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

Electrical Engineering

SEMESTER II

SrNo	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	**25EE201T**	Applied Chemistry	**2**	**-**	**-**	**2**	**10**	**10**	**30**	**50**	**23**	**1.5**
2	BSC	**25EE201P**	Applied Chemistry Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	**-**
3	BSC	**25EE202T**	Statistics and Transforms	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**45**	**3**
4	BSC	**25EE202P**	Statistics and Transforms Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	**-**
5	PCC	**25EE203T**	Electrical Measurement & Instrumentation	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**45**	**3**
6	PCC	**25EE203P**	Electrical Measurement & Instrumentation Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	**-**
7	ESC	**25EE204T**	Basic Electronics Circuits	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**45**	**3**
8	ESC	**25EE204P**	Basic Electronics Circuits Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	**-**
9	AEC	**25EE206P**	Business Communication Skills - II Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	**-**
10	IKS	**25EE107T**	Indian Knowledge Systems[#]	**2**	**-**	**-**	**2**	**10**	**10**	**30**	**50**	**23**	**1.5**
11	CC	**25EE208P**	Co-Curricular Courses - II	**-**	**-**	**4**	**2**	**-**	**50**	**-**	**50**	**25**	**-**
Total				**13**	**-**	**14**	**20**	**80**	**255**	**365**	**700**	**-**	**-**

 # Course to be taken online through NPTEL

		July 2025	**NEP 3.0**	**Applicable for 2025-26**
Chairman - BoS	**Dean – Academics**	**Date of Release**	**Version**	

SEMESTER II

Course Code	Course Name	Th	Tu	Pr	Credits		Evaluation		
25EE201T	Applied Chemistry	2	0	-	2	MSE	CA	ESE	Total
						10	10	30	50

Course Objectives	Course Outcomes
1. To impart knowledge on water chemistry, electrochemical phenomena, types of fuels and lubricants 2. To enhance analytical skills in solving numerical problems related to hardness of water, calorific values of fuel. 3. To cultivate an awareness of the importance of material selection and corrosion prevention strategies.	**Students will be able to** 1. Analyze the concepts of hardness of water and apply it for industrial water treatment. 2. Evaluate the performance and advantages of Li-Ion battery, fuel cell and photochemical cell in terms of efficiency, working mechanism, and applications. 3. Compare and explain different types of corrosion & its prevention methods. 4. Determine calorific values of fuels using different calorimeters and evaluate the significance of analysis of coal 5. Measure 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	Ist	DhanpatRai& Sons, New Delhi
2	Applied Chemistry	N. Krishnamurthy:P. Vallinavagam. And K. Jeysubramanian	Ist	TMH

SEMESTER II

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
25EE201P	Applied Chemistry Lab	-	-	1	1	CA	ESE	Total
						25	25	50

Course Objectives	Course Outcomes
1. To develop practical skills for analyzing water quality parameters, including hardness, alkalinity and turbidity using standard analytical techniques 2. To impart hands-on experience in testing and evaluating fuel and lubricant properties 3. To enable students to use modern analytical instruments	Students will be able to 1. Determine hardness of water samples using complexometric titration and virtual simulation experiments. 2. Evaluate key physical properties of lubricating oils 3. Perform proximate analysis of coal and interpret its industrial relevance. 4. 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	Ist	New Age International
2	Laboratory Manual on Engineering Chemistry	Dr. Subdharani	Ist	Dhanpat Rai Publishing

SECOND SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits		Evaluation		
						MSE	CA	ESE	Total
25EE202T	Statistics and Transforms	3	-	1	4	20	20	60	100

Course Objectives	Course Outcomes
This Course is intended to: 1. To equip students with the skills to analyze, interpret, and model statistical data using appropriate computational and analytical techniques. 2. To develop students' understanding of integral transforms and their application in solving differential equations and engineering problems.	**Students will be able to:** 1. Solve numerical integration and find analytical solutions to difference equations. 2. Apply statistical methods such as regression, correlation, and least squares fitting to analyze data. 3. Apply Laplace and inverse Laplace transforms with their properties and theorems to evaluate integrals and solve differential equations. 4. 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	38th	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.

SECOND SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
25EE202P	Statistics and Transforms Lab	--	--	2	1	25	25	50

Course Objectives	Course Outcomes
This Course is intended to: 1. 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. 2. To interpret mathematical outcomes through transforms, series, and regression-based analysis in SageMath environment.	**Students will be able to:** 1. Apply symbolic and numerical computation techniques using Sage Math to solve problems in calculus and discrete mathematics. 2. Analyze and interpret mathematical models using data fitting, correlation, and regression techniques. 3. 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/Resourses

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

SECOND SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25EE203T	Electrical Measurement & Instrumentation	3	-	-	3	20	20	60	100

Course Objectives	Course Outcomes
This course is intended 1. To learn different instruments used for measurement of various electrical quantities. 2. To learn DC & AC Bridges, CT and PT, Power and Energy measurement. 3. To learn different instruments used for measurement of various non-electrical quantities.	**Students will be able to** 1. Use appropriate type of measuring instrument for Particular application. 2. Calculate the value of unknown resistance, inductance, Capacitance. 3. Calculate power and energy in electric circuits. 4. Explain transducers used for different applications. 5. Explain measurement of various non-electric quantities.

Unit I	**[09Hrs]**
Measuring Instruments: - Principle of Galvanometer, Moving Iron (MI), PMMC and Dynamo meter type instruments (Numerical on MI and PMMC). Calibration. Loading effect of instruments, Errors in measurement (Basic Statistical analysis: Mean, Standard deviation, etc.). **Special Instruments:** Single phase Power Factor meter (any one type), Single phase Frequency meter (any one type), Synchroscope (Modified).	
Unit II	**[09Hrs]**
Measurement of RLC Elements: - Measurement of Resistance: classification, Measurement of medium resistance :- Wheatstone Bridge. Low resistance: - Kelvin's Double Bridge. High resistance: - Ohmmeter, Insulation Tester & loss of charge method. Earth resistance: - Earth tester. Balanced condition in AC Bridge, Measurement of inductance using Maxwell's inductance-capacitance bridge, Hays bridge. Measurement of Capacitance using Schering´s	
Unit III	**[09Hrs]**
Measurement of Power and Energy: - Principle of measurement of active, reactive and apparent power in single and poly-phase circuits. Principle of measurement of energy in single and poly-phase circuits. **Instrument Transformers:** General theory & extension of range using CT & PT, errors in instrument transformers, applications of instrument transformers for metering.	
Unit IV	**[09Hrs]**
Digital Instruments and Transducers: - Introduction to digital meters: Measurement of voltage, current, Phase, Time. Piezoelectric transducer, Strain gauges, load cell, Seismic instruments, Accelerometer.	
Unit V	**[09Hrs]**
Measurement of Non-electric quantities: - Measurement of temperature, measurement of torque, measurement of flow, measurement of motion and measurement of pressure.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Electrical & Electronics Measurements & Instrumentation	A. K. Sawhney	5th revise	DHANPAT RAI & sons
2	Electronic Instrumentation & Measurement Technique	W. D. Cooper	New	Prentice Hall
3	Mechanical and Industrial Measurements	R. K. Jain	New	Khanna Publishers

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Measurement System Application and Design	E.O. Doeblin	New	Mcgraw-Hill
2	Instrumentation for Engineering Measurements	Dalley Railey, Mc Conne	New	John Wiley & Sons
3	Electrical Instrumentation	H. S. Kalsi	2nd revised	Tata Mcgraw-Hill education

SECOND SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25EE203P	Electrical Measurement & Instrumentation Lab	-	-	2	1	-	25	25	50

Course Objectives	Course Outcomes
This course is intended 1. To learn different instruments used for measurement of various electrical quantities. 2. To learn DC & AC Bridges, CT and PT, Power and Energy measurement. 3. To learn different instruments used for measurement of various non-electrical quantities.	**Students will be able to** 1. measure unknown resistance using DC Bridges and loss of charge method. 2. Measure value of unknown capacitance and inductance using AC bridges. 3. Measure electrical energy using single phase energy meter 4. Measurement of displacement using bourdon tube. 5. Measure non-electrical quantity using suitable transducer.

Expt. No.	Title of the experiment
1	Measurement of low resistance using Kelvin Double bridge.
2	Measurement of high resistance by loss of charge method.
3	Measurement of medium resistance using Wheatstone bridge.
4	To determine the Inductance of unknown coil by Maxwell's bridge.
5	To determine the capacitance of an unknown capacitor by Schering Bridge.
6	To determine the Inductance of unknown coil by Hay's bridge.
7	To determine electrical power by two watt-meter method.
8	Study of single phase energy meter.
9	Measurement of displacement using LVDT.
10	Measurement of pressure using Bourdon Tube.
11	Study of resistance temperature detector.
12	Study of measurement of torque.

Text Books

S.N	Title	Authors	Edition	Publisher
1	Electrical & Electronics Measurements & Instrumentation	A. K. Sawhney	5th revise	DHANPAT RAI & sons
2	Electronic Instrumentation & Measurement Technique	W. D. Cooper	New	Prentice Hall
3	Mechanical and Industrial Measurements	R. K. Jain	New	Khanna Publishers

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Measurement System Application and Design	E.O. Doeblin	New	Mcgraw-Hill
2	Instrumentation for Engineering Measurements	Dalley Railey, Mc Conne	New	John Wiley & Sons
3	Electrical Instrumentation	H. S. Kalsi	2nd revised	Tata Mcgraw-Hill education

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SECOND SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
24EE204T	Basic Electronics Circuits	3	-	-	3	20	20	60	100

Course Objectives	Course Outcomes
This course is intended * To introduce basic electronic circuit made up of diodes and transistors. * To understand analysis and design of basic digital circuits and linear integrated circuits	Students will be able to ● Explain basic applications of diodes. ● Describe basic applications of transistor. ● Analyse basics of digital electronics. ● Identify basics combinational and sequential digital circuits ● Explain basic analog circuits using Op-AMP

Unit I Basic diode and its applications	**[9Hrs]**
Zener diode, voltage regulator, p-n junction diode clipping and clamper circuits, Half Wave Rectifier and full wave bridge rectifier with and without C-filter	
Unit II Basic transistor and its applications	**[9Hrs]**
Npn BJT working ,input and output characteristics of CE configuration, Transistor as a switch, Transistor as an amplifier CE configuration (all npn)	
Unit III Basics of digital electronics	**[9Hrs]**
Number system and conversion, binary addition and subtraction by ones and twos compliment method, binary, BCD, Gray codes conversions, basic gate (AND,OR,NOT), Universal gate (NAND,NOR), special gate(EXOR EXNOR),Boolean algebra theorems De Morgans proof, classification of digital logic families TTL,CMOS and ECL	
Unit IV Basic digital circuits	**[9 Hrs]**
K-map upto 4-variables,combinational and sequential circuits, half and full adder, half and full subtracter, Multiplexer and demultiplexer , Code converters, One bit memory cell, latch and flip flop, SR ,D,JK,T flip flops, JK master slave flip flop	
Unit V Basic analog circuits	**[9 Hrs]**
Block diagram of an op-amp, pin out of IC741,various parameters and definitions ideal and non ideal ,open loop,close loop,inverting,non inverting and differential configurations, concept of virtual short and ground	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Electronic principles	V.K. Mehta	XII	S.Chand
2	Digital Circuits	Anand Kumar	IV	PHI
3	Operational Amplifiers	Ramakant Gaikwad	IV	PHI

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	R.Tinder	2 nd Edition	Wiley

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SECOND SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
24EE204P	Basic Electronics Circuits Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
This course is intended 1. To understand the basic applications of diodes and transistors. 2. To summarize and apply the basic concepts of digital circuits and analog circuits.	**Student will able to** 1. Develop diode circuits on bread board. 2. Verify working of transistor circuits. 3. Study basic digital circuits and basic analog circuits

Expt. No.	Title
1	To perform Zener diode voltage regulator on breadboard.
2	To perform diode clipping and clamping circuits.
3	To perform input and output characteristics of CE configuration.
4	To perform a transistor as an amplifier.
5	To verify NAND gate as universal gate.
6	To verify the truth tables of basic gates, special gates ICs.
7	To verify truth table of perform half and full adder.
8	To perform an inverting amplifier.
9	To perform non inverting amplifier

Minimum 8 experiments

Text Books

S. N	Title	Authors	Edition	Publisher
1	**Electronics laboratory primer**	S.Poornachandra	2nd	S.Chand
2	Electronics & communication	B.Sasikala	2nd	Vikas

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,	4 th Edition,	PHI Learning Pvt. Ltd.

SECOND SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
25EE206P	Business Communication Skills - II Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
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 & SunitaMIshra	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

SECOND SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25EE107T	Indian Knowledge Systems	2	-	-	2	10	10	30	50

Course Objectives	Course Outcomes
This course is intended to 1. To understand the distinctive features of Indian Knowledge Traditions. 2. To explore India's contributions in science, mathematics, astronomy, technology, and architecture. 3. To connect IKS concepts with modern applications and sustainable practices.	**Students will be able to** 1.Comprehend the foundations of Indian Knowledge System and its difference from Western approaches. 2.Analyze India's contributions in mathematics, astronomy, and technology. 3.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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