



ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY, NAGPUR

(An autonomous institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech. Scheme of Examination & Syllabus 2025-26

MECHANICAL ENGINEERING

SEMESTER II

Sr No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Min Passing Marks	No. of Hrs for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total		
1	BSC	25ME201T	Applied Chemistry	2	-	-	2	10	10	30	50	23	1.5
2	BSC	25ME201P	Applied Chemistry Lab	-	-	2	1	-	25	25	50	25	-
3	BSC	25ME202T	Statistics and Transforms	3	-	-	3	20	20	60	100	45	3
4	BSC	25ME202P	Statistics and Transforms Lab	-	-	2	1	-	25	25	50	25	-
5	ESC	25ME203T	Basics of Electrical and Electronics Engineering	2	-	-	2	10	10	30	50	23	1.5
6	ESC	25ME203P	Basics of Electrical and Electronics Engineering Lab	-	-	2	1	-	25	25	50	25	-
7	ESC	25ME204T	Materials Engineering	2	-	-	2	10	10	30	50	23	1.5
8	ESC	25ME204P	Materials Engineering Lab	-	-	2	1	-	25	25	50	25	-
9	PCC	25ME205P	Problem Solving with Python Lab	-	-	4	2	-	25	25	50	25	-
10	AEC	25ME206P	Business Communication Skills – II Lab	-	-	2	1	-	25	25	50	25	-
11	IKS	25ME107T	Indian Knowledge Systems #	2	-	-	2	10	10	30	50	23	1.5
12	CC	25ME208P	Co-curricular Courses – II	-	-	4	2	-	50	-	50	25	-
Total				11	0	18	20	60	260	330	650	-	-

Course to be taken online through NPTEL

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**SEMESTER II**

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25ME201T	Applied Chemistry	2	0	-	2	10	10	30	50
Course Objectives		Course Outcomes							
<ol style="list-style-type: none">To impart knowledge on water chemistry, electrochemical phenomena, types of fuels and lubricantsTo enhance analytical skills in solving numerical problems related to hardness of water, calorific values of fuel.To cultivate an awareness of the importance of material selection and corrosion prevention strategies.		Students will be able to <ol style="list-style-type: none">Analyze the concepts of hardness of water and apply it for industrial water treatment.Evaluate the performance and advantages of Li-Ion battery, fuel cell and photochemical cell in terms of efficiency, working mechanism, and applications.Compare and explain different types of corrosion & its prevention methods.Determine calorific values of fuels using different calorimeters and evaluate the significance of analysis of coalMeasure and interpret the important properties of lubricants							

Unit I Water Technology [10 Hrs]
Hardness of water, Numericals on Hardness, Industrial water treatment- Boiler Troubles- Carry over, Caustic embrittlement, Boiler corrosion, Scale & Sludge formation External treatments - Softening of water by Zeolite process and De-mineralization process, Numericals on Zeolite process. Desalination of sea water- Electro dialysis and Reverse Osmosis process-Principle, methods and advantages
Unit II Electrochemical Phenomenon & Corrosion [10 Hrs]
Introduction- brief idea about electrochemical & galvanic series; Electrolytic & Electrochemical Cell; Construction, working & Advantages of Li Ion Battery, Fuel Cell, Photochemical Cell. Corrosion- Introduction, Factors affecting corrosion, Types of corrosion, Corrosion prevention- Material & Design selection & Cathodic protection
Unit III Fuels & Lubricants [10 Hrs]
Fuels: Introduction, Calorific value, HCV & LCV. Determination of calorific value of fuels by Bomb & Boy's calorimeter. Numericals on Dulong's formula. Significance of Proximate and Ultimate analysis of Coal. Lubricants: Introduction, Classification, Mechanisms. Properties & Significance of liquid lubricants-Viscosity and viscosity index, Flash and fire point, Cloud and pour point, Aniline point, acid value, saponification number. Numerical on Viscosity Index

Text Books

S.N	Title	Authors	Edition	Publisher
1	Text Book of Engineering Chemistry	S.S. Dara,	New	S. Chand and Company Ltd. New Delhi.
2	Textbook of Engineering Chemistry	P.C. Jain and Monica Jain	Sixth	Dhanpat Rai and Sons, New Delhi.

Reference Books

S.N	Title	Authors	Edition	Publisher
1	A Text book of Engineering Chemistry	Shashi Chawla	1st	Dhanpat Rai & Sons, New Delhi
2	Applied Chemistry	N. Krishnamurthy: P. Vallinavagam. And K. Jeysubramanian	1st	TMH

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SEMESTER II

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
25ME201P	Applied Chemistry Lab	-	-	2	1	25	25	50
Course Objectives				Course Outcomes				
<ol style="list-style-type: none"> To develop practical skills for analyzing water quality parameters, including hardness, alkalinity and turbidity using standard analytical techniques To impart hands-on experience in testing and evaluating fuel and lubricant properties To enable students to use modern analytical instruments 				Students will be able to <ol style="list-style-type: none"> Determine hardness of water samples using complexometric titration and virtual simulation experiments. Evaluate key physical properties of lubricating oils Perform proximate analysis of coal and interpret its industrial relevance. Utilize electrochemical and conductometric methods for the quantitative estimation of chemical substances such as acids and metals. 				

Expt. No.	Experiments based on Performance - Any SIX
1	Determination of Hardness (Total, Permanent & Temporary) of Water Sample by Complexometric method
2	Determination of heavy metal from industrial effluent by colorimeter
3	Determination of Flash point by using Cleveland Open cup flash point apparatus / Abel's Close cup apparatus / Pensky Marten close cup apparatus
4	Determination of viscosity of lubricating oil at different temperature by Redwood Viscometer No.1 OR No. 2
5	Proximate analysis of coal -Determination of % of Moisture, Volatile Matter and Ash in coal sample
6	Determination of Neutralisation number (Acid value) of oil.
7	Determination of Cloud point & pour point from given lubricating oil
8	Determination of strength of the given acid Conductometrically
Demonstration - Any ONE	
1	Measurement of pH of sample from different sources by Digital pH Meter.
2	Determination of Consistency of grease by Penetrometer.
3	Determination of turbidity from industrial effluent.
4	Determination of calorific value of solid/ liquid fuel by using Bomb calorimeter.
Virtual Experiment - Any ONE	
1	Determination of Alkalinity of Water Sample using Warder method
2	Determination of Hardness from Tap water/ Well water/ Sea water
3	Estimation of DO content of Water sample.
Activity - Any ONE	
1	Visit of nearby industrial chemicals and safety measures.
2	Estimation of Air /Water Pollution Level at different Sites in Nagpur City.
3	Visit to Water Treatment Plant/Effluent Treatment Plant

Text Books

S.N	Title	Authors	Edition	Publisher
1	A Textbook on experiment and calculation in engineering chemistry	S.S. Dara	9th	S.Chand

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Applied Chemistry theory and practical	O.P. Virmani and A.K. Narular	1st	New Age International
2	Laboratory Manual on Engineering Chemistry	Dr. Subdharani	1st	Dhanpat Rai Publishing

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MECHANICAL ENGINEERING

SECOND SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25ME202T	Statistics and Transforms	3	-	-	3	20	20	60	100

Course Objectives	Course Outcomes
<p>This Course is intended to:</p> <ol style="list-style-type: none"> To equip students with the skills to analyze, interpret, and model statistical data using appropriate computational and analytical techniques. To develop students' understanding of integral transforms and their application in solving differential equations and engineering problems. 	<p>Students will be able to:</p> <ol style="list-style-type: none"> Solve numerical integration and find analytical solutions to difference equations. Apply statistical methods such as regression, correlation, and least squares fitting to analyze data. Apply Laplace and inverse Laplace transforms with their properties and theorems to evaluate integrals and solve differential equations. Compute Fourier series for periodic functions and apply Fourier transform to convert signals into frequency domain.

Unit I	[9hrs]
Finite Differences: Operator E and delta, Factorial Polynomial, Numerical integration: Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule, Difference equations with constant coefficients.	
Unit II	[9hrs]
Statistics: Fitting of straight line, parabola and exponential curves by method of least squares, Coefficient of correlation and lines of regressions, Rank correlation, Multiple regression.	
Unit III	[7hrs]
Laplace Transform –I : Definition, Properties, Evaluation of Integrals by Laplace Transform.	
Unit IV	[10hrs]
Laplace Transform –II : Inverse Laplace Transform and its properties, Convolution theorem(Statement only), Unit Step Function, Periodic function, Applications of Laplace Transform.	
Unit V	[10hrs]
Fourier Series and Fourier Transform: Introduction to Fourier series, Concept of even and odd function, Definition, properties, Fourier Integral Theorem, Relation with Laplace Transform, Applications of Fourier Transform.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Higher Engineering Mathematics	B. S. Grewal	38 th	Khanna Publishers, New Delhi.
2	Higher Engineering Mathematics	H. K. Dass and Er. Rajnish Verma	1st	S. Chand & Co. Pvt. Ltd., New Delhi.

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Higher Engineering Mathematics	B. V. Ramana	11th reprint, 2010.	Tata McGraw-Hill Publications, New Delhi.
2	A Text Book of Engineering Mathematics	Peter O' Neil	8th	Thomson Asia Pvt. Ltd., Singapore.

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**SECOND SEMESTER**

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
25ME202P	Statistics and Transforms Lab	--	--	2	1	25	25	50

Course Objectives	Course Outcomes
<p>This Course is intended to:</p> <ol style="list-style-type: none">To equip students with the ability to solve mathematical problems in calculus, discrete mathematics, and applied models by integrating symbolic and numerical techniques using SageMath.To interpret mathematical outcomes through transforms, series, and regression-based analysis in SageMath environment.	<p>Students will be able to:</p> <ol style="list-style-type: none">Apply symbolic and numerical computation techniques using Sage Math to solve problems in calculus and discrete mathematics.Analyze and interpret mathematical models using data fitting, correlation, and regression techniques.Develop mathematical representations of functions using Laplace and Fourier transforms and apply them to solve engineering problems.

List of Experiments:-

Experiment No.	List of Experiment
1	To compute factorial polynomials for a given algebraic function with the help of SageMath.
2	To evaluate definite integrals by employing SageMath using Numerical Techniques.
3	To fit linear and quadratic models by means of the SageMath environment using least squares method.
4	To calculate the correlation coefficient and derive regression lines through the use of SageMath tools.
5	To determine Spearman's rank correlation coefficient with the help of SageMath.
6	To verify properties of Laplace Transform using SageMath.
7	To determine the Laplace and inverse Laplace transforms of various mathematical functions using SageMath.
8	To solve linear ordinary differential equations with initial conditions using the Laplace transform approach in SageMath.
9	To compute Fourier coefficients and construct the Fourier series of periodic functions using SageMath.
10	To compute the Fourier Transform and Inverse Fourier Transform of continuous-time functions using symbolic tools in SageMath.

Text Books

S.N	Title	Authors	Edition	Publisher
1	Computational Mathematics with SageMath	Paul Zimmermann	1st	SIAM Publications Library.
2	Basics of SageMath : Mathematics(Practicals)	Varun Kumar	1st	Amazon KDP

Reference Books/Resources

S.N	Title	Authors	Edition	Publisher
1	Mathematics-SageMath Math Software System	Indrajeet Varhadpande & Dr. Kirti Sahu	1 st	Himalaya Publication
2	Applied Mathematics Using SageMath	Dr. Kirti Sahu & Dr. Sajid Anwar	1 st	Himalaya Publication

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**SECOND SEMESTER**

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25ME203T	Basics of Electrical and Electronics Engineering	2	-	-	2	10	10	30	50

Course Objectives	Course Outcomes
<ol style="list-style-type: none">To understand the basic concepts of DC circuit, magnetic Circuits, single phase and three phase ac circuitTo understand the basic concepts of different Electrical MachinesTo understand the basic concepts of different semiconductor devices.	Students will be able to: <ol style="list-style-type: none">Analyze the DC & magnetic circuits using basic laws and theorems.Inculcate the understanding about 1-phase & 3-Phase AC fundamentalsUnderstand the knowledge of basic concept, construction, working of the single- phase transformer and rotating electrical machines and their applications in industryExplain the principles of semiconductor devices and their applications. Understand Binary Number System, Boolean Algebra and Logic Gates.

Unit I:DC circuit and magnetic circuit	[10 Hrs]
Concept of energy, power, voltage, current. Ohms Law, Series and Parallel connections, Kirchhoff's Laws (KCL, KVL), Magnetic Circuit, flux, mmf, flux density, amperes law, similarities between electric and magnetic circuit B-H curve. Generation of Single Phase Voltage, Average and RMS value for Sinusoidal Waveform, Steady state behavior of R-L-C circuit with excitation, Resonance in Series R-L-C circuit. Principal of Generation of Three Phase Voltage and Phase Sequence.	
Unit II : AC circuit (single phase and three phase)	[10 Hrs]
Basic Principle of operation, Construction, Types and application of Transformer. Basic Principle of operation, Construction and applications of DC Motors, Stepper Motor, BLDC Motor and Servo Motor.	
Unit III : Basic of Electronics	[10 Hrs]
Introduction to LED, Photo diode, Zener diode, Varactor diode, Solar cell and applications, Bipolar Junction Transistor and its application as a switch and an amplifier, Logic Gates (AND, OR, NOT, NAND, NOR, EX-OR, EX NOR), Introduction to microcontroller (Block Schematic Representation)	

Text Books

S. N.	Title	Authors	Edition	Publisher
1	Basic Electrical Engineering	D. C. Kulshreshtha,	Revised 1st edition	Tata Mc-Graw Hill Education Pvt. Ltd. New Delhi
2	A Text Book of Electrical Technology	B. L. Thareja and A. K. Thareja,	(Volume I, II & III)	S. Chand Publication
3	Electronic Devices and Circuits	Millman and Halkias		McGraw Hill

Reference Books

T. N.	Title	Authors	Edition	Publisher
1	Electric Circuits & Network	K. Suresh Kumar		Pearson Publication
2	Fundamentals of Digital Circuits	A. Kumar	2016	Prentice Hall India,

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**SECOND SEMESTER**

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
25ME203P	Basics of Electrical and Electronics Engineering Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
This course is intended: 1. To explain the basic fundamentals of Electrical & Electronics engineering. 2. To summarize and apply the basic concepts of Electrical & Electronics engineering.	Student will able to: 1. To analyse the ac and dc electrical circuits 2. Develop circuits using bread board. 3. Verify truth tables of gate.

Expt. No.	Title
1	To verify Kirchoff's Laws for a D.C. Circuit.
2	To plot the B-H curve for a Single phase Transformer.
3	To perform and analyze the R-L-C series circuit.
4	To study the performance of step up and step down transformer.
5	To study operation of dc motor.
6	To analyse the performance of Light Emitting Diode (LED) circuit with LDR.
7	To verify the Truth Table of Basic Gates for different voltage inputs.
8	To verify the Truth Table of NAND and NOR as Universal Gates for different voltage inputs.

Text Books

S. N	Title	Authors	Edition	Publisher
1	A Text Book of Electrical Technology	B. L. Theraja and A. K. Theraja,	(Volume I, II & III)	S. Chand and Company
2	Electronic Devices and Circuits	N. Suresh Kumar, S. Salivahanan,	4 th Edition	Mc-Graw Hill Education Pvt. Ltd. New Delhi
3	Modern Digital Electronics	R. P. Jain	4 th Edition,	Mc-Graw Hill Education,

Reference Books

S. N	Title	Authors	Edition	Publisher
1	Integrated Electronics	J. Millman, C. Halkias,	4 th Edition,	Mc-Graw Hill Education
2	Fundamentals of Digital Circuits	A. Anand Kumar,		PHI Learning Pvt. Ltd.

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MECHANICAL ENGINEERING

SECOND SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25ME204T	Materials Engineering	2	-	-	2	10	10	30	50

Course Objectives	Course Outcomes
<ol style="list-style-type: none"> To provide comprehensive understanding about the basics of engineering materials, their classification, properties and testing method. To prepare students to understand and interpret structure property co-relation of various engineering materials in selecting appropriate materials for industrial and engineering applications. To build knowledge for heat treatment processes, its importance and effects on mechanical properties. 	<p>Students will be able to:</p> <ol style="list-style-type: none"> Describe the fundamentals of various engineering materials, properties, their crystal structure and compute the mechanical properties of engineering materials using testing methods. Interpret and explain the phase diagram and make use of this knowledge to illustrate the Iron-Iron carbide equilibrium diagram, realize the significance and general procedure of heat treatment processes. Differentiate the composition, microstructure, properties and application of alloy steels, cast-iron and non-metal alloys.

Unit I	[10Hrs]
Introduction to engineering materials and their classification, mechanical properties of engineering materials, Non metals, Crystalline nature of metals, Polymorphism, Microscopic and macroscopic examinations of metals, Tensile test, Stress-strain curves, Hardness test : Rockwell, Brinell. Introduction to nondestructive testing (NDT).	
Unit II	[10Hrs]
Alloys, solid solutions, Hume-Rothery's rules of solid solubility, Gibb's phase rule. Solidification of pure metal, Phase diagrams: Iron Iron-carbide phase diagram, invariant reactions. Heat treatment of Steel, Annealing, Normalizing, case hardening.	
Unit III	[10Hrs]
Alloying of steel, Stainless steel and Tool steels, Cast irons; grey, white, nodular cast irons. Copper and copper alloys; brass, bronze. Introduction to Powder metallurgy.	

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Material Science and Metallurgy for Engineers	V. D. Kodgire & S. V.Kodgire	2nd	Everest Publishing House.
2.	Introduction to Physical Metallurgy	Sindney H Avner	2nd	Mc-Graw Hill Education (India) Pvt. Ltd.
3.	Engineering Materials and Metallurgy	U. C. Jindal	1st	Pearson

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Materials Science and Engineering-An Introduction	W. D. Callister	6th	Wiley India
2.	Engineering Materials	Kenneth G. Budinski and Michael K. Budinski	4th	Prentice Hall

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SECOND SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
25ME204P	Materials Engineering Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
<ol style="list-style-type: none">To provide hands on experience on metallurgical microscope.To provide hands on experience on specimen preparation and equip to perform microstructural examinations of engineering materials.To explain and demonstrate the procedure for performing hardness test.To explain and demonstrate the procedure for performing tensile test.	<p>Student will be able to:</p> <ol style="list-style-type: none">Perform microstructural examination and study of various metals using metallurgical microscope.Prepare specimen for metallographic examinations.To perform hardness test and determine mechanical properties of engineering materials.To perform tensile test and determine various mechanical properties of engineering materials.

Minimum 6 practical's to be performed from following list

Expt. No.	Title of the experiment
1	Metallurgical Microscope and observation of specimens.
2	Preparation of specimen for metallographic examination.
3	Micro-structural examination of different types of Steels.
4	Micro-structural study of Meehanite alloy.
5	Micro-structural study of White Cast Iron and Grey Cast Iron.
6	Micro-structural study of Malleable Cast Iron and Nodular Cast Iron.
7	Measurement of hardness with the help of Rockwell Hardness Tester.
8	Measurement of hardness with the help of Brinell Hardness Tester.
9	Determination of tensile properties of ductile material.
10	Measurement of hardenability with the help of Jominy end quench test.

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Introduction to Engineering Metallurgy	Rollason E.C	2nd	Edward Arnold publications
2.	Engineering Materials	Kenneth G. Budinski and Michael K. Budinski	4th	Prentice Hall of India

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Material Science and Engineering	V. Raghavan	2nd	Prentice Hall of India
2.	Materials Science and Engineering-An Introduction	W. D. Callister	6th	Wiley India

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Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
25ME205P	Problem Solving with Python Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
1. To enable the students to find the solution to various mathematics or engineering problems and develop the solution using Python programming language.	Student will able to: 1. Develop a program using python operators 2. Develop a python program using sequential concept. 3. Develop a python program using non-sequential concept. 4. Develop a python program using branching and looping conditional statements.

Expt. No.	Title of Experiment
1	Develop a Python program using various arithmetic operators.
2	Develop a Python program using various conditional operators.
3	Develop a Python program using functions.
4	Develop a Python program using functions.
5	Develop a Python program using tuples.
6	Develop a Python program using sets.
7	Develop a Python program using Dictionary.
8	Develop a Python program using various branching and looping conditional statements.

Text Books

S. N	Title	Authors	Edition	Publisher
1	Python Programming using problem solving Approach	Reema Theraja	First Edition, 2017.	Oxford University Press
2	A Byte of Python	C. H. Swaroop	Edition 2.1	Swaroop C H

Reference Books

S. N	Title	Authors	Edition	Publisher
1	Python: The Complete Reference	Martin C. Brown	First Edition, 2017.	Oxford University Press

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Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
25ME206P	Business Communication Skills - II Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
1. To empower students to develop a career oriented mindset while harnessing the power of LSRW skills.	Students would be able to: 1. Participate in Group Discussions. 2. Improve their reading and formal writing skills. 3. Develop upon their listening skills to engage in meaningful conversations. 4. Develop oratory skills to engage and inform audiences. 5. Prepare themselves for participating in business meetings.

Expt. No.	Title of the experiment
1	Group Discussion
2	Reading for Competitive Exams II
3	Listening Skills II
4	Presenting a TED Talk
5	Media Interaction
6	Business Correspondence II
7	Report Writing
8	Mock Meeting

Reference Books

S. N	Title	Authors	Edition	Publisher
1.	Communication Skills for Engineers	C. Muralikrishna & Sunita Mishra	2nd Edition, 2011	Pearson India Education Services
2.	Communication Skills	Dr. L. Bisen, Dr. B. Agrawal & Dr. N. T. Kalyani	1st Edition, 2021	Himalaya Publishing House
3.	Barron's IELTS Superpack	Lin Lougheed	2012	Barrons Educational Series

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Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25ME107T	Indian Knowledge Systems	2	-	-	2	10	10	30	50

Course Objectives	Course Outcomes
This course is intended to <ol style="list-style-type: none">To understand the distinctive features of Indian Knowledge Traditions.To explore India's contributions in science, mathematics, astronomy, technology, and architecture.To connect IKS concepts with modern applications and sustainable practices.	Students will be able to <ol style="list-style-type: none">Comprehend the foundations of Indian Knowledge System and its difference from Western approaches.Analyze India's contributions in mathematics, astronomy, and technology.Appreciate the relevance of art, architecture, and traditional sciences in modern contexts.

Unit I FOUNDATIONS OF IKS [8Hrs]

Introduction to the Indian Knowledge System with its distinctive features in contrast to Western thought, the Vedic corpus including the Vedas, Upaniṣads, and associated philosophical traditions, knowledge traditions of Śikṣā dealing with phonetics, Vyākaraṇa focusing on grammar, Nirukta exploring etymology, Chandas emphasizing prosody, Kalpa codifying rituals and social duties, Jyotiṣa concerning astronomy and timekeeping, and reflective Discover IKS activities based on case studies and experiential learning.

Unit II SCIENTIFIC AND TECHNOLOGICAL CONTRIBUTIONS [8Hrs]

Mathematics including the number system, importance of zero, contributions of Brahmagupta, developments in geometry and algebra, ancient Indian astronomy and its observations, contributions of Parāśara and Garga, connections between astronomical knowledge and Vedic rituals, engineering and technology in ancient India covering metallurgy and advanced metalworking, healthcare practices and their scientific basis, construction of granite structures and architectural precision, Harappan technology and innovations in urban planning, maritime traditions and shipbuilding heritage, case studies on the works of Indian mathematicians, the astronomical observatory of Jantar Mantar, and the corrosion-resistant Iron Pillar of Delhi.

Unit III Art, Architecture & Sustainable Knowledge [8Hrs]

Town planning traditions from the Harappan civilization to classical India, rock-cut architecture including the Ellora caves, Kailasanātha temple, and Buddhist cave traditions, principles of temple design and Vastu Shastra, indigenous engineering in art and architecture blending aesthetics, science, and spirituality, relevance of IKS in contemporary contexts through sustainability, holistic living, and eco-conscious design.

Text Books

Sr.	Title	Authors	Edition	Publisher
1	Indian Knowledge System	Kapil Kapoor & Michel Danino(Eds.)	1st	PHI Learning
2	Foundations of Indian Culture and Knowledge System	B. L. Atreya	Reprint	Bharatiya Vidya Bhavan
3	Essays on Indian Knowledge Systems	Michael Danino	1st	AICTE – IKS Division

Reference Books

Sr. No.	Title	Authors	Edition	Publisher
1	Indian Knowledge Systems: Nature, Philosophy and Manifestation	Bal Ram Singh, Pushpesh Pant	1st	Pratibha Prakashan
2	The Science and Technology in Ancient India	Debiprasad Chattopadhyaya	Reprint	People's Publishing House

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