edition, Tata McGraw Hill Education Private Limited, 2021.
2. Electronic Instrumentation and Measurement Techniques, A. D. Helfrick and W. D. Cooper, Pearson, 2015.
3. Networks, Lines and Fields, John D. Ryder, 2nd edition, Pearson Publications, 2015

Reference Books

1. Milman's Integrated Electronics, Jacob Milman, Christos Halkias, Chetan D. Parikh, 2nd edition, Tata McGraw Hill Education, 2017.
2. Electronic Instrumentation and Measurements, H. S. Kalsi, McGraw Hill Education Private Limited, 4th edition, 2022.

CO101N: FUNDAMENTALS OF COMPUTER SCIENCE AND ENGINEERING

Teaching Scheme: 03L+ 00T , Total: 03 **Credits:** 03
Evaluation Scheme: 10 ISA+ 30 MSE+ 60 ESE **Total Marks:** 100
ESE Duration: 3Hrs.

COURSE DESCRIPTION:

This course is aimed to familiarize the students with the basics of Computer System- Hardware , Software and Networking. The course also covers the concepts of System Softwares ,Application Softwares, Computer Security and Cloud Computing. This course also provides the knowledge of Web Technologies and Web Development.

DESIRABLE AWARENESS/SKILLS:

Basic knowledge of Electronics.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1: Explain the basic concepts of computer science and engineering.
CO2: Discuss the concepts of System Software, Application Software.
CO3: Use the concepts of computer networking and computer security.
CO4: Develop a web site using various technologies and tools.
CO5: Apply the knowledge of cloud/ cloud computing.

Course Outcomes (COs) and Program Outcomes (POs) mapping with strength of correlation

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	1											
CO2			1									
CO3	2	1	2	1	1			2				**1**
CO4	1	3	3	1	2	2		2	2	2	**2**	**2**
CO5	1		1	1	1	1		2	2	2	**2**	2

1 - Weakly correlated 2 – Moderately correlated 3 – Strongly correlated

COURSE CONTENTS:

Basics of Computer System: **[08 Hrs.]**

Brief overview of Computer History, Block diagram and functions of the different units of a computer system - CPU, I/O devices, Computer Memory, Memory hierarchy, Concepts of Hardware, Software, Firmware, Customized software, Communication Software, Performance Monitoring Software, Open source software, Computer Peripherals and interfacing, Booting/Shutting of a Computer System , Device Drivers, Data and Information, Data Visualisation tools.

System Software and Application Software: **[08 Hrs.]**

Operating System- function and types, Program Language Translators- Assembler, Compiler, Interpreter, Linker, Loader, Utility Programs, Application Software**,** Software hierarchy and dependence between the different layers, Computer Languages- Machine language, Assembly language, High level languages, Introduction to Apache Open Office, Word Processors , Document editors.

Basics of Networking and Computer Security: **[08 Hrs.]**

Introduction to Computer Network, Concepts of Networking- LAN, WAN, MAN, WLAN , Internetworking- Internet, Intranet, Extranet, Networking Components, ISP's in India and their responsibilities, Video Conferencing, Client Server Communication, downloading and uploading files, Computer Viruses and types, How computer virus spreads , Detection and Prevention of viruses, Protection against viruses, Antivirus softwares, Basic computer maintenance and troubleshooting,

Web Technologies and Web Development: **[08 Hrs.]**

Introduction to World Wide Web, Search engines, E-mail, Web browsers, Website, Understanding URL, Domain name, IP Address , Video Conferencing, Internet Protocols- FTP, Telnet, TCP/IP, SMTP, HTTP, Introduction to HTML - Basic tags, Formatting tags, Style sheets, Table handling, Lists, Hyperlinks in HTML, Introduction to CSS and JavaScript.

Cloud Computing Fundamentals: **[08 Hrs.]**

Defining Cloud computing, Cloud architecture, Characteristics, Components, Types of Clouds, Cloud Service models- Iaas, PaaS, SaaS, Applications, Advantages & Limitations, Benefits of using Cloud for business.

TEXT BOOKS:

1. Pradeep K. Sinha, Priti Sinha, Computer Fundamentals, Eighth edition, BPB Publication, ISBN:13978-8176567527.
2. Sudakshina Kundu, Fundamentals of Computer Networks, Second Edition, PHI, ISBN: 978-8120327627, 2008.
3. Jain Satish, Iyer G.M., Web Designing and Publishing, First edition, BPB, ISBN;978-9389845747, 2020.

REFERENCE BOOKS:

1. Rajaraman V., Adabala N., Fundamentals of Computers, , sixth edition, PHI, ISBN: 978-81203506702014.
2. Goel A., Computer Fundamentals, First edition. Pearson, 2010 , ISBN; 978-8131733097.

3. Dinesh Maidasani, Learning Computer fundamentals, MS Office and Internet & Web Technology, Third edition, ISBN: 978-8190855938.

4. M Lotia, P Nair, P Lotia , Modern Computer Hardware Course, ISBN: 978-8183331678.

CO151N PROGRAMMING FOR PROBLE SOLVING

TeachingScheme:03L+00T **Credit:**03
EvaluationScheme:30MSE+10ISA +60ESE **TotalMarks:**100
Duration of ESE:03 Hrs

COURSE DESCRIPTION:

This course introduces basic proficiency in programming for solving real life problems.

DESIRABLE AWARENESS/SKILLS:

Basic computer fundamental.

COURSE OUTCOMES:

On the successful completion of this course student will learn:

CO1	Implement algorithms for mathematical and scientific problems
CO2	Compare alternate algorithmic approach for problem solving
CO3	Understand the components of computing systems
CO4	Choose datatypes and structures to solve mathematical and scientific problem
CO5	Develop modular programs using control structures

THE RELEVANCE OF PO'S AND STRENGTH OF CO-RELATION:

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12
CO1	3	3	2	2	3	3		2	2			2
CO2	3	3	2	3	3	3		2	2			2
CO3	3	3	2	2	3	3		2	2		2	
CO4	3	3	3	2	3	3		2	2			
CO5	3	3	2	3	3	3		2	2			

COURSE CONTENTS

Introduction to Programming: **[02 Hrs.]**

Introduction to Programming, Types of Programming- Procedural Oriented Programming and Object Oriented Programming. Basic Program practices.

Introduction to Algorithm: **[02 Hrs.]**

Steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples. From Algorithms To Programs;source code, variables (with data types) variables and memory locations, Syntax and Logical Errors Compilation, object and executable code

Tokens, Arithmetic expressions and precedence: **[06 Hrs.]**

keywords, variables, constants, arithmetic operators, relational operators, logical operators, assignment operators, increment and decrement operators, conditional operators, bitwise operators, operator precedence, type casting

Conditional Branching and Loops: **[05 Hrs.]**

Writing and evaluation of conditionals and consequent branching, if, if-else, else if ladder, switch case, Iteration using looping construct like while, for, do-while, continue, break

Arrays: **[03 Hrs.]**

Arrays (1-D,2-D),Character arrays and Strings

Basic Algorithms: **[03 Hrs.]**

Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs

Function: **[03 Hrs.]**

Functions (including using builtin libraries), Parameter passing in functions, call by value, passing arrays to functions: idea of call by reference

Recursion: **[04 Hrs.]**

Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc.

Structure: **[04 Hrs.]**

Structures, Defining structures and Array of Structures

Pointers: **[04 Hrs.]**

Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

File Handling: **[04 Hrs.]**

defining and opening a file, closing a file, input/output operations on files

TEXT BOOKS

1. Byron Gott fried ,Schaum's Outline of Programming with C, McGraw-Hill
2. E.Balagurusamy, Programming In ANSI C, 4th edition, Tata McGraw Hill,2007.
3. Yashavant Kanetkar, Let Us C,10th edition,BPBPublications,2010.

REFERENCE BOOKS:

1. BrianW.KernighanandDennisM.Ritchie,TheCProgrammingLanguage,PrenticeHallofIndia
2. K.R.Venugopal And S.R.Prasad,MasteringC,1st edition,Tata McGraw Hill,2011.
3. Stephen G Kochan, Programming In C,3rd edition,PearsonEducation,2004.
4. Ashok N Kamthane, Computer Programming, 2nd edition, Pearson Education, 2008

ME102N BASIC OF MECHANICAL ENGINEERING

Teaching Scheme	**:** 03 L + 00 T; Total: 03 hours/week	**Credits**	03
Evaluation Scheme	**:** 10 ISA + 30 MSE + 60 ESE	**Total Marks**	100
ESE Duration	**:** 3 Hrs.		

COURSE DESCRIPTION

This course introduces to analyze and design concepts of mechanical systems. This course includes basic elements of mechanical systems like clutch, couplings, gears, boilers, air compressors.

DESIRABLE AWARENESS / SKILLS

Knowledge of Physics.

COURSE OUTCOMES

On the successful completion of this course; student shall be able to -

1. Understand energy transfer in mechanical systems.
2. Identify the type of boiler.
3. Distinguish IC engines.
4. Estimate the performance of transmission system.
5. Enumerate the mechanical properties of material.

RELEVANCE OF COURSE OUTCOMES (COS) WITH POS AND PSOS (WITH STRENGTH OF CO-RELATION)

CO	PO												PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	1				1						1	1	2
2	1	1	1		1								2	2	2
3	2	3	2		2		2						2	2	2
4	3	3	3		3		2						1	1	2
5	1	3	2	1	1		1						1	1	2

1-Weakly correlated **2 – Moderately correlated** **3 – Strongly correlated**

COURSE CONTENT

Unit 1 **[08 Hrs.]**

Energy:

Introduction and applications of Energy sources- Fossil fuels, Nuclear fuels, Hydro, Solar, Wind, and Bio-fuels, Environmental issues-Global warming and Ozone depletion.

Heat Engines:

Heat engine cycle, working substances, Classification of heat engines, Description and thermal efficiency of Carnot; Rankine; Otto cycle and Diesel cycles.[Simple Numerical Treatment]

Unit 2 **[08 Hrs.]**

Steam Boilers:

Introduction, Classification, Cochran, Lancashire and Babcock and Wilcoxboiler, functioning of different mountings and accessories.

Internal Combustion Engines:

Introduction, Classification, Engine details, four-stroke, two-stroke engines.

Air Compressors:

Types and operation of Reciprocating and Rotary air compressors, significance of multistage compression.

Unit 3 **[08 Hrs.]**

Couplings, Clutches and Brakes: Construction and applications of Couplings (Box; Flange; Pin type flexible; Universal and Oldham), Clutches (Disc and Centrifugal), and Brakes (Block; Shoe; Band and Disc).[No Numerical Treatment]

Unit 4 **[08 Hrs.]**

Transmission of Motion and Power: Shaft and axle, Different arrangement and applications of Belt drive; Chain drive; Friction drive and Gear drive.[No Numerical Treatment]

Unit 5 **[08 Hrs.]**

Engineering Materials: Types, properties and applications of Ferrous & Nonferrous metals,

ME151 N- ENGINEERING GRAPHICS

Teaching Scheme: 03L +00T, Total: 03 **Credit :** 03
Evaluation Scheme: 30 MSE+10 ISA+ 60 ESE **Total marks:** 100
Duration of ESE: 04 Hrs.

COURSE DESCRIPTION:

Engineering Graphics is a basic course for all undergraduate Engineering program. This course provides the elementary level knowledge of technical Geometry that is engineering drawing. This course is therefore introduced to provide the basic understanding of the fundamentals of Engineering Drawing, mainly visualization, graphics theory, standards and conventions of drawing, the tools of drawing and the use of Drawings in engineering applications. Course includes in briefs that introduction to Engineering Drawing, Orthographic Projection, Isometric view and Isometric Projection, line planes, solids and Development of solids

DESIRABLE AWARENESS/SKILLS:

Fundamental knowledge of Geometry, mechanics

COURSE OUTCOMES:

Students will be able to -

1. Understand the concept of Projection of lines, Planes and able to draw basic views of projection of lines and Planes.
2. Understand the concept of conversion of Pictorial view into orthographic view and able to draw orthographic view.
3. Understand the concept of conversion of Orthographic view into Isometric view/Pictorial View and able to draw isometric view.
4. Understand the concept of calculating external surface area of given object and able to draw the external surface.

RELEVANCE OF COURSE OUTCOMES (CO_S) WITH PO_S AND PSO_S (WITH STRENGTH OF CO-RELATION)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	-	-	-	2	-	-	-	-	3	-	2	3	2	1
2	1	-	1	2	2	-	-	-	1	3	-	1	3	1	1
3	1	2	1	1	2	-	-	-	-	3	-	-	3	1	1
4	1	-	3	-	2	-	-	-	-	3	-	2	3	1	1

1-Weakly correlated 2 – Moderately correlated 3 – Strongly correlated

COURSE CONTENT

Projections of Lines: [06 Hrs.]

Projections of Straight Lines: Introduction and concept projection of line, line position & its exercises on following cases as: - line parallel to both the reference planes, line parallel to one reference plane and perpendicular to the other, line inclined to one reference plane and parallel to the other, line inclined to both the reference planes. Applications based exercise on line inclined to both reference planes based on HP & VP only. (Note: - *Exercises on **Traces of line are excluded***).

Projections of Planes: **[06 Hrs.]**

Projections of planes: Introduction and concept of shapes or forms of various types Plane, Position of plane with respective reference plane cases concepts and exercises based on following cases as: plane surface parallel to one reference plane and perpendicular to other reference plane, plane surface inclined to one reference plane and perpendicular to other reference plane, planes inclined to both reference planes (Oblique planes).(Exercises shall be based and exercised on all above cases as wellas suspended planes & Composite planes applications).

Note: - *all exercises will be solving by any* ***one*** *of method chose among of two kinds which are as either by '****change of position method****' or '****Auxiliary Plane method****'.*

Orthographic Projections: **[06 Hrs.]**

Principle of orthographic projections Methods (First and third angle orthographic projection methods) Exercises shall be consist of orthographic projection methods of different machine / mechanical components; problem shall be based on first and third angle Orthographic. Projection Methods only, Concept of sectional orthographic projections method (First and third angle orthographic projection methods). Types of Sectional view; Sectional orthographic projections (view) problem shall be exercised only on object sectioned (cut) only by single cutting plane. **[07 Hrs.]**

Note: - following part are excluded from TH –ESE and ICA. *Following Prerequisite part of ME151R & ME153R EG LAB is necessiate to obeying Standards of drawing as:* - Lettering -*single stoke and double stroke gothic lettering, Types* of lines, Dimensioning*: methods of dimensioning and types of dimensioning,* scaling. *All these topics of standards shall be cover in practical session of ME153R EGD lab.*

Isometric view: **[07 Hrs.]**

Isometric Views: Introduction to pictorial views, isometric scale, isometric projections and its classification, exercises consist of problems on simple and complex mechanical objects shall be solve on Isometric view and isometric projection methods.

[

Projection of Development of Lateral surfaces: **[07 Hrs.]**

Introduction, Concept and significance of Development of surfaces and lateral surfaces, Development of lateral surfaces of all types of regular solids such as prisms, pyramids, cones and cylinders Cases shall be exercised as: - solid surface/s are cut by following means such as single cutting plane line (C-P line), two parallel C-P lines, Two Non-parallel C-P lines, Two Intersecting CP lines and Underneath cuts of any shape on surfaces of solids (parallel and radial method only).

Introduction to CAD tool: **[06 Hrs.]**

Introduction to 2D CAD software, Advantages of CAD packages, applications of CAD, essential configuration, basic operation of drafting packages, Understand Basic Use of Various menus commands in CAD tool.

(Note: - ***The CAD based questions shall be excluded from theory - MSE & ESE****. The teaching part of same shall be conduct concurrently in the laboratory practical hours with practice of different exercises.).*

Text Books:

1) Engineering Drawing, Bhatt N. D., Panchal V. M., 2008 onwards Charotar Publication, Anand, India.
2) Engineering Drawing and Graphics, K. Venugopal, 3rd edition, New Age International, 1998.
3) Publishers, New Delhi, 2007.
4) A Text book of Engineering Drawing, P.J. Shah, S. Chand & company Ltd., New Delhi.2009.
5) A First Course in Engineering Drawing, Rathnam, K., (2018), Springer Nature SingaporePte. Ltd., Singapore.

Reference Books:

1) Engineering Drawing and design, Madsen, D. P. and Madsen, (2016), D. A DelmarPublishers Inc., USA.
2) A Textbook of Engineering Drawing, Dhawan, R. K., (2000), S. Chand, New Delhi.
3) Fundamentals of Engineering Drawing, W J Luzadder and J M Duff, Fundamentals of Engineering Drawing, 11th edition, Prentice-Hall of India, 1995Giesecke, F. E., Mitchell, A., Spencer, H. C., Hill, I. L., Loving, R. O., Dygon, J. T., (1990), "Principles of engineering graphics, McMillan Publishing, USA
4) Engineering Drawing and Design", Jensen, C., Helsel, J. D., Short, D. R., (2008), McGraw-Hill International, Singapore.
5) Graphic Science and Design, T. E. French, C. J. Vierck and R J Foster, 4th edition, McGraw Hill, 1984.
6) Engineering Graphics, Vol.-I and Vol.-II, Dhabhade M. L., Vision Publications 2003 onwards
7) Engineering drawing – P.S Gill, S. K. Kataria publication.2012 onwards.
8) Engineering Graphics with AutoCAD, Kulkarni, D. M., Rastogi, A. P. and Sarkar, A. K PHI, India, 2009.

Timber, Abrasive material, silica, ceramics, glass, graphite, diamond, plastic and polymer.

Reference Books :

1. Elements of Mechanical Engineering by N M Bhatt and J R Mehta, Mahajan Publishing House .
2. Basic Mechanical Engineering by Pravin Kumar, Pearson Education .
3. Fundamental of Mechanical Engineering by G.S. Sawhney, PHI Publication New Delhi.
4. Elements of Mechanical Engineering by Sadhu Singh, S. Chand Publication.
5. Introduction to Engineering Materials by B.K. Agrawal, McGraw Hill Publication, New Delhi.

ME154N-MANUFACTURING PROCESSES

Teaching Scheme : 02L + 00 T; Total: 02 hours/week **Credits** : 02
Evaluation Scheme : 10 ISA + 30 MSE + 60 ESE **Total Marks** : 100
ESE Duration : 3 Hrs.

COURSE DESCRIPTION

This course provides the basic knowledge of manufacturing processes, fundamentals of casting processes, metal forming and forging processes, welding and joining processes, metal removing processes.

DESIRABLE AWARENESS / SKILLS

Knowledge of basic manufacturing processes and their concepts

COURSE OUTCOMES

On the successful completion of this course; student shall be able to -

1. Know the patterns and casting for various mechanical engineering applications.
2. Compare different metal forming process for particular application.
3. Use proper joining processes for particular application.
4. Explain metal removing process for particular application.

RELEVANCE OF COURSE OUTCOMES (COs) WITH POs AND PSOs (WITH STRENGTH OF CO-RELATION)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3					1							1		1
2	1	1			1	1							1		
3	1				1	1							1		1
4	3				1								1		

1-Weakly correlated **2 – Moderately correlated** **3 – Strongly correlated**

COURSE CONTENT

1) **Introduction Manufacturing** – definition, classification of manufacturing processes.

Sand Casting and Special Casting Methods- **[06 Hrs.]**

Basic principle and terminology of sand casting, types of casting pattern, types of patterns, pattern materials, various allowances in pattern making, core print, core boxes, gating system, types of gate, directional and progressive solidification, general properties of molding sand, sand molding defects, permanent mould casting, slush casting, shell molding, investment or lost wax casting, vacuum process, centrifugal casting, die casting. (No numerical treatement)

2) **Metal Forming Processes-** **[06 Hrs.]**

Rollin process, classification of rolling, hot and cold working processes, Forging: forging process, forging operations, open die and close die forging, hammer forging, impression die, press forging, upset forging, roll forging, extrusion methods, extrusion of hollow shape, hydrostatic extrusion, continuous extrusion, wire, and rod drawing.

Metal Joining Processes- **[06 Hrs.]**

Introduction to riveting, soldering, brazing and welding, classification, gas welding, working principle and its application, arc welding: types and purpose of electrodes, Tungsten Inert Gas (TIG) welding: working principle and its application, Metal Inert Gas (MIG) welding: working principle and its application, submerge arc welding,(SAW), resistance welding: working principle and its applications, other welding processes: electron beam, laser welding.

Metal Removing Processes- **[06 Hrs.]**

Introduction to machine tool, lathe machine: - principal parts of lathe machines lathe specification. lathe machine operations: facing, turning, boring, parting, drilling, reaming, knurling, milling machine: principle of milling, up milling and down milling, types of milling cutters, drilling machine: operations, drilling, boring, reaming, spot facing, counter boring, counter sinking, tapping, grinding Process: grinding machine, types of grinding wheels. **[06 Hrs.]**

Text Books:

1. Industrial engineering and Production Management , M.S. Mahajan, 1 stedition, Dhanpat Rai and sons, Delhi, 2014.
2. Production Technology, P C Sharma, 8th revised edition edition, Khanna Publications, New Delhi. 1999.
3. Element of Workshop Technology, Volume I and II ,Hajara Chaudhary and Bose S K, 2nd edition, Asia Publishing House, Bombay,1999.
4. Manufacturing Processes for Engineering Materials, Steven R. Schmid, Serope Kalpakjian, 5th edition, Pearson Publication, 2009.

Reference Books:

1. Materials and Processes in Manufacturing, DeGarmo, Black Konser, 11th edition, Wiley, 2011.
2. Introduction to Manufacturing Processes, Schey J. A., 3rd edition, Tata McGraw Hill, 1999.
3. Processes and Materials of Manufacturing, Lindberg A., 4th edition, Prentice Hall, 1998.
4. Workshop Technology, Vol. I Raghuvanshi B.S.10 th edition, Dhanpat Rai and sons, Delhi, 2013.
5. Elements of Workshop Technology, Vol. I Hazra Choudhary, 2 nd edition 2009, Media Promoters 6. Production Technology, Jain R.K., 17th edition, Khanna publication, 2014.
7. HMT Production Technology, Handbook,Tata McGraw Hill Publishing Co.1998

ME155N Mechanics for Mechanical Engineering

Teaching Scheme	**:** 02 L; Total: 02 hours/week	**Credits**	**:** 02
Evaluation Scheme	**:** 10 ISA + 30 MSE + 60 ESE.	**Total Marks**	**:** 100
ESE Duration	**:** 3 Hrs.		

COURSE DESCRIPTION

This course provides the elementary level knowledge of Engineering and Engineering mechanics which includes study of forces and force systems, Resultant and equilibrium of coplanar force systems, Simple machines and SFD/ BMD

DESIRABLE AWARENESS / SKILLS

Knowledge of Mathematics, Physics and Basics of Science.

COURSE OUTCOMES

On the successful completion of this course; student shall be able to -

1. apply concept of engineering mechanics with various theorems and its applications.
2. apply the approaches of equilibrium, beam of different supports and loadings.
3. find out centroid, moment of inertia of various regular and composite planes of bodies.
4. apply the principle of linear motion and momentum principle.
5. estimate shear force and bending moment diagram for simple beam and loadings.

RELEVANCE OF COURSE OUTCOMES (CO) WITH PO AND PSO (WITH STRENGTH OF CO-RELATION)

CO	PO												PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2		1			1					1	1		1
2		1	3	1	1								1	1	1
3	3	2	1	1									1		1
4	2	3	2	1		1							1		1
5	2	2	3	2			1						1	1	1

1-Weakly correlated **2 – Moderately correlated** **3 – Strongly correlated**

Course Content

Introduction to Engineering Mechanics **[06 Hrs.]**

Basic concept, Principles of Mechanics, Force types and Force System, composition and Resolution of forces, Resolution of Concurrent force System in Plane, Moment of forces/ Couple, Varignon's theorem, Equivalent Force system, Resultant of Non-Concurrent Force System in plane, Introduction to Space forces, Resultant of Concurrent Forces system in Space.(Numerical treatment)

Equilibrium of Force System: **[06 Hrs.]**

Particle equilibrium in 2d/3d, rigid body equilibrium, type of supports and Loads, Free body diagram, Conditions and equations of equilibrium, Equilibrium of forces in Plane, Equilibrium of concurrent force system in space, Lami's theorem, Reactions of determinate beams. .(Numerical treatment)

Center of Gravity: Introduction, center of Gravity / centroid of simple figures / composite

Moment of Inertia: **[06 Hrs.]**

Introduction, definition, moment of inertia of plane sections / standard sections/composite sections, theorem of moment of Inertia, mass moment of inertia of circular plate, cylinder, cone, sphere and hook.(simple numerical treatment)

Internal Forces: **[05 Hrs.]**

Internal forces in simply supported and cantilever member for point load and UDL, Determination of variation of axial force (Axial force diagram), Shear force (Shear force diagram), Bending moment (Bending moment diagram) and twisting moment. .(Numerical treatment)

Simple Machines: **[04 Hrs.]**

Introduction simple machine, compound machine, simple gear drive, simple gear train, velocity ratio of a simple gear train, velocity ratio, compound gear train, terminology in simple lifting machine- (M.A, V.R. &Efficiency and relation between them), law of machine, maximum mechanical advantage (max. M.A.), maximum efficiency.

Text Books

1. Bhavikatti S.S, Engineering Mechanics, New Age International Publications, edition, 2013.
2. F. P. Beer and E. R. Johnston, Vector Mechanics for Engineers Vol I-Statics, Vol. Dynamics, Tata McGraw Hill 9 Ed, 2011.
3. Stephen Timoshenko, Strength of Materials Part -1, CBS Publishers and Distributors, New Delhi, 2000.
4. Singer F.L. and Andrew Pytel, Strength of Material, Harper and Row Publishers, NewYork.
5. R. K. Bansal, A Text Book of Engineering Mechanics, Laxmi Publication NewDelhi,6th edition, 2013

Reference Books

1. Irving H. Shames, Engineering Mechanics, Prentice Hall, 4th Edition,2006.
2. R.C.Hibbler, Engineering Mechanics, Pearson Press,4th edition, 2006.
3. Andy Ruina and Rudra Pratap, Introduction to Statics and Dynamics, Oxford University Press, 2011,
4. Hibler and Gupta, Engineering Mechanics , Pearson Education 11th edition, 2010.
5. Reddy Vijaykumar K. and K. Suresh Kumar, Engineering Mechanics, Singer's, 3rd edition 2011.
6. Ramamrutham, A Text Book of Engineering Mechanics, Dhanpatrai Publications, 8th edition, 2008.

AEC1: SH 100 N ENGLISH

For F. Y. B. Tech. (All Programs)

Teaching Scheme: 01 TH 00 T 02 P **Credit:** 02
Evaluation Scheme: ICA 50 **Total marks:** 50

COURSE DESCRIPTION:

This course focuses on developing effective communication skills specifically tailored for students in the fields of Engineering. Students will learn practical techniques to enhance written and oral communication abilities, with a special emphasis on professional scenarios and business-related contexts.

DESIRABLE AWARENESS/ SKILLS:

Concept and theory of Communicative English.

COURSE OUTCOMES:

On the successful completion of this course; students shall be able to

1. understand basic concepts and techniques of communication that are useful in developing the skills of communicating effectively.
2. develop positive awareness and interest in language use and the function of each language in our context, which is a multilingual one.
3. demonstrate proper techniques when communicating in writing.
4. improve fluency through regular practice and speaking drills.
5. recognize and describe various communicative styles.

RELEVANCE OF COURSE OUTCOMES [COS] WITH POS AND PSOS [WITH ATRENGTH OF CO-RELATION] :

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1				2		2	2		1						
2				2		2	2		1						
3				2		2	2		1						
4				2		2	2		1						
5				2		2	2		1						

COURSE CONTENT

Communication: An Introduction: **[03 Hrs.]**
Definition, The Importance of Communication, The Communication Process, Barriers to communication, Perspectives in Communication: Introduction, Visual Perception, Language, Other factors affecting our perspective.

Listening and Speaking Skills: **[03 Hrs.]**
Basic Listening Skills: Introduction, The process, importance and types of listening, Effective Listening: Principles and Barriers, Guidelines to increase listening, Activities to enhance listening
Speaking Skills: Introducing yourself, Describing a person, place, situation and event, Giving instruction, Making inquiries – at a bank, post- office, air-port, hospital, reservation, counter and role play

Reading and Writing Skills: **[03 Hrs.]**
Effective Reading: Process, types and reading rate adjustment, Tips for improving reading skills, Reading Comprehension.
Effective Written Communication: Introduction, Importance of written communication, Letter Writing: Types, Formats, Official Correspondence: Memo, Notice and Circulars, Agenda and Minutes, Report Writing: Purpose and Scope of a Report, Fundamental Principles of Report Writing, Project Report Writing, Summer Internship Reports.

Workplace Communication: **[03 Hrs.]**
Greeting, Welcoming, Dealing with Complaints, Giving Instructions or Directions, Giving Information: About Various Facilities, Distance, Area, Local Specialties Consultation and Solution of Problems, Accepting Praises and Criticism,
Apologizing. Fluency and Etiquette, Polite sentences and Words, Use of Persuading words, Intonation and Voice Modulation, Developing

LIST OF PRACTICAL **[02 Hrs./ Practical]**

1) Speech/Seminar presentation
2) Observation of a recorded seminar and suggestions for improvement.
3) Technical Report Writing and presentation
4) Role Plays
5) Interview Simulations
6) Reading and Listening Comprehension
7) Group Discussions
8) Resume Building
9) Business Correspondence
10) Cross-Cultural Communication
11) Situational Writing
12) SWOT analysis
13) Public Speaking Exercises
14) Greetings for different occasions.
15) Participation in institute/National level Elocution/Essay/G.D. Competitions

GUIDELINES FOR ICA:

Internal continuous assessment (ICA) should support for regular performance of practical by student and his/her regular assessment with proper understanding of practical carried out. It is a representative list of practical. The instructor may choose practical as per his requirements (so as to cover entire contents of the course) from the list. Minimum ten practical should be performed to cover entire curriculum of the course. The list of practical given above is just a guideline.

EVALUATION METHODOLOGY:

Fifty marks for ICA evaluation are distributed as per the following table:

Sr.No.	Skills	Marks
1	Listening	08
2	Speaking	10
3	Reading	08
4	Writing	10
5	Attendance	10
6	Participation in institute/National level Elocution/Essay/G.D. Competitions (if participated)	04

REFERENCE BOOKS:

1. Communication Skills for Engineers by S. Mishra & C. Muralikrishna (Pearson)
2. Communication Skills for Technical Students by T.M. Farhatullah (Orient Longman)
3. Written Communication in English by Saran Freeman (Orient Longman)
4. Essential English Grammar (Elementary & Intermediate) Raymond Murphy (CUP)
5. Communication for Business: A Practical Approach by Shirley Tailor (Longman)
6. Developing Communication Skills by Krishna Mohan & Meera Banerji (Macmillan)
7. Business Correspondence and Report Writing, R. C. Sharma & Krishna Mohan (Tata McGraw Hill)

LL102N: Yoga & Nutrition

For F. Y. B. Tech. (ALL)

Teaching Scheme	**:** 02 P; Total: 04hours/week	**Credits**	**:** 02
Evaluation Scheme:	50 Marks (ICA)	**Total Marks**	**:** 50

CORSE DESCRIPTION:

It is Liberal Learning compulsory course introduced for the First Year B.Tech. students with effect from the academic year 2023-24, as per NEP 2020 policy and policy of the Institute.

COURSE OUTCOMES

- This course will bring peace and harmony in the student's life.
- It will make them focused towards their goals and make them mentally strong to face different challenges in life.
- It will make them physically strong, healthy and will keep them away from diseases.
- It will also help them in self management and living a disciplined life.
- It will help students to cope up in situation of conflict and depression.
- It will make students aware of the functions of various systems of the body.
- It will develop positive attitude and moral values among the students.
- It will create awareness amongst the students about Nutritional food habits and its importance
  in day-to-day life for better physical and mental health

RELEVANCEOF COURSE OUTCOMES (COS) WITH POS AND PSOS (WITH STRENGTH OF CO-RELATION)

	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO								3	1			1

1-Weakly correlated **2 –Moderately correlated** **3 – Strongly correlated**

COURSE CONTENTS

Minimum 20 Exercises shall be performed to cover the entire curriculum of course LL102N.The Yoga Exercise list is given below.

List of Yoga Exercises:

(I) Asana and Pranayama: (04 hrs. per week for 08-11 weeks)

No.	Name of the Asanas	No.	Name of the Asanas	No.	Name of the Asanas
01.	Suryanamaskar with Mantras	10.	Shashankasan	19.	Matsyasan
02.	Padmasan	11.	Bhujangasan	20.	Paschimotton asan
03.	Vajrasana	12.	Ushtrasan	21.	Halasan
04.	Yogamudra	13.	Tadasan	22.	Naukasan
05.	Veerasan	14.	Dhruvasan	23.	Sarvagasan
06.	Gomukhasan	15.	Utkatasan	24.	Makarasan
07.	Ardha-matsyendrasan	16.	Uttanpadasan	25.	Shavasan
08.	Marjariasan	17.	Trikonasan		
09.	Mandukasan	18.	Shalbhasan		

Pranayama:

01 Preparatory aspects of Prananyama: Correct abdominal breathing in Savasana and Meditative pose with 1.1 & 1.2 ratio
02 Deep breathing – Abdominal breathing – Yogic breathing
03 Nadishodhanpranayam
04 Surya Bedan pranayama
05 ChandrabhediPranayama
06 Bhramriprayanama

Importance of food and Nutritional values [02 Hrs.]

Advice for Nutritional food habits [02 Hrs.]

EVALUATION SCHEME:

The Final evaluation for Examination of each student will be done as per the Rubrics:

Attendance:

Less than 75%	75% -80%	Greater than 80%
Not Eligible for this course and Examination	10 Marks	20 arks

Performance in Exercises

Expertise in at least 10 Asanas Exercises	Expertise in at least 05 Pranayama Exercise
20 Marks	10 Marks

INCENTIVES:

After successful completion of the Course, the five students will be selected for State or National level Yoga Competitions in future, if any.

After successful completion of the Course, the five students from economically weaker sections, if eligible, will be selected as volunteers for one semester next onwards under Earn while Learn scheme.

LL101N: NSS & SPORTS
For F. Y. B. Tech. (ALL PROGRAMMES)

Teaching Scheme	: 02 P; Total: 04 hours/week	**Credits**	: 02
Evaluation Scheme	: 50 Marks (ICA)	**Total Marks**	: 50

CORSE DESCRIPTION:

It is Liberal Learning compulsory course for the first year admitted students with effect from the academic year 2023-24, as per NEP 2020 policy of the Institute.

COURSE OUTCOMES

- This course will bring peace and harmony in the student's life.
- It will make them focused towards their goals and make them mentally strong to face different challenges in life.
- It will make them physically strong, healthy and will keep them away from diseases.
- It will also help them in self-management and living a disciplined life.
- It will help students to cope up in situation of conflict and depression.
- It will make students aware about various games and sports activity.
- National Service Scheme (NSS) is a voluntary program under which young students from colleges, come together and work for humanity.
- It will develop positive attitude and moral values among the students.
- It will create awareness amongst the students' habits and its importance in day-to-day life for better physical and mental health.
- NSS helps the student to grow individually and also as a group. Volunteering for various tasks

  under NSS activities allows students to become confident, develop leadership skills, and learn about different people from different walks of life.

RELEVANCEOF COURSE OUTCOMES (COS) WITH POS AND PSOS

(WITH strength of co-relation)

	PO											
	1	2	3	4	5	6	7	8	9	10	11	12
CO								3	1			1

2- Weakly correlated 2 –Moderately correlated 3 – Strongly correlated

COURSE CONTENTS

Minimum Two Game skill/Exercises shall be performed to cover the entire curriculum of course LL102N.

Games list is given below.

List of Games:

No.	Games	No.	Games	No.	Games
01	Archery	10	Hockey	20	Powerlifting
02	Athletics	11	Karate	21	Kho-Kho
03	Badminton	12	Shooting	22	Kabaddi
04	Basketball	14	Volleyball	23	Chess
05	Boxing	15	Table Tennis	24	Mini Golf
06	Fencing	16	Tennis	25	Softball
07	Football	17	Cricket	26	Taekwondo
08	Handball	18	Wrestling	27	Carrom
09	Judo	19	Weightlifting		

Proficiency in Games and Sports. (Perform one skill of any two Games).

Physical Exercise

Play any one game in Intramural or Inter Collegiate or State or National Tournaments.

NSS (two days camp).:Social work camp in college campus or any other places.

EVALUATION SCHEME:

The Final evaluation for Examination of each student will be done as per the Rubrics:

1. Attendance:

Less than 75%	75% -80%	Greater than 80%
Not Eligible for this course and Examination	10 Marks	20 Marks

2. Performance in Exercises or skills

Perform any two games skills	NSS and Social work camp
10 Marks	20 Marks

Incentives:

After successful completion of the Course, the student's teams will be selected for Inter College/ Inter Zonal or State level Sports Competitions in future, if any.

SH103N: ENGINEERING CHEMISTRY LAB

For F. Y. B. Tech. (All Programmes)

Teaching Scheme	**:** 02 P Total: 02 hours/week	**Credits**	**:** 01
Evaluation Scheme: ICA 50		**Total Marks**	**:** 50

COURSE DESCRIPTION

Lab Engineering Chemistry course provides knowledge about analysis of materials with various analytical techniques. It provides knowledge and hands-on practice of analysis, interpretation of result.

DESIRABLE AWARENESS / SKILLS

Concepts and theory of the course SH102N: Engineering chemistry:
Awareness of basic handling of glassware and Instruments used in Chemistry laboratory.

COURSE OUTCOMES

After completion of this course students will able to

1. Perform qualitative and quantitative determination of physical and chemical properties of lubricants for domestic and Industrial application.
2. Explain the objective of experiments, perform the experiments appropriately record the data and analyze the results with accuracy of precision.
3. Demonstrate excellent laboratory skills by use of relevant instruments.
4. Recognize the issue of safety regulation, ethical, societal, economical and environmental issues in the use of chemical in their laboratory work.

Relevance of COURSE OUTCOMES (COs) WITH POs AND PSOs (WITH strength of co-relation)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2														
2		2													
3	1														
4		3													

2- Weakly correlated **2 – Moderately correlated** **3 – Strongly correlated**

COURSE CONTENT

Minimum 08 Experiments shall be performed to cover the entire curriculum of course SH-103N.The list given below is just a guideline.

List of Experiments

1. Determination of Acid Value of lubricant.
2. Determination of Saponification Value of lubricant.
3. Determination of Viscosity of lubricating oils by Redwood

4. Determination of Flash & Fire point of lubricant oil.
5. To Determination PH value of solutions by indicator, paper and by PH meter.
6. Preparation of Phenol Formaldehyde Resin (Bakelite).
7. Determine the yield percentage of Polystyrene by bulk polymerization.
8. Determination chloride content of water.
9. Determination of hardness of water by EDTA method.
10. Determination of alkalinity of water sample by titrimetry.
11. Determination of Viscosity by Ostwald's Viscometer.
12. Determination of Cloud & Pour point.
13. Chemical analysis of a salt.
14. Adsorption acetic acid of Charcoal.
15. Determination of surface tension and Viscosity coefficient.
16. Thin layer chromatography.
17. Determination of partition coefficient of a substance between two immiscible Liquids.
18. To verify Lambert Beer's Law calorimetrically.
19. Conductometric Titration of mixture of strong and weak acid with strong base.
20. To determine specific rotation and concentration of Dextrose solution using calorimeter.
21. To determine λMax of the solution by calorimeter.
22. Determination of cell constant of conductometer.

SH153N ENGINEERING PHYSICS LAB

For F. Y. B. Tech. (All Programmes)

Teaching Scheme : 02 P; Total: 02 hours/week **Credits** : 01
Evaluation Scheme: 50 ICA **Total Marks** : 50

COURSE DESCRIPTION

Lab course of Engineering Physics provides hands on practice of understanding various principles of physics in order to encourage and enable students to apply the principles via practical for the design and development of innovative engineering systems.

DESIRABLE AWARENESS / SKILLS

Concepts and theory of Engineering Physics course (SH152N)
Basic awareness and sophisticated handling of instruments in Physics laboratory.

COURSE OUTCOMES

After completion of this course students will be able to

1. Perform qualitative and quantitative determination of physics principles.
2. Explain the objective of experiments, perform the experiments appropriately record the data and analyze the results with accuracy of precision.
3. Demonstrate excellent laboratory skills by use of relevant instruments.
4. Work effectively and safely in laboratory environment in teams as well as independently.

RELEVANCE OF COURSE OUTCOMES (COS) WITH POS AND PSOS (WITH STRENGTH OF CO-RELATION)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1		2													
2		2													
3			3												
4		2													

3-Weakly correlated **2 – Moderately correlated** **3 – Strongly correlated**

COURSE CONTENT

Minimum 10 Experiments shall be performed to cover the entire curriculum of course SH153R.The experiment list given below.

List of Experiments

1. Newton’s rings
2. Wavelength by diffraction grating
3. Diffraction experiment with LASER
4. Cosine square law of Malus
5. Brewster’s Law
6. Polarimeter
7. Characteristics of P-N junction diode
8. Ultrasonic interferometer
9. Experiment on Solar Cell
10. Experiment on Sound level
11. e/m by Thomson method
12. X-ray diffraction of materials
13. Hall effect

CE152N ENGINEERING MECHANICS LAB

Teaching Scheme : 02 P; Total: 02 hours/week **Credits** : 01
Evaluation Scheme : 50 ICA **Total Marks** : 50

COURSE DESCRIPTION

The laboratories cover experiments related to basic principles of Statics, Dynamics, and solution with computer programs/software's.

DESIRABLE AWARENESS / SKILLS

Knowledge of basics of material science and mathematics.

COURSE OUTCOMES

On the successful completion of this course; student shall be able to

6. To understand basic laws of engineering mechanics & apply the same to solve problems.
7. Understand the conditions of equilibrium of forces.
8. Describe frictional forces, limiting friction, coefficient of friction and verify law of friction
9. Apply graphical methods to solve problems
10. verify principles of mechanics through experiments

RELEVANCE OF COURSE OUTCOMES (COs) WITH POs AND PSOs (WITH STRENGTH OF CO-RELATION)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2					2	2	2					2		1
2	2					2	3	3					1		2
3	2					2	2	3					2		1
4	2					2	2	2					1		2
5	2		2			3	3	3					2		1

1-Weakly correlated **2 – Moderately correlated** **3 – Strongly correlated**

COURSE CONTENT

Minimum eight experiments / assignments shall be performed to cover entire curriculum of course CE152N. At least one experiment may be performed using software or program. The list given below is just a guideline.

List of Experiments

- Reaction of Beam.
- Belt friction/ Simple frictions on horizontal and inclined planes.
- Forces in plane truss – jib crane.
- Verification of Law of parallelogram of forces.
- Verification of Law of polygon of forces.
- Verification of equilibrium equation for spatial forces.
- Study of Simple machines and verification of Law of Machine (any one).
- Moment of Inertia of Fly Wheel.
- Compound Pendulum /Torsion of Pendulum.
- Analysis of truss using software.

- Demonstration of concept of - Impact of elastic bodies and coefficient of restitution.
- Demonstration of concept of - Rolling of various bodies.
- Study of space force.
- Graphical work: problems of graphical solution of Static Problems

Evaluation Methodology:

- **ICA –** It shall support for regular performance of practical and its regular assessment. In addition; it shall be based on knowledge/skill acquired and record submitted by student (journal) based on practical performed by him/her. The performance shall be assessed experiment wise using the prescribed internal continuous assessment format.

EE102N: BASIC ELECTRICAL ENGINEERING LAB

Teaching Scheme : 02 P; Total: 02 hours/week **Credits:** 01
Evaluation Scheme : 50 ICA **Total Marks:** 50

COURSE DESCRIPTION

This course deal with the practical exposure to verification of network theorems, to verify the relationships of various parameters of single and three phase A.C. circuits, to study the behavior of hysteresis loop/B-H curve of magnetic material, to find output of various machines etc.

DESIRABLE AWARENESS / SKILLS

Concepts and theory of the course EE101R: BASICS OF ELECTRICAL ENGINEERING

COURSE OUTCOMES

On the successful completion of this course, the students shall be able to-

1 Apply various basic laws and theorem to electric circuit
2 Demonstrate and understand definition relationship of various electric circuits
3 Apply the basic concept to understand the working of various machines
4 Identify the various wiring systems
5 Apply electrical safety measures

RELEVANCE OF COURSE OUTCOMES (COS) WITH POS AND PSOS (WITH STRENGTH OF CO-RELATION)

Course outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2				1	3	2	2	3	2	1	3			
CO2	2	1		1	1	2	2	2	3	2	1	3			
CO3	2	1		1	1	2	2	2	3	2	1	3			
CO4	2	1		1	1	2	2	2	3	2	1	3			

1-Weakly correlated **2 – Moderately correlated** **3 – Strongly correlated**

COURSE CONTENT

Minimum **eight** experiments from the list of experiments provided below shall be performed tocover entire curriculum of course EE101N.

LIST OF EXPERIMENTS

1. Perform an experiment for Verification of Thevenin's theorem
2. Perform an experiment for Verification of Superposition theorem
3. Perform an experiment for Verification of Norton's theorem
4. Perform an experiment for Verification of Maximum power transfer theorem
5. To perform experiment for Measurement of current, voltage and power in R-L-C seriesexited by single phase AC supply
6. To study the R-L-C series resonance circuit
7. To perform an experiment to plot hysteresis loop/B-H curve of magnetic material
8. Verification of relationship of line and phase voltages and current for star and deltaconnected three phase balanced load
9. Perform experiment for measurement of output of single phase/three phase transformerand to find the transformation ratio
10. Perform experiment to measure the rated speed of single-phase induction motor /D.C. motor
11. Wiring of simple light circuit for controlling light/fan point (PVC conduit wiring), Wiringof light/fan circuit using two-way switches (Staircase wiring), Wiring of power distribution arrangement using single phase MCB distribution board with ELCB, Main switch and Energy meter
12. Study of domestic earthing
13. Study of Battery Maintenance

EVALUATION METHODOLOGY:

- **ICA –** It shall support for regular performance of practical and its regular assessment. In addition; it shall be based on knowledge/skill acquired and record submitted by student (journal) based on practical performed by him/her. The performance shall be assessed experiment wise using the prescribed internal continuous assessment format.

ET152N BASIC ELECTRONICS ENGINEERING LAB

Teaching Scheme: 02 PR, Total: 02 **Credit:** 01
Evaluation Scheme: 50 ICA **Total Marks:** 50

COURSE DESCRIPTION

This course provides knowledge about basic analog electronics components to familiarize students with construction, their working, operation, performance and applications. This course also provides knowledge about measuring instruments and standards. It also gives introduction to measuring instruments It also covers the active and passive electronic components used in measuring circuits.

COURSE OUTCOMES

Upon successful completion of this course the students will be able to:

1. demonstrate the practical knowledge of electronic circuits using diodes and transistors.
2. compute experimentally various parameters of diode circuits.
3. operate measuring instruments like multi-meter and Cathode Ray Oscilloscope (CRO).
4. develop experimental skills on sensor/transducer based circuits.

RELEVANCE OF COs WITH POs AND PSOs (WITH STRENGTH OF CO-RELATION)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	1									1	1	
2	3	3	3	1									1	2	
3	3	3	3	1									1	2	
4	3	3	2	2									1	2	

COURSE CONTENT

Minimum ten experiments shall be performed to cover the entire curriculum of course ET151N. The list given below is just a guideline.

1. V-I characteristics of p-n junction diode.
2. V-I characteristics of Zener diode.
3. Zener diode as voltage regulator.
4. Half wave and full wave rectifiers.
5. Filter circuits.
6. Transistor (BJT) input/output characteristics – CB and CE configuration.
7. Transistor (JFET) input/output characteristics – CS configuration.
8. Transistor (MOSFET) input/output characteristics – CS configuration.
9. Transistor as a switch.
10. Temperature measurement using RTD.
11. Displacement measurement using LVDT.
12. Study of front panel controls of CRO.
13. Study of multi-meter.

Note

ICA – It shall support regular performance of practical and its regular assessment. In addition; it shall be based on knowledge/skill acquired and record submitted by the student (journal) basedonpracticalperformancebyhim/her.Theperformanceshallbeassessedexperimentwise using internal continuous assessment format.

CO102N: FUNDAMENTALS OF COMPUTER SCIENCE AND ENGINEERING LAB

Teaching Scheme: 02P; Total: 02 **Credits:** 01
Evaluation Scheme: 50 ICA **Total Marks:** 50

Minimum 10 experiments (five from Group A and five from Group B) shall be performed to cover entire curriculum of course CO102N.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO1: Assemble/ **dismantle** a computer system and identify various hardware /software components , network devices/ cables , their specifications and configuration.

CO2: Install/ Uninstall various softwares/ Antivirus softwares .

CO3: Prepare a document/ presentation/spreadsheet using Apache open office.

CO4: Create a Webpage/Web site using free web hosting.

CO5: Perform basic troubleshooting and maintainance of a computer system.

GROUP A

1. Assemble/ dismantle computer system and demonstrate software / hardware configuration , and different peripherals.
2. Understand BIOS setup and Booting process, systematic shutting of a computer system.
3. Use of Task Manager to check CPU usage and Memory Speed, Perform Internet speedup test, Perform downloading/uploading speed test.
4. Recognize different types of network components- Repeater, Hub, Switch , Router, and network cables- CAT-6 /Fiber Optic , their Specifications and configurations, Use of RJ-45 connector for Internet connection.
5. Perform Crimping of network cables using a crimping tool. Set up wired LAN and wireless LAN. Perform interconnections of computers in LAN to share resources.
6. Install/Uninstall various softwares/ Antivirus softwares step by step.
7. PC Maintenance - Creating data backup drives, Understanding Hard Disk Drive space, Running the Disk Cleanup Program, improving computer speed.

GROUP B

1. Working with Apache open office – prepare a word document, prepare a powerpoint presentation, perform basic spreadsheet operations and functions.
2. Construction of tables to organize data, construction of various charts - Line, Bar and Pie charts, Understanding and constructing Histograms , Scatter plots, Flowcharts and other drawings.
3. Working with Cloud/ Android cloud.
4. Introduction and use of HTML tags, styles, colors, lists , tables, hyperlinks, and image maps.
5. Creating a web page of self introduction/ student registration form.
6. Creating a unique layout using CSS.
7. Creating a Web site using free web hosting.

NOTE:

- ICA – Internal Continuous Assessment shall support for regular performance of practical and its regular assessment. In addition; it shall be based on knowledge/skill acquired and record submitted by student (journal) based on practical performed by him/her. The performance shall be assessed experiment wise using internal continuous assessment format (S 10).

CO152N PROGRAMMING FOR PROBLEM SOLVING LAB

Teaching Scheme: 02P, Total: 02 **Credit:** 01
Evaluation Scheme: 50 ICA **Total Marks:** 50

COURSE DESCRIPTION:

This course introduces basic proficiency in programming for solving real life problems.

DESIRABLE AWARENESS/SKILLS:

Basic computer fundamental.

COURSE OBJECTIVES:

The objectives of offering this course are:

1 To use the concepts of computing systems for problem solving
2 To understand various programming constructs like Array, string, pointer, structure and file.
3 To implement algorithms for solving problems using programming languages.

COURSE OUTCOMES:

On the successful completion of this course; student will learn;

CO1	Implement algorithms for mathematical and scientific problems
CO2	Compare alternate algorithmic approaches to problem solving
CO3	Understand the components of computing systems
CO4	Choose data types and structures to solve mathematical and scientific problem
CO5	Develop modular programs using control structures

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	3	3		2	2			2
CO2	3	3	2	3	3	3		2	2			2
CO3	3	3	2	2	3	3		2	2		2	
CO4	3	3	3	2	3	3		2	2			
CO5	3	3	2	3	3	3		2	2			

COURSE CONTENTS:

Minimum five experiments from each Group A and Group B shall be performed to cover the entire curriculum of course CO152R. The list given below is just a guideline.

GROUP-A (C-PROGRAMMING)

1. **Program for basic arithmetic operations and expressions:** Performing simple arithmetic operations like Addition, Subtraction, Multiplication, and Division.
2. **Find area and volume of geometric objects:** Calculate area and volume of geometric objects (circle, square, triangle etc.)
3. **Finding greatest and smallest of 3 numbers:** To find smallest and largest numbers from given 3 numbers.
4. **Integer to binary / hex and octal conversion:** To convert integer to binary, hex and octal.
5. **Generating odd / even numbers:** To generate odd and even numbers.
6. **Greatest/smallest/sum/average of'n' numbers:** To find the greatest/smallest/sum/average of given n numbers using arrays.
7. **Matrix operations:** Performing matrix operation (addition, subtraction, multiplication etc.) using arrays.
8. **Linear / binary search:** To search a number from given n numbers using linear and binary search.
9. **Checking a number for palindrome:** Check the given number for palindrome.
10. **Finding GCD of two numbers:** Calculate GCD of any two numbers.
11. **Program to swap two numbers using Call by Reference:** Swapping of two numbers using call by reference
12. **Finding factorial of a number:** Calculate the factorial of any given number.
13. **Checking / generating prime numbers:** Generate the prime numbers.
14. **String processing / operations:** Performing string operations using arrays.
15. **Record processing using structure:** Processing student record using structures.
16. **Simple program for FILES:** Read and write operations

GROUP-B (PYTHON PROGRAMMING)

Refer Group-A Practical List to write in Python Programming

TEXT BOOKS

1. Byron Gottfried, Schaum's Outline of Programming with C, 3rd edition, McGraw-Hill 2007
2. E. Balagurusamy , Programming in ANSI C, 4th edition, Tata McGraw Hill, 2007.
3. Yashavant Kanetkar, Let us C, 10th edition, BPB Publications, 2010.

REFERENCE BOOKS

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, 2nd edition Prentice Hall of India 1998.
2. K. R. Venugopal and S. R. Prasad, Mastering C, 1st edition, Tata McGraw Hill, 2011.
3. Stephen G Kochan, Programming in C, 3rd edition, Pearson Education, 2004.
4. Ashok N Kamthane, Computer Programming, 2nd edition, Pearson Education, 2008.

. 5. Python Programming:An introduction to Computer Science,John Zelle, Franklin, Beedle and Associates, Inc.

6. Learning Python ,Mark Lutz,O'reilly,5e

7. Python the complete reference, Brown, McGraw Hill Education Pvt. Ltd, ISBN : 9789387572942.

8. Programming in Python, Dr,PoojaSharma, BPB publications,ISBN:978-93-8655-127-6

ME103N BASIC OF MECHANICAL ENGINEERING LAB

Teaching Scheme : 02 P; Total: 02 hours/week **Credits** 01
Evaluation Scheme :50 ICA **Total Marks** 50

COURSE DESCRIPTION

This course deal with the practical exposure to verification of basic mechanical systems.

DESIRABLE AWARENESS / SKILLS

Concepts and theory of the course ME101N BASIC MECHANICAL ENGINEERING

COURSE OUTCOMES

On the successful completion of this course; student shall be able to

1 Analyze working of boilers
2 Demonstrate function of boiler mountings and accessories.
3 Understand the working of gear trains.
4 Examine the transmission system.

RELEVANCE OF COURSE OUTCOMES (COS) WITH POS AND PSOS (WITH STRENGTH OF CO-RELATION)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1				2						1	1	1
2	2	1	2		1		1						1	1	1
3	1	3	1		1		2						1	1	1
4	2	2	2		1		2						1	1	

1-Weakly correlated **2 – Moderately correlated** **3 – Strongly correlated**

COURSE CONTENT

Minimum eight experiments shall be performed to cover entire curriculum of course ME101N Basic Mechanical Engineering

LIST OF EXPERIMENTS

- To understand construction and working of various types of Fire tube boilers.
- To understand construction and working of various types of Water tube boilers.
- To understand construction and working of various types of boiler mountings.
- To understand construction and working of various types of boiler accessories.
- To understand construction features of two stroke and four stoke engines.

- To understand construction and working of different types of air compressors.
- To understand construction, working of clutches, coupling and brakes.
- To understand different arrangement and application of various power transmission drives
- Study and demonstration of various types of pumps.
- Study and demonstration of Domestic refrigerator.

EVALUATION METHODOLOGY:

- **ICA –** It shall support for regular performance of practical and its regular assessment. In addition; it shall be based on knowledge/skill acquired and record submitted by student (journal) based on practical performed by him/her. The performance shall be assessed experiment wise using the prescribed internal continuous assessment format.

- **ESE –** It shall be based on performance in one of the experiments performed by student in the semester followed by sample questions to judge the depth of understanding/knowledge or skill acquired by the student. It shall be evaluated by two examiners, out of which one examiner shall be external examiner.

ME153 N- ENGINEERING GRAPHICS LAB

Teaching Scheme: 02 PR, Total: 01 **Credit:** 01**Evaluation Scheme:** 50 ICA **Total Marks:** 50

COURSE DESCRIPTION:

Engineering Graphics Lab is a basic course for all undergraduate Engineering program. This course provides the elementary level knowledge of technical Geometry that is engineering drawing. This course is therefore introduced to provide the basic understanding of the fundamentals of Engineering Drawing, mainly visualization, graphics theory, standards and conventions of drawing, the tools of drawing and the use of Drawings in engineering applications. Course includes in briefs that introduction to Engineering Drawing, Orthographic Projection, Isometric view and Isometric Projection, line planes, solids and Development of solids by plotting on sheets manually and computerized.

DESIRABLE AWARENESS/SKILLS:

Fundamental knowledge of Geometry, elements of Mechanical, Civil and Electrical Engineering.

COURSE OUTCOMES:

Students will be able to –

1. Understand the concept of Projection of lines , Planes and able to draw basic views ofprojection of lines and Planes.
2. Understand the concept of conversion of Pictorial view into orthographic view andable to draw orthographic view.
3. Understand the concept of conversion of Orthographic view into Isometric view/Pictorial View and able to draw isometric view.
4. Understand the concept of calculating external surface area of given object and able todraw the external surface .

RELEVANCE OF COURSE OUTCOMES (COs) WITH POs AND PSOs(WITH STRENGTH OF CO-RELATION)

CO	PO												PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	1	-	-	-	2	-	-	-	-	3	-	2	3	2	1
2	1	-	1	2	2	-	-	-	1	3	-	1	3	1	1
3	1	2	1	1	2	-	-	-	-	3	-	-	3	1	1
4	1	-	3	-	2	-	-	-	-	3	-	2	3	1	1

1- Weakly correlated 2 – Moderately correlated 3 – Strongly correlated

CONTENT:

Internal continuous assessment (ICA) shall be on performances of sheets drawn and based onsyllabus of course ME 151R EG.

All **five** sheets are mandatory. Each sheet shall be based and drawn as per below;

Plot the following sheets on full trimmed sheet (hand sketched sheets),Sheets shall be based on –

1. The orthographic projections and sectional view – problems shall be exercisedin the sheet on five mechanical objects.
2. The Isometric View and isometric projections - – problems shall be exercised inthe sheet on four 2d drawings.
3. The projections of lines – problems shall be exercised in the sheet on two onsimple cases and rest four on line inclined to both reference planes.
4. The projections of plane – problems shall be exercised in the sheet on planeinclined to both reference planes.
5. Development of surfaces – four problems shall be exercised on the lateral Development of surfaces of different regular solid (out of four two shall be onparallel line method and rest two shall be based on radial line method only).

Note:-

- Standard sizes of trimmed and untrimmed sheet shall be as per BIS standards SP:46 (2003).

Guide lines for ICA:

Internal Continuous Assessment should support for regular performance of practical/sheets and its regular assessment with proper understanding principles of practical/ sheets completed.

TEXT BOOKS:

1. A text book of Engineering Graphics with an Introduction to Computer AidedDrafting (Vol. I) by Phakatkar. H. G, 7th edition, Nirali Prakashan, Pune 1997.
2. A text book of Machine Drawing and Computer Graphics by Farazdak Haideri, NiraliPrakashan, Pune, 1998.

REFERENCE BOOKS:

1. Engineering Drawing, N. D. Bhatt and V.M. Panchal, Charoter Publications.
2. Fundamental of Engineering Drawing and computer Graphics, Haravinder Singh, 3rdedition, Dhanpat Rai Publication Co, New Delhi, India.
3. Engineering Graphics with AutoCAD, Kulkarni, D. M., Rastogi, A. P. and Sarkar, A. K PHI,India, 2009.

ME101N –MECHANICAL WORKSHOP PRACTICES

Teaching Scheme : 04 P; Total: 04 hours/week **Credits** : 02
Evaluation Scheme : 50 ICA **Total Marks** :50

COURSEDESCRIPTION

The course intends to make students familiar with the basic manufacturing operations that are widely used in day to day life, such as Welding, Fitting ,Plumbing, Molding and Smithy operations.

DESIRABLE AWARENESS/SKILLS:

Fundamental knowledge of Physics, chemistry and mathematics.

COURSE OUTCOMES:

On successful completion of this course ,student shall be able to:

1. Understand the concept of welding and able to practice the operations in Arc welding.
2. Understand the concept of fitting , black smithy and able to practice the operations in fitting and black smithy .
3. Understand the concept of foundry and able to practice the operations in foundry.
4. Understand the concept of plumbing and able to practice the operations in plumbing.

RELEVANCE OF COURSE OUTCOMES (COs) WITH POs AND PSOs (WITH STRENGTH OF CO-RELATION)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2		3										1	2	2
CO2	2	1	1										1	2	1
CO3	1		2	2					1				2	2	2
CO4			1						2				2	1	1

COURSE CONTENT

Students entering in workshop must perform following practical's

1) Welding Shop.

Concept of accidents causes of accidents, safety precautions while working in shop , safety equipment's and their use. One job on Arc welding-Lap/Butt/Tee Joint etc.

2) Fitting Shop.

Study of various tools like-files, drills, taps, dies and Fitting operations.
One job Male/Female fitting with operations-Marking, cutting, drilling, tapping filing etc

3) Black smithy.

Introduction to smithy operations like- bending, forming, upsetting, drawing.
Introduction to smithy tools, hammer, hot and cold chisel, flatters, tongs, anvil etc.
One job in smithy involving upsetting, drawing, bending such as hook, peg, square headed bolt etc.

4) Foundry Shop.

Principles of molding, methods, core and core boxes, preparation of foundry sand

for casting.

5) Plumbing Shop.

Demonstration on plumbing tools, pipes, types of pipe joints, threading dies, Pipe fittings fitments, valves, etc.

TEXT BOOKS:

1. M.S.Mahajan ,Manufacturing Engineering, Firstedition, Dhanpat Raiandsons, Delhi, 2008
2. Hajara Chaudhary and Bose SK, Element of Workshop Technology,2nd Edition.

REFERENCE BOOKS

1. P N Rao, Production Technology, Volume I and II", Tata McGraw Hill Publication, New Delhi, 2001.
2. PCSharma, Production Technology, KhannaPublications,2014
3. R K Jain, Production Technology, Khanna Publication, 2014.
4. W.A.J.Chapman, Workshop Technology,ELBS Low Price Text, Edward Donald Publications. Ltd.
5. Chapman WAJ, Production Technology, HMTTataMcGrawHillPublication,2001.
6. Kannaiah KL, Narayana, Workshop Manual Chennai, second Edition Scitech Publications, 1998.

ME152N-ENGINEERING EXPLORATION WORKSHOP

Teaching Scheme : 04 P; Total: 04 hours/week **Credits** 02

Evaluation Scheme : 50 ICA **Total Marks** 50

COURSE DESCRIPTION

The course intends to make students familiar with the basic Workshop operations that are widely used in day to day life, such as Carpentry, Sheet Metal. Further it intends tooffer fundamental knowledge of equipment used in Electrical workshop. It also covers most of the widely used Computer peripherals and their operations and fundamental equipment used by a Civil engineer.

DESIRABLE AWARENESS/SKILLS

Fundamental knowledge of Physics, Mathematics, Electrical and Computer sciences.

COURSE OUTCOMES

On successful completion of this course student shall be able to:

1) Understand the concept of carpentry, sheet metal and practice hands-on operations on it.
2) Understand the concept of basic electrical appliances and practice hands-on exercise on it.
3) Understand the concept of basic computer devices and practice hands- on exercise on it.
4) Understand the concept of basic electronics component and practice hands on exercise on it.
5) Understand the concept of basic civil measuring instruments and practice hands on exercise on it.

RELEVANCE OF COURSE OUTCOMES (COS) WITH POS AND PSOS (WITH STRENGTH OF CO-RELATION)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1			2										1	2	2
CO2			2										1	2	1
CO3				1									2	2	2
CO4	1				2								2	1	1
CO5	1	2	2										2	2	1

COURSE CONTENT

Students entering in workshop must perform following practical's

1) Carpentry Shop.

Introduction to wood working, kinds of woods, hand tools and machines, Types of joints, wood turning, to instruments like Steel rule, Callipers, Vernier Calliper Micrometre. One job involving joint and wood turning.

2) Sheet Metal Shop.

Introduction to primary technology processes involving bending, punching and drawing various sheet metal joints, development of joints. One job on commercial it emssuchas Dustbin , funnel, tray etc.

3) Electrical Workshop.

Minimum **four** experiments shall be performed from the list of experiments provided below. 1.Identify different types of cables/wires, switches, fuses and fuse carriers, MCB and ELCB,MCCB with ratings and usage.2. Measurement of voltage, current and power in single phase circuit Using voltmeter, ammeter and wattmeter 3. Wiring of backup power supply including inverter, battery and load for domestic installations. 4. Demonstration and measurement of power consumption of electric iron, mixer grinder, single phase pump, exhaust fan etc. 5.Installation and maintenance of domestic solar appliances 6. Demonstration on preparationof extension boards 7. Study of On-OFF control of electrical lighting and fans operated by remote.

4) Computer Workshop.

Introduction and identification of hardware components of a typical computer system. Assembling and Disassembling the PC. Handling and operating peripheral devices like printer, scanner, pen drives, CD-ROM, Multimedia Devices, UPS etc.

5) Electronics Workshop.

Demonstration and use of electrical and electronics hand and power tools. Measurement ofresistance, capacitance, voltage and frequency. Assembly of Electronic components on the printed circuit board(PCB)/BreadBoard.

6) Civil Workshop.

Study and use of Chain and tape, Levelling staff and Dumpy level, Planimeter and Measurement of height of building.

TEXT BOOKS

1. M.S.Mahajan,MetrologyandQualityControl,DhanpatRaiandsons,Delhi.2008 onwards.
2. HajaraChaudhary, Bose SK, Element of Workshop Technology, Volume I and II, Asia

Publishing House. 1997 onwards.
3) B.L.Theraja,FundamentalsofElectricalEngineering,27 Publishers,1996.

REFERENCE BOOKS

1 Chapman W. A. J., Workshop Technology, CBS Publication. 1986 onwards.

2 T. P. Kanetkar and S. V. Kulkarni, Surveying and leveling Part 1, Pune VidyarthigrihaPrakashan, 2010

3 Leonard S. Bobrow, Fundamentals of Electrical Engineering, 2nd Edition, Oxford Press,1998.