B. Tech.

MECHANICAL ENGINEERING

Semester – I

CURRICULUM AND SYLLABUS

2025 Scheme

CHRIST COLLEGE OF ENGINEERING

(AUTONOMOUS)

Irinjalakuda, Thrissur - 680125

MECHANICAL ENGINEERING

B. Tech – 2025

SEMESTER – S1 (GROUP - C)

CURRICULUM AND SYLLABUS

FIRST SEMESTER: Mechanical Engineering														
Sl. No:	Slot	Course Code	Course	Course Category	Course Title (Course Name)	Credit Structure				SS	Total Marks		Credits	Hrs./Week
						L	T	P	R		CIE	ESE		
THEORY														
1	A	G25MAT121	BS	GC	Mathematics for Physical Science-1	3	0	0	0	4.5	40	60	3	3
2	B	G25PYE122	BS	GC	Physics for Physical Science	3	0	2	0	5.5	40	60	4	5
3	C	G25MHT104	ES	GC	Engineering Mechanics	3	0	0	0	4.5	40	60	3	3
4	D	G25MCT105	ES	GC	Introduction to Mechanical Engineering & Civil Engineering (Part 1: Mechanical Engineering)	2	0	0	0	3	20	30	2+2=4	4
					(Part 2: Civil Engineering)	2	0	0	0	3	20	30		
PRACTICALS														
5	E	A25ATE106	PC	PC	Algorithmic Thinking with Python	3	0	2	0	5.5	40	60	4	4
6	I	G25EWP107	HM	CC	Basic Civil and Mechanical Engineering Workshop	0	0	2	0	1	50	50	1	2
7	L	A25HWE108	ES	CC	Health and Wellness	1	0	1	0	0	50	0	1	2
MANDATORY COURSES														
9	-		MC	MC	Activity Point Programme								-	-
Total										**27**			**20**	**24**

SEMESTER S1

MATHEMATICS FOR PHYSICAL SCIENCE - 1

Course Code	G25MAT121	**CIE Marks**	40
Teaching Hours/Week (L:T:P:R)	3:0:0:0	**ESE Marks**	60
Credits	3	**Exam Hours**	2 Hrs. and 30 Mins.
Prerequisites (if any)	Basic knowledge in single variable calculus and matrix operations.	**Course Type**	Theory

Course Objective:

1. To provide a comprehensive understanding and basic techniques of matrix theory to analyze linear systems.
2. To offer advanced knowledge and practical skills in solving second-order ordinary differential equations, applying Laplace transforms, and understanding Fourier series, enabling students to analyze and model dynamic systems encountered in engineering disciplines effectively.

SYLLABUS

Module No.	Description	Contact Hours
1	Linear systems of equations: Gauss elimination, Row echelon form, Linear Independence: rank of a matrix, Solutions of linear systems: Existence, Uniqueness (without proof), The matrix Eigen Value Problem, Determining Eigen values and Eigen vector, Diagonalization of matrices.	9
2	Homogeneous linear ODEs of second order, Superposition principle, General solution, Homogeneous linear ODEs of second order with constant coefficients (Method to find general solution, solution of linear Initial Value Problem). Non homogenous ODEs (with constant coefficients) - General solution, Particular solution by the method of undetermined coefficients (Particular solutions for the functions ke^x , kx^n, kcosωx, ksinωx , ke^αxcosωx, ke^αxsinωx), Initial value Problem for Non-Homogeneous Second order linear ODE(with constant coefficients), Solution by variation of parameters (Second Order).	9
3	Laplace Transform, Inverse Laplace Transform, Linearity property, First shifting theorem, Transform of derivatives, Solution of Initial value problems by Laplace transform (Second order linear ODE with constant coefficients with initial conditions at t=0 only), Unit step function, Second shifting theorem, Dirac delta function and its transform (Initial value	9

	problems involving unit step function and Dirac delta function are excluded), Convolution theorem (without proof) and its application to finding inverse Laplace transform of products of functions.	
4	Taylor series representation (without proof, assuming the possibility of power series expansion in appropriate domains), Maclaurin series representation, Fourier series, Euler formulas, Convergence of Fourier series (Dirichlet's conditions), Fourier series of 2π periodic functions, Fourier series of $2l$ periodic functions, Half range sine series expansion, Half range cosine series expansion.	9

Course Assessment Method
(CIE: 40 Marks, ESE: 60 Marks)

Continuous Internal Evaluation Marks (CIE):

Assignment (Activity based)	Assignment (Activity based)	Internal Examination-I (Written)	Internal Examination-II (Written)	Internal Examination-III (Written)	Total
10	10	30	30	30	
		A total of 90 marks will be scaled to 20.			**40**

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions.

Part A	Part B	Total
• 2 questions from each module. • Total of 8 questions, each carrying 3 marks **(8 x 3 = 24 Marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4 x 9 = 36 Marks)**	**60**

Course Outcomes (Cos)

At the end of the course students should be able to:

CO No.	Description	Blooms Knowledge Level (KL)
CO1	Solve the system of linear equations, compute eigen values and eigenvectors and apply these concepts to real-world problems in various fields	3
CO2	Analyze different forms of linear differential equations and examine their applicability in modeling and solving problems across various scientific disciplines.	4
CO3	Apply Laplace transform and inverse Laplace transform to solve ordinary differential equations with impulsive inputs relevant to engineering problems.	3
CO4	Analyze functions using Taylor and Fourier series to select suitable representations and examine their role in modeling periodic phenomena in engineering.	4
CO5	Able to develop, analyze and make use of theoretical concepts to solve complex problems and visualize the output	4

Note: K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, and K6 - Create

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3												
CO2	3	3												
CO3	3	3												
CO4	3	3												
CO5	3	3			2	2		2	3		2			

Text Books

Sl. No.	Title of the Book	Name of the Author(s)	Name of the Publisher	Edition and Year
1	Advanced Engineering Mathematics	Erwin Kreyszig	John Wiley & Sons	10th Edition, 2016
2	Calculus	H. Anton,I. Biven, S.Davis	Wiley	12th edition, 2024

Reference Books

Sl. No.	Title of the Book	Name of the Author(s)	Name of the Publisher	Edition and Year
1	Thomas' Calculus	Maurice D. Weir, Joel Hass, Christopher Heil, Przemyslaw Bogacki	Pearson	15th edition, 2023
2	Essential Calculus	J. Stewart	Cengage	2nd edition, 2017
3	Elementary Linear Algebra	Howard Anton, Chris Rorres	Wiley	11th edition, 2019
4	Bird's Higher Engineering Mathematics	John Bird	Taylor & Francis	9th edition, 2021
5	Higher Engineering Mathematics	B. V. Ramana	McGraw-Hill Education	39th edition, 2023
6	Calculus	Howard Anton, Irl Bivens, Stephens Davis	Wiley	12th Edition, 2024
7	Signals and Systems	Simon Haykin, Barry Van Veen	Wiley	2nd edition,

Video Links (NPTEL, SWAYAM, etc.)

Module No.	Link
1	https://archive.nptel.ac.in/courses/111/107/111107164/
2	https://archive.nptel.ac.in/courses/111/104/111104031/
3	https://archive.nptel.ac.in/courses/111/106/111106139/
4	https://archive.nptel.ac.in/courses/111/101/111101164/

SEMESTER S1

PHYSICS FOR PHYSICAL SCIENCE

Course Code	G25PYE122	**CIE Marks**	40
Teaching Hours/Week (L:T:P:R)	3:0:2:0	**ESE Marks**	60
Credits	4	**Exam Hours**	2 Hrs. and 30 Mins.
Prerequisites (if any)	None	**Course Type**	Theory + Lab

Course Objective:

1. To provide students with a solid background in the fundamentals of Physics and impart this knowledge in Physical Science and Life Science disciplines.
2. To develop scientific attitudes and enable students to correlate Physics concepts with their core programs.
3. To equip students with practical knowledge that complements their theoretical studies and develop their ability to create practical applications and solutions in engineering based on their understanding of Physics.

SYLLABUS

Module No.	Description	Contact Hours
1	**Laser & Fibre Optics** Optical processes – Absorption-Spontaneous emission and stimulated emission, Principle of laser - conditions for sustained lasing – Population inversion- Pumping- Metastable states, Basic components of laser - Active medium - Optical resonant cavity, Construction and working of Ruby laser and CO2 laser, Construction and working Semiconductor laser (qualitative), Properties of laser, Applications of laser. Optic fibre-Principle of propagation of light, Types of fibres-Step index and Graded index fibres - Multimode and single mode fibers, Acceptance angle, Numerical aperture –Derivation, Applications of optical fibres - Fibre optic communication system (block diagram)	9
2	**Interference and Diffraction** Introduction, Principle of super position, Constructive and destructive interference, Optical path, Phase difference and path difference, Cosine law-reflected system- Condition for constructive and destructive interference, Colours in thin films, Newton's Rings-Determination of refractive index of transparent liquids and wavelength, Air wedge- Measurement of thickness of thin sheets. Diffraction-types of diffraction, Diffraction due to a single slit, Diffraction grating – Construction - grating equation, Dispersive and Resolving Power (qualitative).	9

3	**Quantum Mechanics** Introduction, Concept of uncertainty and conjugate observables (qualitative), Uncertainty principle (statement only), Application of uncertainty principle- Absence of electron inside nucleus - Natural line broadening, Wave function – properties - physical interpretation, Formulation of time dependent and time independent Schrodinger equations, Particle in a one- dimensional box - Derivation of energy eigen values and normalized wave function, Quantum Mechanical Tunnelling (qualitative)	9
4	**Waves & Acoustics** Waves- transverse and longitudinal waves, Concept of frequency, wavelength and time period (no derivation), Transverse vibrations in a stretched string- derivation of velocity and frequency - laws of transverse vibration. Acoustics- Reverberation and echo, Reverberation time and its significance - Sabine's Formula, Factors affecting acoustics of a building. Ultrasonics- Piezoelectric oscillator, Ultrasonic diffractometer, SONAR, NDT-Pulse echo method, medical application-Ultrasound scanning (qualitative)	9

Course Assessment Method
(CIE: 40 Marks, ESE: 60 Marks)

Continuous Internal Evaluation Marks (CIE):

Continuous Assessment	Internal Examination-I (Written)	Internal Examination-II (Written)	Internal Examination-III (Written)	Internal Lab Examination	Total
10	30	30	30	10	
	A total of 90 marks will be scaled to 20.				**40**

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions.

Part A	Part B	Total
• 2 questions from each module. • Total of 8 questions, each carrying 3 marks **(8 x 3 = 24 Marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4 x 9 = 36 Marks)**	**60**

Course Outcomes (COs)

At the end of the course students should be able to:

CO No.	Description	Blooms Knowledge Level (KL)
CO1	Analyze the working principles of lasers and optical fibers and evaluate their applications in communication, medical technology, and industrial processing.	4
CO2	Apply the properties of light for accurate measurement of various physical quantities such as refractive index, thickness, and wavelength	3
CO3	Analyze the behaviour of matter in the atomic and subatomic levels through the principles of quantum mechanics to perceive the microscopic processes in electronic devices.	4
CO4	Analyze different types of waves and its properties. Apply ultrasonics in non-destructive testing. Apply the principles of acoustics to design a building, producing sustainable cities and communities.	4
CO5	Apply physics concepts in experimental settings to interpret results, demonstrate technical proficiency, and translate theoretical knowledge into practical engineering applications.	3

Note: K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, and K6 – Create

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2												
CO2	2	2												
CO3	2	2												
CO4	2	2				3								
CO5	2	2			2			3	3		2			

Text Books

Sl. No.	Title of the Book	Name of the Author(s)	Name of the Publisher	Edition and Year
1	Engineering Physics	H K Malik and A K Singh	McGraw Hill	2nd Edition, 2017
2	Optics	Ajoy Ghatak	McGraw Hill	6th Edition, 2017

3	A Textbook of Engineering Physics	MN Avadhanulu, P G Kshirsagar, TVS Arun Murthy	S. Chand	11th Edition, 2018

Reference Books

Sl. No.	Title of the Book	Name of the Author(s)	Name of the Publisher	Edition and Year
1	Engineering Physics	G Vijayakumari	Vikas Publications	8th Edition, 2014
2	Concepts of Modern Physics	Arthur Beiser	Tata McGraw Hill	6th Edition, 2003
3	Engineering Physics	Aruldhas G.	Prentice Hall India Pvt. Ltd.	2nd Edition, 2015
4	Fiber Optic Communications	Gerd Keiser	Springer	2021
5	A Text Book of Engineering Physics	I. Dominic and A. Nahari	Owl Books	Revised Edition, 2016
6	Advanced Engineering Physics	Premlet B	Phasor Books	
7	Engineering Physics	Rakesh Dogra	Katson Books	1st Edition, 2019

Video Links (NPTEL, SWAYAM, etc.)

Module No.	Link
1	https://nptel.ac.in/courses/115102124 https://nptel.ac.in/courses/104104085
2	https://nptel.ac.in/courses/115105537
3	https://nptel.ac.in/courses/115102023 https://nptel.ac.in/courses/115101107
4	https://nptel.ac.in/courses/112104212 https://nptel.ac.in/courses/124105004

1. Continuous Assessment (10 Marks)

i. Preparation and Pre-Lab Work (2 Marks)

- Pre-Lab Assignments: Assessment of pre-lab assignments or quizzes that test understanding of the upcoming experiment.
- Understanding of Theory: Evaluation based on students' preparation and understanding of the theoretical background related to the experiments.

ii. Conduct of Experiments (2 Marks)

- Procedure and Execution: Adherence to correct procedures, accurate execution of experiments, and following safety protocols.

- Skill Proficiency: Proficiency in handling equipment, accuracy in observations, and troubleshooting skills during the experiments.
- Teamwork: Collaboration and participation in group experiments.

iii. Lab Reports and Record Keeping (3 Marks)

- Quality of Reports: Clarity, completeness and accuracy of lab reports. Proper documentation of experiments, data analysis and conclusions.
- Timely Submission: Adhering to deadlines for submitting lab reports/rough record and maintaining a well-organized fair record.

iv. Viva Voce (3 Marks)

- Oral Examination: Ability to explain the experiment, results and underlying principles during a viva voce session.

Final Marks Averaging: *The final marks for preparation, conduct of experiments, viva, and record are the average of all the specified experiments in the syllabus.*

2. Evaluation Pattern for Lab Examination (5 Marks)

1. **Procedure/Preliminary Work/Conduct of Experiments (2 Marks)**
   - Procedure Understanding and Description: Clarity in explaining the procedure and understanding each step involved.
   - Preliminary Work and Planning: Thoroughness in planning and organizing materials/equipment.
   - Setup and Execution: Proper setup and accurate execution of the experiment or programming task
2. **Result (2 Marks)**
   - Accuracy of Results: Precision and correctness of the obtained results.
3. **Viva Voce (1 Marks)**
   - Proficiency in answering questions related to theoretical and practical aspects of the subject.

Experiment List (Minimum 10 Experiments)

Experiment No.	Experiment
1	Optical fiber characteristics- Measurement of Numerical aperture.
2	Determination of wavelength of Laser using diffraction grating.
3	Measure the wavelength of Laser using a millimetre scale as a grating.
4	Determination of wavelength of a monochromatic light using Newton's Rings method.
5	Determination of diameter of wire or thickness of thin sheet using Air wedge method.
6	Determination of slit width (diffraction due to a single slit).
7	Measure wavelength of light source using diffraction grating.
8	Determination of resolving power and dispersive power of grating.
9	Characteristics of LED.

10	CRO basics-Measurement of frequency and amplitude of wave forms.
11	Solar Cell- I V and Intensity Characteristics.
12	Melde's experiment- Frequency calculation in Transverse and Longitudinal Mode.
13	LCR circuit –forced and damped harmonic oscillations.
14	Determination of wavelength and velocity of ultrasonic waves using ultrasonic diffractometer.
15	Determination of particle size of lycopodium powder.

SEMESTER S1

ENGINEERING MECHANICS

Course Code	G25MHT104	**CIE Marks**	40
Teaching Hours/Week (L:T:P:R)	3:0:0:0	**ESE Marks**	60
Credits	3	**Exam Hours**	2 Hrs. and 30 Mins.
Prerequisites (if any)	None	**Course Type**	Theory

Course Objective:

1. The course aims to enable students to analyse and solve fundamental mechanics problems

SYLLABUS

Module No.	Description	Contact Hours
1	Introduction to statics: introduction to branches of mechanics, concept of rigid body scalars and vectors, vector operations, forces in space. Support reactions of beams (point load and UDL only) Force systems: rectangular components in 2D and 3D, moment and couple, resultants Equilibrium: system isolation and the free-body diagram, equilibrium conditions 2D and 3D	10
2	Friction: -laws of friction – analysis of blocks and ladder Centroid of composite areas- – moment of inertia- parallel axis and perpendicular axis theorems. Polar moment of inertia, radius of gyration, mass moment of inertia-ring and disc	10
3	Dynamics – rectilinear translation - equations of motion in kinematics and kinetics – D'Alembert's principle. –motion on horizontal and inclined surfaces, motion of connected bodies	8
4	Curvilinear translation - equations of kinematics projectile motion (solution starting from differential equations) Rotation – kinematics of rotation- equation of motion for a rigid body rotating about a fixed axis –rotation under a constant moment	8

Course Assessment Method
(CIE: 40 Marks, ESE: 60 Marks)

Continuous Internal Evaluation Marks (CIE):

Assignment-I (Activity based)	Assignment-II (Activity based)	Internal Examination-I (Written)	Internal Examination-II (Written)	Internal Examination-III (Written)	Total
10	10	30	30	30	
		A total of 90 marks will be scaled to 20.			**40**

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions.

Part A	Part B	Total
• 2 questions from each module. • Total of 8 questions, each carrying 3 marks **(8 x 3 = 24 Marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4 x 9 = 36 Marks)**	**60**

Course Outcomes (Cos)

At the end of the course students should be able to:

CO No.	Description	Blooms Knowledge Level (KL)
CO1	Apply the principles of rigid body mechanics and concepts of equilibrium to determine forces acting on bodies	3
CO2	Analyse the coplanar system of forces and frictional force acting on bodies	4
CO3	Apply appropriate theorems to determine properties of plane areas	3
CO4	Solve problems of rigid bodies in dynamic conditions	3
CO5	Demonstrate practical application of mechanics principles through activity-based tasks such as lab experiments, model building, case studies, or mini-projects involving friction analysis, equilibrium studies, or dynamics simulations.	5

Note: K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, and K6 - Create

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3				2								
CO2	3	3				2								
CO3	3	3				2	2				2			
CO4	3	3				2	2				2			
CO5			3	3	2			3			3			

Text Books

Sl. No.	Title of the Book	Name of the Author(s)	Name of the Publisher	Edition and Year
1	Engineering Mechanics	Timoshenko and Young	McGraw Hill Publishers 5th Edition 2017	5th Edition 2017
2	Engineering Mechanics: Combined Statics and Dynamics	Russell C. Hibbeler	Pearson Education,	14th Edition 2015
	Engineering Mechanics - Statics and Dynamics,	Shames, I. H.	Prentice Hall of India.	4th Edition 2008
	Textbook of Engineering Mechanics	R. K. Bansal	Laxmi Publications Pvt ltd.	4th Edition 2016

Reference Books

Sl. No.	Title of the Book	Name of the Author(s)	Name of the Publisher	Edition and Year
1	Engineering Mechanics Statics	J. L. Meriam, L. G.	Wiley	9th Edition 2020
2	Engineering Mechanics	Kraige	PHI Learning	2011

Video Links (NPTEL, SWAYAM, etc.)

Module No.	Link
1	https://nptel.ac.in/courses/112106286

SEMESTER S1

INTRODUCTION TO MECHANICAL ENGINEERING & CIVIL ENGINEERING

Course Code	G25MCT105	**CIE Marks**	40
Teaching Hours/Week (L:T:P:R)	4:0:0:0	**ESE Marks**	60
Credits	4	**Exam Hours**	2 Hrs. and 30 Mins.
Prerequisites (if any)	None	**Course Type**	Theory

Course Objective:

1. Understand thermodynamic cycles and working of IC engines.
2. Understand the refrigeration cycles and psychrometric concepts.
3. Understand the relevance of civil engineering and its various disciplines.
4. Describe the relevance of various building codes and types of buildings as per NBC.
5. Understand different building components and building materials.

SYLLABUS

Module No.	Description	Contact Hours
1	**General introduction to Mechanical Engineering:** Thermodynamic cycles -Carnot Cycle -Derivation of efficiency (problems on efficiency) Otto, Diesel cycles (no derivation of efficiency and problems). **IC Engines:** CI & SI Engines, working of 2-Stroke & 4-Stroke engines. Listing the parts of IC Engines. Concept of CRDI, MPFI and hybrid engines. **Refrigeration:** Unit of refrigeration, reversed Carnot cycle, COP, vapour compression cycle (only description and no problems); Definitions of dry, wet & dew point temperatures, specific humidity and relative humidity, Psychrometric chart, Cooling and dehumidification, Layout of central air conditioning systems.	9
2	**Classification of pumps**, Description about working with sketches of: Reciprocating pump, Centrifugal pump. Classification of Hydraulic Turbines. Different type of gears and its applications (spur, helical, bevel, worm and worm wheel), List types of clutches and their use, Bearings and their classification (Journal bearing and ball bearing) **Manufacturing Process:** Sand Casting, Forging, Rolling, Extrusion. Metal Joining Processes: List types of welding, Description with sketches of Arc Welding, SMAW, Soldering and Brazing and their applications. **Machining processes:** Description and operations performed on Lathe, Drilling machine, Milling machine, CNC machine, 3D printing.	9

3	**General Introduction to Civil Engineering:** Relevance of Civil Engineering in the overall infrastructural development of the country. Brief introduction to major disciplines of Civil Engineering like Structural Engineering, Geo-technical Engineering, Transportation Engineering, Water Resources Engineering and Environmental Engineering. **Introduction to buildings:** Types of buildings according to character of occupancy as per NBC, Load bearing and non-load bearing building structures, components of a residential building and their functions (concept only). Selection of site for a residential building. Building Area Definitions: Built up area, Plinth area, Floor area, Carpet area and Floor area ratio of a building as per KBR. Building rules and regulations: Relevance of NBC, KBR & CRZ norms (brief discussion of relevance only).	9
4	**Conventional construction materials:** Brick, stone, sand, cement and timber- Classifications, Qualities, Tests and Uses of construction materials. **Tests on fresh and hardened concrete** - slump test, cube compressive strength as per IS Codes. Steel: Structural steel sections and steel reinforcements – types and uses. Soil-Origin of soil-weathering of rocks, types of weathering	9

Course Assessment Method
(CIE: 40 Marks, ESE: 60 Marks)

Continuous Internal Evaluation Marks (CIE):

Assignment (Activity based)	Assignment (Activity based)	Internal Examination-I (Written)	Internal Examination-II (Written)	Internal Examination-III (Written)	Total
10	10	30	30	30	
		A total of 90 marks will be scaled to 20.			**40**

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions.

Part A	Part B	Total
• 2 questions from each module. • Total of 8 questions, each carrying 3 marks **(8 x 3 = 24 Marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4 x 9 = 36 Marks)**	**60**

Course Outcomes (COs)

At the end of the course students should be able to:

CO No.	Description	Blooms Knowledge Level (KL)
CO1	Apply the concepts of thermodynamic cycles, internal combustion engines, and refrigeration systems to identify their functional roles and practical applications in engineering systems.	3
CO2	Apply knowledge of the roles of civil engineers, various disciplines in civil engineering, and building types and regulations to understand their impact on technological development.	3
CO3	Analyze different types of pumps, turbines, mechanical systems, and basic manufacturing processes to determine suitable options based on operating conditions and criteria for energy-efficient applications.	4
CO4	Analyze various building components and construction materials to identify appropriate combinations under different site and loading conditions for safe and sustainable construction practices.	4
CO5	Apply the concepts of basic Civil and Mechanical Engineering using an Engineering Tool to develop a model showcasing sustainable technologies for real-world applications.	3

Note: K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, and K6 – Create

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3		2		3		2	3		2			
CO2	3	3		2		3		2	3		2			
CO3	3	3		2		3		2	3		2			3
CO4	3	3		2		3		2	3		2			3
CO5	3	3	2	2	3	3		2	3		2			

Text Books

Sl. No.	Title of the Book	Name of the Author(s)	Name of the Publisher	Edition and Year
1	Basic Mechanical Engineering	Pravin Kumar	Pearson Education	1st Edition, 2013
2	A Textbook of Basic Mechanical Engineering	R.K. Rajput	Laxmi Publications	3rd Edition, 2017
3	Elements of Mechanical Engineering	K.P. Roy, S.K. Hajra Choudhury, A.K. Hajra Choudhury	Media Promoters & Publishers Pvt. Ltd.	Revised Edition, 2012

4	Fundamentals of Mechanical Engineering	G.S. Sawhney	PHI Learning Pvt. Ltd.	1st Edition, 2013
5	Essentials of Civil Engineering	Dalal K R	Charotar Publishing house	1st Edition 2012
6	Engineering Materials (Material Science)	Rangwala S C	Charotar Publishing House Pvt Limited	43rd Edition 2019
7	Building Materials	Duggal S K	New Age International	5th Edition 2019

Reference Books

Sl. No.	Title of the Book	Name of the Author(s)	Name of the Publisher	Edition and Year
1	Hybrid Electric Vehicles: Principles and Applications with Practical Perspectives	Chris Mi and M. Abul Masrur John	Wiley & Sons	2nd Edition, 2017
2	Automotive Engineering Fundamentals	Richard Stone and Jeffrey K. Ball	SAE International	1st Edition, 2004
3	Additive Manufacturing Technologies: 3D Printing, Rapid Prototyping, and Direct Digital Manufacturing	Ian Gibson, David W. Rosen, and Brent Stucker	Springer	2nd Edition, 2015
4	Heating, Ventilating, and Air Conditioning Analysis and Design	Faye C. McQuiston, Jerald D. Parker, and Jeffrey D. Spitler John	Wiley & Sons	6th Edition, 2005
5	Materials for Civil and Construction Engineering	Mamlouk, M.S.,and Zaniewski, J.P	Pearson Publishers	4th Edition, 2017
6	Building Construction	Rangwala, S.C and Dalal, KB	Charotar Publishing house	34th Edition 2022
7	Construction Technology Vol.I to IV	Chudley, R	Longman group,England Course Plan	2nd Edition 2014
8	Building Construction Volumes1to4	Mckay, W.B.and Mckay,J.K	Pearson India Education Services	5th Edition
9	Engineering Geology	Duggal S. K., Pandey H.K. and Rawat N,	Mcgraw Hill Education, New Delhi	1st Edition 2017
10	Latest Building codes and related rules and regulations.			

Video Links (NPTEL, SWAYAM, etc.)

Module No.	Link
1	https://nptel.ac.in/courses/112/105/112105123/ https://nptel.ac.in/courses/112/106/112106133/ https://nptel.ac.in/courses/112/105/112105129/
2	https://nptel.ac.in/courses/112/105/112105171/ https://nptel.ac.in/courses/112/105/112105268/ https://archive.nptel.ac.in/courses/112/107/112107145
3	https://archive.nptel.ac.in/courses/105/106/105106201/
4	https://archive.nptel.ac.in/courses/105/106/105106206/

SEMESTER S1

ALGORITHMIC THINKING WITH PYTHON

Course Code	A25ATE106	**CIE Marks**	40
Teaching Hours/Week (L:T:P:R)	3:0:2:0	**ESE Marks**	60
Credits	4	**Exam Hours**	2 Hrs. and 30 Mins.
Prerequisites (if any)	None	**Course Type**	Theory + Lab

Course Objective:

1. To provide students with a thorough understanding of algorithmic thinking and its practical applications in solving real-world problems. To develop the ability to accurately interpret and understand engineering drawings.
2. To explore various algorithmic paradigms, including brute force, divide-and-conquer, dynamic programming, and heuristics, in addressing and solving complex problems.

SYLLABUS

Module No.	Description	Contact Hours
1	**Problem-Solving Strategies**: - Problem-solving strategies defined, Importance of understanding multiple problem-solving strategies, Trial and Error, Heuristics, Means-Ends Analysis, and Backtracking (Working backward). **The Problem-Solving Process:** - Computer as a model of computation, Understanding the problem, formulating a model, developing an algorithm, Writing the program, Testing the program, and evaluating the solution. **Essentials of Python Programming:** - Creating and using variables in Python, Numeric and String data types in Python, Using the math module, Using the Python Standard Library for handling basic I/O - print, input, Python operators and their precedence.	7
2	**Algorithm and Pseudocode Representation:** - Meaning and Definition of Pseudocode, Reasons for using pseudocode, The main constructs of pseudocode - Sequencing, selection (if-else structure, case structure) and repetition (for, while, repeat-until loops). Sample problems. **Flowcharts:** - Symbols used in creating a Flowchart - start and end, arithmetic calculations, input/output operation, decision (selection), module name (call), for loop (Hexagon), flow-lines, on-page connector, off-page connector.	9

3	**Selection and Iteration Using Python:** - if-else, elif, for loop, range, while loop. Sequence data types in Python - list, tuple, set, strings, dictionary, Creating and using Arrays in Python (using Numpy library). **Decomposition and Modularization*:** - Problem decomposition as a strategy for solving complex problems, Modularization, Motivation for modularization, Defining and using functions in Python, Functions with multiple return values **Recursion:** - Recursion Defined, Reasons for using Recursion, The Call Stack, Recursion and the Stack, Avoiding Circularity in Recursion, Sample problems.	10
4	**Computational Approaches to Problem-Solving:** Brute-force Approach, Divide-and-conquer Approach, Dynamic Programming Approach, Greedy Algorithm Approach, Randomized Approach.	10

Course Assessment Method
(CIE: 40 Marks, ESE: 60 Marks)

Continuous Internal Evaluation Marks (CIE):

Continuous Assessment	Internal Examination-I (Written)	Internal Examination-II (Written)	Internal Examination-III (Written)	Internal Lab Examination	Total
10	30	30	30	10	
	A total of 90 marks will be scaled to 20.				**40**

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions.

Part A	Part B	Total
• 2 questions from each module. • Total of 8 questions, each carrying 3 marks **(8 x 3 = 24 Marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4 x 9 = 36 Marks)**	**60**

Course Outcomes (Cos)

At the end of the course students should be able to:

CO No.	Description	Blooms Knowledge Level (KL)
CO1	Utilize computing as a model for solving real-world problems.	2
CO2	Articulate a problem before attempting to solve it and prepare a clear and accurate model to represent the problem.	3
CO3	Develop effective algorithms to solve formulated models and translate algorithms into executable programs.	3
CO4	Demonstrate problem-solving approaches, a systematic technique to solving computational problems, and essential Python programming skills.	4
CO5	Design and implement using algorithmic solutions using problem-solving strategies to address real-world sustainability challenges.	4

Note: K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, and K6 – Create

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3			1						2			3
CO2	3	3		3	1						2	2	2	
CO3	3	3		3	3						2			3
CO4	3	3		3	3						3			3
CO5	3	3		3	2	3	2	3	3	3	3	2	2	3

Reference Books

Sl. No.	Title of the Book	Name of the Author(s)	Name of the Publisher	Edition and Year
1	Problem solving & programming concepts	Maureen Sprankle, Jim Hubbard	Pearson	9th Edition, 2011
2	How to Solve It: A New Aspect of Mathematical Method	George Pólya	Princeton University Press	2nd Edition, 2015
3	Creative Problem Solving: An Introduction	Donald Treffinger., Scott	Prufrock Press	4th Edition, 2005

		Isaksen, Brian Stead-Doval		
4	Psychology (Sec. Problem Solving.)	Spielman, R. M., Dumper, K., Jenkins, W., Lacombe, A., Lovett, M., & Perlmutter, M	H5P Edition	1st Edition, 2021
5	Computational Thinking: A Primer for Programmers and Data Scientists	G Venkatesh Madhavan Mukund	Mylspot Education Services Pvt Ltd	1st Edition, 2020
6	Computer Arithmetic Algorithms	Koren, Israel	AK Peters/CRC Press	2nd Edition, 2001
7	Python for Everyone	Cay S. Horstmann, Rance D. Necaise	Wiley	3rd Edition, 2024
8	Introduction to Computation and Programming using Python	Guttag John V	PHI	2nd Edition, 2016

Video Links (NPTEL, SWAYAM, etc.)

Module No.	Link
1	https://opentextbc.ca/h5ppsychology/chapter/problem-solving/
2	https://onlinecourses.nptel.ac.in/noc21_cs32/preview

Continuous Assessment (10 Marks)

Accurate Execution of Programming Tasks

- Correctness and completeness of the program
- Efficient use of programming constructs
- Handling of errors.
- Proper testing and debugging

Evaluation Pattern for Lab Examination (10 Marks)

1. Algorithm (2 Marks)

Algorithm Development: Correctness and efficiency of the algorithm related to the question.

2. Programming (3 Marks)

Execution: Accurate execution of the programming task.

3. Result (3 Marks)

Accuracy of Results: Precision and correctness of the obtained results.

4. Viva Voce (2 Marks)

Proficiency in answering questions related to theoretical and practical aspects of the subject.

Sample Classroom Exercises:

1. Identify ill-defined problem and well-defined problems
2. How do you differentiate the methods for solving algorithmic problems: introspection, simulation, computer modelling, and experimentation?
3. Use cases for Trial and error, Algorithm, Heuristic and Means-ends analysis can be applied in proffering solution to problems
4. Use a diagram to describe the application of Tower of Hanoi in choosing and analysing an action at a series of smaller steps to move closer to the goal
5. What effect will be generated if the stage that involves program writing is not observed in the problem-solving process?
6. What effect will be generated if the stage that involves program writing is not observed in the problem-solving process?
7. Evaluate different algorithms based on their efficiency by counting the number of steps.
8. Recursive function that takes a number and returns the sum of all the numbers from zero to that number.
9. Recursive function that takes a number as an input and returns the factorial of that number.
10. Recursive function that takes a number ‘n’ and returns the nth number of the Fibonacci number.
11. Recursive function that takes an array of numbers as an input and returns the product of all the numbers in the list.

LAB Experiments:

1. Demonstrate about Basics of Python Programming
2. Demonstrate about fundamental Data types in Python Programming. (i.e., int, float, complex, bool and string types)
3. Demonstrate different Arithmetic Operations on numbers in Python.
4. Create, concatenate, and print a string and access a sub-string from a given string.
5. Familiarize time and date in various formats (Eg. “Sun May 29 02:26:23 IST 2017”)
6. Write a program to create, append, and remove lists in Python using numPy.
7. Programs to find the largest of three numbers.
8. Convert temperatures to and from Celsius, and Fahrenheit. [Formula: c/5 = f-32/9]
9. Program to construct the stars (*) pattern, using a nested for loop
10. Program that prints prime numbers less than 20.
11. Program to find the factorial of a number using Recursion.
12. Recursive function to add two positive numbers.
13. Recursive function to multiply two positive numbers
14. Recursive function to the greatest common divisor of two positive numbers.

15. Program that accepts the lengths of three sides of a triangle as inputs. The program output should indicate whether or not the triangle is a right triangle (Recall from the Pythagorean Theorem that in a right triangle, the square of one side equals the sum of the squares of the other two sides). Implement using functions.
16. Program to define a module to find Fibonacci Numbers and import the module to another program.
17. Program to define a module and import a specific function in that module to another program.
18. Program to check whether the given number is a valid mobile number or not using functions?

Rules:

1. Every number should contain exactly 10 digits.
2. The first digit should be 7 or 8 or 9

SEMESTER S1

BASIC CIVIL AND MECHANICAL ENGINEERING WORKSHOP

Course Code	G25EWP107	CIE Marks	40
Teaching Hours/Week (L:T:P:R)	0:0:2:0	ESE Marks	60
Credits	1	Exam Hours	2 Hrs. and 30 Mins.
Prerequisites (if any)	None	Course Type	Lab

Course Objective:

1. To enable the student to familiarize various tools, measuring devices, practices and different methods employed in the industry.
2. To enable the students to apply this experience while developing product/project for the benefit of society.

Experiments

(Minimum 12 Exercises)

Module No.	Description
1	General: Introduction to workshop practice, Safety precautions, Shop floor ethics, and Basic First Aid knowledge. Study of mechanical and measurement tools, components and their applications: (a) Tools: screw drivers, spanners, Allen keys, cutting pliers etc. and accessories (b) bearings, seals, O-rings, circlips, keys etc.(c)Vernier Calipers, Height Gauge, Depth Gauge, Micrometers, Bevel Protractor etc.
2	Carpentry: Understanding carpentry tools and knowledge of at least one model 1. T –Lap joint 2. Cross lap joint 3. Dovetail joint 4. Mortise joints
3	Foundry: Understanding of foundry tools and knowledge of at least one model 1. Bench Moulding 2. Floor Moulding 3. Core making 4. Pattern making
4	Sheet Metal: Understanding sheet metal working tools and knowledge of at least one model 1. Cylindrical shape 2. Conical shape 3. Prismatic shaped job from sheet metal
5	Fitting: Understanding the tools used for fitting and knowledge of at least one model 1. Square Joint 2. V- Joint 3. Male and female fitting

6	Plumbing: - Understanding plumbing tools and pipe joints, along with practicing one exercise on joining pipes using a minimum of three types of pipe joints
7	Smithy: - Understanding the tools used in smithy. Demonstrating the forge ability of different materials (MS, Al, alloy steel and cast steels) in both cold and hot states. Observing the qualitative difference in the hardness of these materials. One exercise on smithy (Square prism).
8	Welding: Understanding welding equipment and practicing at least one welding technique, such as making joints using electric arc welding. Bead formation in horizontal, vertical and overhead positions
9	Rolling: - Objective of rolling, rolling process, practical on two high rolling mill
10	Electroplating: -Electroplating a given job
11	Metrology: Common measuring instruments used in workshop, experiments to find the angle of a dovetail, angle of a taper and the radius of a circular surface. Introduction to instruments Vernier Bevel Protractor, Vernier Depth Gauge, Vernier Height Gauge.
12	Assembly: Demonstration only Dissembling and assembling of 1. Cylinder and piston assembly 2. Tail stock assembly 3. Bicycle 4. Pump or any other machine
13	Machines: Demonstration of the following machines: Shaping and slotting machine; Milling machine; Grinding Machine; Lathe; Drilling Machine.
14	Modern manufacturing methods (Fab lab/IDEA Lab - Demonstration only): Power tools, CNC machine tools, 3D printing, Soft Materials cutting using special machines
15	Use of proper Personal Protective Equipments. Measurements using Tape, Ruler, Vernier calipers, screw gauge
16	Measuring the area of a plot with an irregular boundary using a chain and cross staff
17	Measuring the area of a building using Distomat
18	Finding the level difference between two points using dumpy level
19	Onsite quality assessment of brick, and cement
20	Construct a 1 and 1 ½ thick brick wall with a height of 50 cm and a minimum length of 60 cm using English bond. Check the verticality of the wall
21	Construct a 1 and 1 ½ thick brick wall with a height of 50 cm and a minimum length of 60 cm using Flemish bond. Check the verticality of the wall
22	Estimate the number of different types of building blocks needed to construct the walls of a room measuring 2m x 3m, accounting for standard-sized doors and windows.

23	Setting out of a two roomed building using thread, tape and water tube levelling.
24	Conduct a market study to understand the types, prices, and general specifications of at least three materials available in the market (such as bricks, cement, aggregates, steel, plumbing items, fixtures, welding rods, fasteners etc.).
25	Studying the tools and testing instruments for electrical works. Wiring a light or a fan circuit using one way and two-way switch.
26	Familiarization/Application of testing instruments and commonly used tools in electronic works. [Multimeter, Soldering iron, De-soldering pump, Pliers, Cutters, Wire strippers, Screw drivers, Tweezers, Crimping tool, Hot air soldering and desoldering station etc.]
Note: Minimum of 12 experiments from among the 26 experiments listed, is to be completed.	

Course Assessment Method
(CIE: 40 Marks, ESE: 60 Marks)

Continuous Internal Evaluation Marks (CIE):

Preparation/Pre-Lab Work, experiments, Viva and Timely completion of Lab Reports / Record (Continuous Assessment)	Total
40	**40**

End Semester Examination Marks (ESE)

Procedure/ Preparatory work/Design/ Algorithm	Conduct of experiment/ Execution of work/ troubleshooting/ Programming	Result with valid inference/ Quality of Output	Viva voce	Record	Total
10	**25**	**10**	**10**	**5**	**60**

Submission of Record: Students shall be allowed for the end semester examination only upon submitting the duly certified Lab record.

Pass Criteria:

- A student must score a minimum of 50% overall, combining marks from both Continuous Internal Evaluation (CIE) and End Semester Examination (ESE).

Course Outcomes (Cos)

At the end of the course students should be able to:

CO No.	Description	Blooms Knowledge Level (KL)
CO1	Understand safe and efficient use of mechanical workshop tools and machines while adhering to industrial safety standards.	2
CO2	Create simple mechanical components using traditional manufacturing processes such as fitting, welding, foundry, and smithy.	6
CO3	Perform basic civil engineering practices such as chain surveying, levelling, brick masonry, and estimation of materials.	3
CO4	Demonstrate familiarity with common construction materials, electrical and electronic tools, and safety practices at construction sites	3
CO5	Integrate modern manufacturing practices CNC, 3D printing, sustainable material use with conventional workshop methods to address real-world engineering challenges.	6
CO6	Conduct a market survey of sustainable construction materials and prepare a comparative report highlighting eco-friendly alternatives.	4

Note: K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, and K6 – Create

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2			3	3	2	3	3	2		2		
CO2	2	3			2							2	3	
CO3	3	3			2									
CO4	3	3	2		2	2	2	3	3	2				
CO5	2	3	2	2	2	2					3	3	3	
CO6			2	2		2		3	3		3			

Text Books

Sl. No.	Title of the Book	Name of the Author(s)	Name of the Publisher	Edition and Year
1	Mechanical Workshop Practice	K C John	PHI Learning	2nd Edition, 2010

2	Engineering Materials	S C Rangwala	Charotar Publishing House Pvt Limited	Edition 43, 2019
3	Building Materials	S K Duggal	New Age International	Edition 6, 2025
4	Indian Practical Civil Engineering Handbook	Khanna P.N,	UBS Publishers Distributers (P) Ltd.	Year 2012
5	Building Construction	Arora S.P and Bindra S.P	Dhanpat Rai Publications	Edition 5, 2022

Reference Books

Sl. No.	Title of the Book	Name of the Author(s)	Name of the Publisher	Edition and Year
1	Elements of Workshop Technology Vol-1 Manufacturing Processes	S K Hajra Choudhury A K Hajra Choudhury Nirjhar Roy	MPP Media Promoters and Publishers	2008

Video Links (NPTEL, SWAYAM, etc.)

Link
https://archive.nptel.ac.in/courses/105/106/105106206/ https://archive.nptel.ac.in/courses/105/106/105106201/ https://archive.nptel.ac.in/courses/105/104/105104101/ https://archive.nptel.ac.in/courses/117/106/117106108/

Continuous Assessment with Equal Weightage for Both Specialisations (10 Marks)

1. Preparation and Pre-Lab Work (10 Marks)

Algorithm Development: Correctness and efficiency of the algorithm related to the question.

2. Programming (3 Marks)

Execution: Accurate execution of the programming task.

3. Result (3 Marks)

Accuracy of Results: Precision and correctness of the obtained results.

4. Viva Voce (2 Marks)

Proficiency in answering questions related to theoretical and practical aspects of the subject.

Evaluation Pattern for End Semester Examination with equal weightage in both specializations (50 Marks)

1. **Procedure/Preliminary Work/Design/Algorithm (10 Marks)**
    - Procedure Understanding and Description: Clarity in explaining the procedure and understanding each step involved.
    - Preliminary Work and Planning: Thoroughness in planning and organizing materials/equipment.
    - Algorithm Development: Correctness and efficiency of the algorithm related to the experiment.
    - Creativity and logic in algorithm or experimental design.
2. **Conduct of Experiment/Execution of Work/Programming (25 Marks)**
    - Setup and Execution: Proper setup and accurate execution of the experiment or programming task.
3. **Result with Valid Inference/Quality of Output (10 Marks)**
    - Accuracy of Results: Precision and correctness of the obtained results.
    - Analysis and Interpretation: Validity of inferences drawn from the experiment or quality of program output.
4. **Viva Voce (10 Marks)**
    - Ability to explain the experiment, procedure results and answer related questions
    - Proficiency in answering questions related to theoretical and practical aspects of the subject.
5. **Record (5 Marks)**
    - Completeness, clarity, and accuracy of the lab record submitted

SEMESTER S1

HEALTH AND WELLNESS

Course Code	A25HWE108	CIE Marks	50
Teaching Hours/Week (L:T:P:R)	1:0:1:0	ESE Marks	0
Credits	1	Exam Hours	Nil
Prerequisites (if any)	None	Course Type	Theory and Practical

Course Objective:

1. To provide essential knowledge on physical activity, health, and wellness.
2. To ensure students understand body systems, exercise principles, nutrition, mental health, and disease management.
3. To educate students on the benefits of yoga, the risks of substance abuse and basic first aid skills.
4. To equip students with the ability to lead healthier lifestyles.
5. To enable students to design effective and personalized exercise programs.

SYLLABUS

Module No.	Syllabus Description	Contact Hours
1	Human Body Systems related to Physical activity and its functions: Respiratory System - Cardiovascular System. Musculoskeletal System and the Major Muscle groups of the Human Body. Quantifying Physical Activity Energy Expenditure and Metabolic equivalent of task (MET) Exercise Continuum: Light-intensity physical activity, Moderate - intensity physical activity, Vigorous -intensity physical activity. Defining Physical Activity, Aerobic Physical Activity, Anaerobic Physical Activity, Exercise and Health-Related Physical Fitness. FITT principle to design an Exercise programme Components of Health-related Physical Fitness: - Cardiorespiratory Fitness- Muscular strength- Muscular endurance- Flexibility- Body composition.	4
2	Concept of Health and Wellness: Health and wellness differentiation, Factors affecting health and wellness. Mental health and Factors affecting mental health. Sports and Socialization: Sports and character building - Leadership through Physical Activity and Sports Diet and nutrition: Exploring Micro and Macronutrients: Concept of Balanced diet	2

	Carbohydrate & the Glycemic Index Animal & Plant - based Proteins and their Effects on Human Health Dietary Fats & their Effects on Human Health Essential Vitamins and Minerals	
3	Lifestyle management strategies to prevent / manage common hypokinetic diseases and disorders - Obesity - cardiovascular diseases (e.g., coronary artery disease, hypertension) - Diabetes - Osteoporosis - Musculoskeletal disorders (e.g., osteoarthritis, Low back pain, Kyphosis, lordosis, flat foot, Knock knee) Meaning, Aims and objectives of yoga - Classification and importance of of Yogic Asanas (Sitting, Standing, lying) Pranayama and Its Types - Active Lifestyle and Stress Management Through Yoga Understanding on substance abuse and addiction - Psychoactive substances & its ill effects- Alcohol- Opioids- Cannabis -Sedative - Cocaine -Other stimulants, including caffeine -Hallucinogens - Tobacco -Volatile solvents.	4
4	First aid and principles of First Aid: Primary survey: ABC (Airway, Breathing, Circulation). Qualities of a Good First Aider First aid measures for: - Cuts and scrapes - Bruises - Sprains - Strains - Fractures - Burns - Nosebleeds. First Aid Procedures: Cardiopulmonary Resuscitation (CPR) - Heimlich Maneuver - Applying a sling Sports injuries: Classification (Soft Tissue Injuries - Abrasion, Contusion, Laceration, Incision, Sprain & Strain)	2

Additional Topics

- Need and Importance of Physical Education and its relevance in interdisciplinary context. Understanding of the Endocrine System
- Developing a fitness profile
- Healthy foods habits for prevention and progression of Lifestyle Diseases. Processed foods and unhealthy eating habits.
- Depression - Anxiety - Stress
- Different ways of carrying an injured person. Usage of Automated external defibrillator

Course Assessment Method
(CIE: 40 Marks)

Continuous Internal Evaluation Marks (CIE):

Activity Evaluation	Case Study/Micro project/Presentation	Total
10	30	40

Course Outcomes (COs)

At the end of the course students should be able to:

CO No.	Description	Blooms Knowledge Level (KL)
CO1	Understand and explain the various human body systems, identify different types of physical activities, and describe appropriate methods to measure and quantify these activities effectively	2
CO2	Understand the role of psychological practices, dietary habits, and sports activities in maintaining and improving health and wellness	2
CO3	Understand common hypokinetic and musculoskeletal disorders, and explain the importance of adopting a healthy lifestyle through yoga practice and avoiding addictive substances	2
CO4	Understand the basic principles of first aid and recognize common sports injuries	2
CO5	Exhibit effective teamwork and communication by engaging in physical activities aimed at enhancing health, fitness, and wellness	3

Note: K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, and K6 – Create

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	1													
CO2	1						1							
CO3	1		3											
CO4	1						1							
CO5	1		3					3	3					

Text Books

Sl. No.	Title of the Book	Name of the Author(s)	Name of the Publisher	Edition and Year
1	Foundations of Nutrition	Bhavana Sabarwal	Commonwealth Publishers	1999
2	Anatomy and physiology in health and illness.	Ross and Wilson	Waugh, A., & Grant, A.	2022

Reference Books

Sl. No.	Title of the Book	Name of the Author(s)	Name of the Publisher	Edition and Year
1	Fit to be Well Essential Concept	Thygerson, A. L., Thygerson, S. M., & Thygerson, J. S.	Jones & Bartlett Learning.	2018

2	Introduction to physical education, fitness, and sport	Siedentop, D., & Van der Mars, H.	Human kinetics.	2022
3	Substance Use Disorders. Manual for Physicians.	Lal, R., & Ambekar, A. (2005).	National Drug Dependence Treatment Centre, New Delhi	2005
4	The exercise health connection-how to reduce your risk of disease and other illnesses by making exercise your medicine.	Nieman, D. C., & White, J. A	Public Health	1998
5	ACSM's resource manual for guidelines for exercise testing and prescription.	Lippincott Williams & Wilkins.	American College of Sports Medicine.	2012
6	Exercise Physiology: energy, nutrition and human performance.	Katch, F. I., Katch, V. L., & McArdle, W. D.	Lippincott Williams & Wilkins	2010

Continuous Internal Evaluation Marks (CIE): for the Health and Wellness Course

Students will be evaluated as follows,

Title	Method of Evaluation
Activity Evaluation	It will be evaluated based on the Fitness Protocols and Guidelines for ages 18+ to 65 years, as set forth by FIT India. Measurements will be taken for all the tests of the FIT India Fitness Protocol and the evaluation will be based on the benchmark score received for the following tests: 1. V Sit Reach Test 2. Partial Curl Up - 30 seconds 3. Push Ups (Male) and Modified Push Up (Female) 4. Two (2) Km Run/Walk Students who achieve a total benchmark score of 8 across the aforementioned 4 tests will be awarded pass marks for activity evaluation. Students who score better will be awarded a maximum mark of 20.
Case Study/Micro project/Presentation	Case studies will be given to students to assess their understanding of the subjects taught. Students will be required to make presentations on the subjects taught in class, and their understanding of the subjects will be assessed. Based on the case studies, micro projects, and Presentations the students will be awarded marks out of 30.
Activity Evaluation – Special Circumstances	Physically challenged and medically unfit students can opt for an objective test to demonstrate their knowledge of the subjects taught. Based on their performance in the objective test, they will be awarded marks out of 20.
Activity Evaluation - Special Considerations - NCC	Students who enrolled themselves in the NCC during the course period (between the start and end dates of the program) and attended 5 college level parades will be awarded pass marks for activity evaluation. Students who attend more parades will be eligible for a maximum mark of 20 based on their parade attendance.

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