E.G.S. PILLAY ENGINEERING COLLEGE

(Autonomous)

Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai

Accredited by NAAC with 'A' Grade | Accredited by NBA (CSE, EEE, MECH)

NAGAPATTINAM – 611 002

B.E MECHANICAL ENGINEERING

Third Year – Fifth Semester

Course Code	Course Name	L	T	P	C	Maximum Marks		
						CA	ES	Total
Theory Course								
1902ME501	Heat and Mass Transfer	3	2	0	4	40	60	100
1902ME502	Design of Machine Elements	3	2	0	4	40	60	100
1902ME503	Kinematics of Machines	3	2	0	4	40	60	100
1902ME504	CAD	3	0	0	3	40	60	100
	PC Elective -I	3	0	0	3	40	60	100
Laboratory Course								
1902ME551	Computer Aided Design And Analysis Laboratory	0	0	2	1	50	50	100
1902ME552	Heat and Mass Transfer laboratory	0	0	2	1	50	50	100
1904GE551	Life Skills: Aptitude I	0	0	2	1	100	-	100
Audit Course								
1902MCX03	Essence of Indian Traditional Knowledge	2	0	0	0	100	-	100

L – Lecture | T – Tutorial | P – Practical | CA – Continuous Assessment | ES – End Semester

1902ME501	HEAT AND MASS TRANSFER	L	T	P	C
		3	2	0	4

MODULE I	CONDUCTION	12 Hours

General Differential equation of Heat Conduction– Cartesian and Polar Coordinates – One Dimensional Steady State Heat Conduction — plane and Composite Systems – Conduction with Internal Heat Generation – Extended Surfaces – Unsteady Heat Conduction – Lumped Analysis – Semi Infinite and Infinite Solids –Use of Heisler's charts.

MODULE II	CONVECTION	12 Hours

Free and Forced Convection - Hydrodynamic and Thermal Boundary Layer. Free and Forced Convection during external flow over Plates and Cylinders and Internal flow through tubes .

MODULE III	PHASE CHANGE HEAT TRANSFER AND HEAT EXCHANGERS	12 Hours

Nusselt‟s theory of condensation - Regimes of Pool boiling and Flow boiling. Correlations in boiling and condensation. Heat Exchanger Types - Overall Heat Transfer Coefficient – Fouling Factors - Analysis – LMTD method - NTU method.

MODULE IV	RADIATION	12 Hours

Black Body Radiation – Grey body radiation - Shape Factor – Electrical Analogy – Radiation Shields. Radiation through gases.

MODULE V	MASS TRANSFER	12 Hours

Basic Concepts – Diffusion Mass Transfer – Fick‟s Law of Diffusion – Steady state Molecular Diffusion– Convective Mass Transfer – Momentum, Heat and Mass Transfer Analogy –Convective Mass Transfer Correlations.

TOTAL: 60 HOURS

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Calculate heat transfer rate in steady and unsteady state of heat conduction.
CO2:	Calculate convective heat transfer rate for external and internal flow.
CO3:	Determine heat transfer rate for boiling and condensation process and heat exchangers.
CO4:	Calculate the emissivity and radiation heat transfer .
CO5:	Estimate mass transfer rate for diffusive and convective mass transfer.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	2	3				3	1			1
CO2	3	1	3	3				2	1			1
CO3	3	3	3	3				1	3			1
CO4	3	1	3	2					1			1
CO5	3	2	3	2								1

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1	3		
CO2	3		
CO3	3		
CO4	3		
CO5	3		

REFERENCES:

1. Frank P. Incropera and David P. Dewitt, "Fundamentals of Heat and Mass Transfer", John Wiley & Sons, sixth edtion 2018.
2. Venkateshan. S.P., "Heat Transfer", Ane Books, New Delhi, 2004.
3. Ghoshdastidar, P.S, "Heat Transfer", Oxford, 2004,
4. Nag, P.K., "Heat Transfer", Tata McGraw Hill, New Delhi, 2002
5. Holman, J.P., "Heat and Mass Transfer", Tata McGraw Hill, 2000

1902ME502	DESIGN OF MACHINE ELEMENTS	L	T	P	C
		3	2	0	4

MODULE I	STEADY AND VARIABLE STRESSES	12 Hours

Introduction to the design process - Design of straight and curved beams – "C" Frame and Crane hook. Stress concentration - Design for variable loading - Soderberg, Goodman, Gerber methods and combined stresses - Theories of failure.

MODULE II	DESIGN OF SHAFTS AND COUPLINGS	12 Hours

Design of shafts based on strength, rigidity and critical speed. Design of rigid flange coupling - Design of flexible coupling.

MODULE III	DESIGN OF JOINTS	12 Hours

Design of bolted joints - stresses due to static loading, eccentrically loading. Design of welded joints - Butt and Fillet welded Joints - Strength of parallel and traverse fillet welded Joints.

MODULE IV	DESIGN OF SPRINGS	12 Hours

Types, End connections and design parameters. Design of helical springs - Circular and noncircular wire - Concentric springs. Design of leaf and torsional springs under constant and varying loads.

MODULE V	DESIGN OF BEARINGS	12 Hours

Types and selection criteria - Design of journal bearings - Design of rolling contact bearing Ball and roller bearing.

TOTAL: 60 HOURS

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Design the various phases of design process , the stress concentration under simple and variable loading.
CO2:	Design the rigid , flexible couplings, solid shaft and hollow shaft for various engineering applications..
CO3:	Calculate the design parameters of bolted and welded joints subjected to static load.
CO4:	Estimate the design parameters for helical, leaf and torsional springs subjected to constant and variable loads
CO5:	Calculate the design parameters of various types of bearings under different loading conditions.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	3	1							1
CO2	3	3	2	3	1							1
CO3	3	3	2	3	1							1
CO4	3	3	2	2	1							1
CO5	3	3	2	2	1							1

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1			3
CO2			3
CO3			3
CO4			3
CO5	3		3

REFERENCES:

1. V. B. Bhandari, Design of Machine Elements, Tata McGraw-Hill Publishing Company Pvt. Ltd., New Delhi, 2010.
2. Faculty of Mechanical Engineering, PSG College of Technology, Design Data Book, M/s.KalaikathirAchchagam, 2013.
3. J. E. Shigley and C. R. Mischke, Mechanical Engineering Design, Tata McGraw-Hill Publishing Company Pvt. Ltd., New Delhi, 2011

4. R. C. Juvinall and K. M. Marshek, Fundamentals of Machine Component Design, John Wiley & Sons, New Delhi, 2011.
5. R. L. Norton, Design of Machinery, Tata McGraw-Hill Publishing Company Pvt. Ltd., New Delhi, 2004. Private Limited, Mumbai,2013.
6. http://nptel.ac.in/courses/112105124/

1902ME503	KINEMATICS OF MACHINES	L	T	P	C
		3	2	0	4

MODULE I	FUNDAMENTALS OF MECHANISMS	12 Hours

Basic Terminology - Kinematic link, Pair, joints, Structure, Machine, Degree of freedom, Grubler & Kutzbach Criterion - Inversions of four bar mechanism, Mechanical advantage - Transmission Angle, Inversion of single slider and double slider crank mechanisms. Common Mechanisms - Straight line mechanism, Dwell mechanism.

MODULE II	KINEMATIC ANALYSIS OF MECHANISMS	12 Hours

Relative velocity of kinematic link, Rubbing Velocity of kinematic pair, Construction of velocity and acceleration diagram by graphical method (Relative Velocity Method), Four bar mechanism, slider crank mechanisms and complex mechanism.

MODULE III	CAM AND FOLLOWER MECHANISMS	12 Hours

Introduction - Terminology, Classifications, Types of follower motion - Uniform Velocity Motion, Simple Harmonic Motion, Uniform Acceleration and Retardation Motion and Cycloidal Motion- Construction of cam profile - Knife edge follower, Roller and flat faced follower.

MODULE IV	GEAR AND GEAR TRAIN	12 Hours

Gears - Terminology, Law of gearing, Length of path of contact, Length of arc of contact, contact ratio- Interference and undercutting. Gear trains- Speed ratio, train value. Simple gear train, compound gear train, Epicyclic gear train- speed calculation by tabular method.

MODULE V	FRICTION DRIVES	12 Hours

Introduction-Friction clutch, types -single plate, Multi plate and cone clutch. Flat Belt Drives Velocity, slip, creep and Centrifugal effect of belt, length of open and cross belt drives, Maximum power transmitted, ratio of driving tension in flat belt drives - V Belt drives.

TOTAL: 60 HOURS

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Differentiate the basic machine mechanisms.
CO2:	Calculate velocity and acceleration of machine mechanisms.
CO3:	Construct the cam profile for different types of follower motion.
CO4:	Describe the kinematic terminologies of spur gear and calculate speed ratio of various types of gear train
CO5:	Solve the amount of power transmitted by friction drives.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2		2		2			2			2
CO2	3	2	3	2		2	2	1	2			
CO3	2	2	3	2		2			2			2
CO4	2	2		2			2	2				
CO5	3	3		2			2					

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1			3
CO2			3
CO3			3
CO4			3
CO5			3

REFERENCES:

1. S. S. Rattan, Theory of Machines, Tata McGraw Hill Publishing Company Pvt. Ltd, New Delhi,2014.
2. J. J. Uicker, G. R. Pennock and J. E. Shigley, Theory of Machines and Mechanisms, Oxford

University Press, New York,2011.
3. Ballaney P L, Theory of Machines and Mechanisms, Khanna Publishers, New Delhi,2005.
4. Sadhu Singh, Theory of Machines, Pearson Education, Second Edition,2012.
5. Rao J S and Dukkipati, Mechanism and Machine Theory, Wiley- Eastern Ltd., New Delhi,2006
6. http://nptel.ac.in/courses/112104121/1

1902ME504	CAD	L	T	P	C
		3	0	0	3

MODULE I	FUNDAMENTALS OF COMPUTER GRAPHICS	9 Hours

Product cycle, Sequential and Concurrent Engineering, CAD - Architecture, Tools, applications - Coordinate systems - Two and Three-dimensional Transformations - Translation - Scaling - Reflection - Rotation, Windowing - clipping and Viewing.

MODULE II	GEOMETRIC MODELING	9 Hours

Representation of curves - Hermite, Bezier, B-Spline and rational curves - Surface Modeling - surface patch - Bezier and B spline surface. Solid Modelling - Boundary representation(B-Rep) and Constructive Solid Geometry(CSG)

MODULE III	VISUAL REALISM	9 Hours

Hidden line removal algorithm - Priority and Area oriented algorithms. Hidden Surface removal algorithm - Depth buffer and Warnock's algorithms. Hidden solid removal algorithm, Ray Tracing algorithm, Shading and Coloring - types. Computer Animation.

MODULE IV	ASSEMBLY OF PARTS	9 Hours

Assembly modeling - Interference of Positions and orientations - CAD Tolerance Analysis - geometrical Mass Properties - degree of freedom - Constraints and Simulation concepts.

MODULE V	CAD STANDARDS	9 Hours

Standards for computer graphics- Graphical kernel system (GKS)- Standards for exchange images- Open Graphics Library(OpenGL)-Data exchange standards- IGES,STEP,CALS,etc.- communication standards.

TOTAL: 60 HOURS

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Explain the concepts of CAD, computer graphics and transformations.
CO2:	Prepare various geometric models using curves, surfaces and solids.
CO3:	Explain the various visual realism methods (shading, colouring and animation).
CO4:	Do the assembly modeling and tolerance analysis.
CO5:	Describe the various computer graphics standards.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1			2	2			1			2
CO2	2	2	1			3					2	1
CO3	2		1	1	2	1					2	
CO4	2			2								
CO5	2	2	2	2	1				3		1	1

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1			1
CO2			2
CO3			2
CO4			
CO5			1

REFERENCES:

1. Ibrahim Zied, CAD/CAM-Theory and Practice, Tata McGraw Hall Publishing CompanyPvt. Ltd., New Delhi, 2009.
2. Donald Hearn, M. Pauline Baker, Computer Graphics, Prentice Hall of India, New Delhi, 2014.
3. Richard M. Lueptow, Graphics Concepts for Computer-Aided Design, Pearson EducationIndia, 2006.

4. William M. Neumann, Robert F. Sproul, Principles of Computer Graphics, Tata McGraw Hall Publishing Company Pvt Ltd., New Delhi, 2005.
5. Mikell P. Groover, Emory W. Zimmers, CAD/CAM Computer-Aided Design and Manufacturing, Prentice Hall of India, New Delhi, 2007.

1903ME001	NON-TRADITIONAL MACHINING PROCESSES (PC ELECTIVE - I)	L	T	P	C
		3	0	0	3

MODULE I	UNCONVENTIONAL MACHINING PROCESS	9 Hours

Introduction - Need - Classification - Energies employed in the processes - Brief overview of Abrasive jet machining(AJM), Water jet machining(WJM), Ultrasonic machining(USM), Electric discharge machining(EBM), Electro-chemical machining(ECM), Electron beam machining(EBM), Laser beam machining(LBM), Plasma arc machining(PAM).

MODULE II	MECHANICAL ENERGY BASED PROCESSES	9 Hours

Abrasive Jet Machining, Water Jet Machining and Ultrasonic Machining - Working Principles, Equipment, Process parameters, Material removal rate, Applications.

MODULE III	ELECTRICAL ENERGY BASED PROCESSES	9 Hours

Electric Discharge Machining - Working Principles, Equipment, Process Parameters, Material removal rate, Electrode / Tool, Power Circuits, Tool Wear, Dielectric, Flushing, Wire cut EDM - Applications.

MODULE IV	CHEMICAL AND ELECTRO-CHEMICAL ENERGY BASED PROCESSES	9 Hours

Chemical machining - Etchants, Maskants - techniques. Electro-chemical machining – Working principle, Equipment, Process Parameters, Material removal rate, Electrical circuit. Electro-chemical grinding - Electro-chemical honing - Applications.

MODULE V	THERMAL ENERGY BASED PROCESSES	9 Hours

Laser Beam machining, Plasma Arc Machining - Principles, Equipment. Electron Beam Machining - Principles, Equipment, Types, Beam control techniques, Material removal rate - Applications.

TOTAL: 45 HOURS

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Explain the basics and needs of unconventional machining processes.
CO2:	Describe mechanical energy based unconventional machining processes.
CO3:	Elaborate electrical energy based unconventional machining processes.
CO4:	Describe chemical and electro-chemical energy based unconventional machining processes.
CO5:	Explain thermal energy based unconventional machining processes.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1			2							1
CO2	2	1			2							1
CO3	2	1			2							1
CO4	2	1			2							1
CO5	2	1			2							1

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1		2	
CO2		2	
CO3		2	
CO4		2	
CO5		2	

REFERENCES:

1. P. K. Mishra, Non-Conventional Machining, Narosa Publishing House, New Delhi, 2007.
2. P. C. Pandey and H.S. Shan, Modern Machining Processes, Tata McGraw Hill Publishing Company Pvt Ltd., New Delhi, 2008.

3. Joao Paulo Davim, Nontraditional Machining Processes: Research Advances, Springer, New York, 2013.
4. Paul De Garmo, J.T. Black, and Ronald.A. Kohser, Material and Processes in Manufacturing, Prentice Hall of India Pvt. Ltd., New Delhi, 2011.
5. Vijaya Kumar Jain, Advanced Machining Processes, Allied Publishers Pvt. Ltd., New Delhi, 2005.
6. Hassan El-Hofy, Advanced Machining Processes: Nontraditional and Hybrid Machining Processes, McGraw-Hill

1902ME551	COMPUTER AIDED DESIGN AND ANALYSIS LABORATORY	L	T	P	C
		0	0	2	1

List of Experiments:

Creation of 3D assembly model of following machine elements

1. Flange Coupling
2. Knuckle joint
3. Screw Jack
4. Universal Joint
5. Stuffing box.
6. Connecting rod

Creation of model and Analysis using software

7. Stress and deflection analysis in beams with different support conditions.
8. Stress analysis of bracket.
9. Thermal stress analysis of mixed boundary.
10. Model analysis of Beams.
11. Harmonic analysis of simple systems.
12. Stress analysis of 3D beam.

TOTAL: 30 HOURS

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Prepare the 3D assembly model of flange coupling and Knuckle joint.
CO2:	Prepare the 3D assembly model of screw jack and universal joint.
CO3:	Prepare the 3D assembly model of stuffing box and connecting rod.
CO4:	Analyze the structures using the FEA software
CO5:	Test for temperature distribution in material using FEA software.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	3	1							1
CO2	3	3	2	3	1							1
CO3	3	3	2	3	1							1
CO4	3	3	2	2	1							1
CO5	3	3	2	2	1							1

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1			3
CO2			3
CO3			3
CO4			3
CO5	3		3

REFERENCES:

1. Ibrahim Zeid, CAD/ CAM Theory and Practice, McGraw Hill, 2007
2. Mikell P. Groover and Emory W. Zimmer, CAD/ CAM – Computer aided design and manufacturing, Pearson Education,1987
3. T. R. Chandrupatla and A. D. Belagundu, Introduction to Finite Elements in Engineering, Pearson Education, 2012
1. FEA Theory and Applications with Ansys, SaeedMoaveni, Pearson Education, 2014.

1902ME552	HEAT AND MASS TRANSFER LABORATORY	L	T	P	C
		0	0	2	1

List of Experiments:

1. Determination of thermal conductivity of insulating powder.
2. Determination of thermal conductivity of guarded hot plate.
3. Determination of thermal conductivity of materials in lagged pipe.
4. Determination of heat transfer co-efficient through composite wall.
5. Determination of heat transfer co-efficient by natural convection.
6. Determination of heat transfer co-efficient by forced convection
7. Determination of heat transfer co-efficient in a parallel and counter flow heat exchanger.
8. Determination of heat transfer co-efficient and effectiveness from Pin-Fin by natural convection.
9. Determination of heat transfer co-efficient and effectiveness from Pin-Fin by forced convection.
10. Determination of Stefan-Boltzmann constant.
11. Determination of emissivity using emissivity apparatus.
12. Determination of performance in a fluidized bed cooling tower.

TOTAL: 30 HOURS

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Measure the heat transfer phenomena predict the relevant coefficient.
CO2:	Experiment with mechanisms of heat transfer under steady and transient conditions.
CO3:	Make use of thermal analysis of heat exchangers to understand the basic Concepts of mass transfer.
CO4:	Do experimentation on convection and radiation heat transfer apparatus.
CO5:	Measure the heat transfer through extended surfaces.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3			2	2	3			3
CO2	3	3	3	3			1	2	3			3
CO3	3	3	3	3			1	2	3			3
CO4	3	3	3	3			1	2	3			3
CO5	3	2	1	3			1	1	3			3

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1	3		
CO2	3		
CO3	3		
CO4	3		
CO5	3		

REFERENCES:

1. Frank P.Incropera & David P.Dewitt, "Fundamentals of Heat and Mass Transfer",John Wiley & Sons, 1998
2. Kothandaraman, C.P., "Fundamentals of Heat and Mass Transfer", New Age International, New Delhi, 1998.
3. Nag, P.K., "Heat Transfer", Tata McGraw Hill, New Delhi, 2002
4. Ozisik, M.N., "Heat Transfer", McGraw Hill Book Co., 1994.

1904GE551	LIFE SKILLS: APTITUDE – 1	L	T	P	C
		0	0	2	1

MODULE I	INTRODUCTION TO NUMBER SYSTEM, BASIC SHORTCUTS OF ADDITION, MULTIPLICATION, DIVISION	6 Hours

Classification of numbers – Types of Numbers - Divisibility rules - Finding the units digit - Finding remainders in divisions involving higher powers - LCM and HCF Models - Fractions and Digits – Square, Square roots – Cube, Cube roots – Shortcuts of addition, multiplication, Division.

MODULE II	RATIO AND PROPORTION, AVERAGES	6 Hours

Definition of Ratio - Properties of Ratios - Comparison of Ratios - Problems on Ratios - Compound Ratio - Problems on Proportion, Mean proportional and Continued Proportion Definition of Average - Rules of Average - Problems on Average - Problems on Weighted Average - Finding average using assumed mean method.

MODULE III	PERCENTAGES, PROFIT AND LOSS	6 Hours

Introduction Percentage - Converting a percentage into decimals - Converting a Decimal into a percentage - Percentage equivalent of fractions - Problems on percentages - Problems on Profit and Loss percentage- Relation between Cost Price and Selling price - Discount and Marked Price - Two different articles sold at same Cost Price - Two different articles sold at same Selling Price - Gain% / Loss% on Selling Price.

MODULE IV	CODING AND DECODING, DIRECTION SENSE	6 Hours

Coding using same set of letters - Coding using different set of letters - Coding into a number - Problems on R-model - Solving problems by drawing the paths - Finding the net distance travelled - Finding the direction - Problems on clocks - Problems on shadows - Problems on direction sense using symbols and notations.

MODULE V	NUMBER AND LETTER SERIES NUMBER AND LETTER ANALOGIES, ODD MAN OUT	6 Hours

Difference series - Product series - Squares series - Cubes series - Alternate series - Combination series - Miscellaneous series - Place values of letters - Definition of Analogy - Problems on number analogy - Problems on letter analogy - Problems on verbal analogy - Problems on number Odd man out - Problems on letter Odd man out - Problems on verbal Odd man out.

TOTAL: 30 HOURS

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Learners should be able to understand number and solving problems least time using various Shortcut.
CO2:	Solve problems on averages; compare two quantities using ratio and proportion.
CO3:	Calculate concept of percentages, implement business transactions using profit and loss.
CO4:	Workout concepts of Coding and Decoding, ability to visualize directions and understand the logic behind a sequence.
CO5:	Learners should be able to find a series the logic behind a sequence.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1											2
CO2	1											2
CO3	1											2
CO4	1											2
CO5	1											2

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1			
CO2			
CO3			
CO4			
CO5			

REFERENCES:

1. Arun Sharma, „How to Prepare for Quantitative Aptitude for the CAT", 7th edition, McGraw Hills publication, 2016.
2. Arun Sharma, „How to Prepare for Logical Reasoning for CAT", 4th edition, McGraw Hills publication, 2017.
3. R S Agarwal, „A modern approach to Logical reasoning", revised edition, S.Chand publication, 2017.
4. R S Agarwal, „Quantitative Aptitude for Competitive Examinations", revised edition, S.Chand publication, 2017.
5. Rajesh Verma, "Fast Track Objective Arithmetic", 3rd edition, Arihant publication, 2018.
6. B.S. Sijwalii and InduSijwali, "A New Approach to REASONING Verbal & Non-Verbal", 2nd edition, Arihnat publication, 2014.

1902MCX03	ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE	L	T	P	C
		2	0	0	0

MODULE I	INTRODUCTION TO CULTURE	6 Hours

Culture, civilization, culture and heritage, general characteristics of culture, importance of culture in human literature, Indian Culture, Ancient India, Medieval India, Modern India

MODULE II	INDIAN LANGUAGES, CULTURE AND LITERATURE	6 Hours

Indian Languages and Literature-I: the role of Sanskrit, significance of scriptures to current society, Indian philosophies, other Sanskrit literature, literature of south India Indian Languages and Literature-II: Northern Indian languages & literature.

MODULE III	RELIGION AND PHILOSOPHY	9 Hours

Religion and Philosophy in ancient India, Religion and Philosophy in Medieval India, Religious Reform Movements in Modern India (selected movements only)

MODULE IV	FINE ARTS IN INDIA (ART, TECHNOLOGY& ENGINEERING)	6 Hours

Indian Painting, Indian handicrafts, Music, divisions of Indian classic music, modern Indian music, Dance and Drama, Indian Architecture (ancient, medieval and modern), Science and Technology in India, development of science in ancient, medieval and modern India

MODULE V	EDUCATION SYSTEM IN INDIA	6 Hours

Education in ancient, medieval and modern India, aims of education, subjects, languages, Science and Scientists of Ancient India, Science and Scientists of Medieval India, Scientists of Modern India.

TOTAL: 30 HOURS

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Explain philosophy of Indian culture.
CO2:	Distinguish the Indian languages and literature.
CO3:	Learn the philosophy of ancient, medieval and modern India.
CO4:	Acquire the information about the fine arts in India.
CO5:	Know the contribution of scientists of different eras.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1						1						
CO2						1						
CO3						1						
CO4						1						
CO5						1						

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1			
CO2			
CO3			
CO4			
CO5			

REFERENCES:

1. KapilKapoor, “Text and Interpretation: The India Tradition”,ISBN: 81246033375, 2005
2. “Science in Samskrit”, SamskritaBharti Publisher, ISBN 13: 978-8187276333, 2007
3. NCERT, “Position paper on Arts, Music, Dance and Theatre”, ISBN 81-7450 494-X, 200
4. S. Narain, “Examinations in ancient India”, Arya Book Depot, 1993
5. SatyaPrakash, “Founders of Sciences in Ancient India”, Vijay Kumar Publisher, 1989