w.e.f. 2017-18

VR17

MECHANICAL ENGINEERING

B. Tech.

FIRST & SECOND YEARS SYLLABUS

Department of Mechanical Engineering

(B.Tech.Programme Accredited by NBA)

VELAGAPUDI RAMAKRISHNA SIDDHARTHA ENGINEERING COLLEGE

(An Autonomous, ISO 9001:2008 Certified Institution)

(Approved by AICTE, Accredited by NAAC with 'A' Grade, Affiliated to JNTUK, Kakinada)

(Sponsored by Siddhartha Academy of General & Technical Education)

Kanuru, Vijayawada

Andhra Pradesh - 520007, INDIA.

www.vrsiddhartha.ac.in

PROGRAMME OUTCOMES

a) An ability to apply the knowledge of mathematics, science and engineering fundamentals

b) An ability to conduct Investigations using design of experiments, analysis and interpretation of data to arrive at valid conclusions

c) An ability to design mechanical engineering components and processes within economic, environmental, ethical and manufacturability constraints

d) An ability to function effectively in multidisciplinary teams

e) An ability to identify, formulate, analyse and solve Mechanical Engineering problems

f) An ability to understand professional, ethical and social responsibility

g) An ability to communicate effectively through written reports or oral presentations

h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

i) An ability to recognize the need and to engage in independent and life-long learning.

j) A knowledge of contemporary issues

k) An ability to use the appropriate techniques and modern engineering tools necessary for engineering practice

l) An ability to apply the principles of management to manage projects Multidisciplinary environments

PROGRAM SPECIFIC OUTCOMES

a) Apply their Knowledge in the domain of thermal systems to solve engineering problems using modern technological tools.

b) Develop and implement new ideas related to product design and manufacturing for societal and industrial needs using modern CAD/CAE/CAM tools.

VELAGAPUDI RAMAKRISHNA
SIDDHARTHA ENGINEERING COLLEGE
DEPARTMENT OF MECHANICAL ENGINEERING
SCHEME OF INSTRUCTION FOR FIRST YEAR UG PROGRAMME

SEMESTER I **Contact Hours: 26**

S.No	Course Code	Title of the Course	L	T	P	Credits
1.	17MA1101	Matrices And Differential Calculus	3	1	0	4
2.	17CH1102A	Engineering Chemistry	3	0	0	3
3.	17CS1103	Problem Solving Methods	2	1	0	3
4.	17ME1104A 17ME1104B	Engineering Mechanics – I(ME and CE) Mechanics for Engineers (EEE)	3	0	0	3
5.	17ME1105	Engineering Graphics	2	0	4	4
6.	17CH1151	Engineering Chemistry Laboratory	0	0	3	1.5
7.	17CS1152	Computing and Peripherals Laboratory	0	0	2	1
		Total	**13**	**2**	**9**	**19.5**
8.	17MC1106B	Professional Ethics & Human Values	2	0	0	-
9.	17MC1107	Induction Program				-

SEMESTER II **Contact Hours: 27**

S.No	Course Code	Course	L	T	P	Credits
1.	17MA1201	Laplace Transforms And Integral Calculus	3	1	0	4
2.	17PH1202C	Physics for Engineers	3	0	0	3
3.	17CS1203	Programming in C	3	0	0	3
4.	17ME1204 17EE1204	Engineering Mechanics – II(ME and CE) Network Analysis-1 (EEE)	3	0	0	3
5.	17HS1205	Technical English and Communication Skills	2	0	2	3
6.	17PH1251	Engineering Physics Laboratory	0	0	3	1.5
7.	17CS1252	Computer Programming Laboratory	0	0	3	1.5
8.	17ME1253	Basic Workshop	0	0	3	1.5
		Total	**14**	**1**	**11**	**20.5**
9.	17MC1206A	Technology and Society	1	0	0	-

L – Lecture, T – Tutorial, P – Practical, C – Credits

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SCHEME OF INSTRUCTION FOR SECOND YEAR UG PROGRAMME

Semester III **Contact Hours: 28**

S.No	Course Code	Course	L	T	P	Credits
1.	17MA1301D	Mathematics for Mechanical Engineers	3	1	0	4
2.	17ME3302	Mechanics of Materials	3	1	0	4
3.	17ME3303	Basic Thermodynamics	3	1	0	4
4.	17ME3304	Manufacturing Processes	3	0	0	3
5.	17ME3305	Kinematics of Machines	3	0	0	3
6.	17TP1306	Logic & Reasoning	0	0	2	1
7.	17ME3351	Solid Modeling Laboratory	0	0	3	1.5
8.	17ME3352	Manufacturing Process Laboratory	0	0	3	1.5
Total			**15**	**3**	**8**	**22**
9.	**17MC1307B**	Indian Constitution (EIE/CE/ME/EEE)	**2**	**0**	**0**	**-**

Semester IV **Contact Hours: 27**

S.No	Course Code	Course	L	T	P	Credits
1.	17ME3401	Fluid Mechanics and Hydraulic Machines	3	1	0	4
2.	17ME3402	Machine Dynamics	3	0	0	3
3.	17ME3403	Engineering Metallurgy	3	0	0	3
4.	17ME3404	Electrical and Electronics Engineering	4	0	0	4
5.	17TP1405	**English for Professionals**	0	0	2	1
6.	17HS2406	Humanities Elective	1	0	0	1
7.	17ME3451	Computational Methods Laboratory	0	0	3	1.5
8.	17ME3452	Electrical and Electronics Engineering Laboratory	0	0	3	1.5
9.	17HS1453	Communication Skills Laboratory	0	0	2	1
Total			**14**	**1**	**10**	**20**
10.	17MC1407A	Environmental Studies (EIE/CE/ME/EEE)	2	0	0	**-**

List of Humanities Electives

17HS2406A	Yoga & Meditation	17HS2406G	Film Appreciation
17HS2406B	Music	17HS2406H	Sanskrit Bhasa
17HS2406C	Human Rights and Legislative Procedures	17HS2406I	Foreign Languages (German/French)
17HS2406D	Philosophy	17HS2406J	Law for Engineers
17HS2406E	Development of societies	17HS2406K	Psychology
17HS2406F	Visual Communication		

17MA1101 MATRICES AND DIFFERENTIAL CALCULUS

Course Category:	Institutional Core	**Credits:**	4
Course Type:	Theory	**Lecture -Tutorial-Practice:**	3 - 2 - 0
Prerequisites:	Fundamentals of Matrices, Fundamentals of Calculus, Integration, Differentiation.	**Continuous Evaluation:**	30
		Semester end Evaluation:	70
		Total Marks:	100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Determine Eigen values, Eigen vectors of a matrix.

CO2 Estimate Maxima and Minima of Multi Variable Functions.

CO3 Solve the Linear differential equations with constant coefficients.

CO4 Solve the Linear differential equations with variable coefficients.

Contribution of Course Outcomes towards achievement of Program Outcomes (L – Low, M - Medium, H – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1	**H**				**M**						**M**	
CO2	**H**				**M**						**M**	
CO3	**H**				**M**						**M**	
CO4	**H**				**M**						**M**	

COURSE CONTENT

UNIT I

Matrices: Rank of a Matrix, Elementary transformations, Inverse of a Matrix (Gauss Jordan Method), Consistency of Linear System of Equations, Linear Transformations, Vectors, Eigen values, Properties of Eigen values, Finding Inverse and Powers of a Matrix by Cayley-Hamilton Theorem. Reduction to Diagonal form, Reduction of Quadratic form to Canonical form, Nature of a Quadratic form, Complex matrices.

UNIT II

Differential Calculus: Rolle's Theorem, Lagrange's Mean Value Theorem, Cauchy's Mean Value Theorem, Taylor's Theorem, Maclaurin's Series.

Application: Curvature, Radius of Curvature**.**

Functions of two or more Variables: Partial Derivatives, Change of Variables, Jacobians, Taylor's Theorem for Function of two Variables, Maxima and Minima of Functions of two Variables, Lagrange's Method of Undetermined Multipliers.

UNIT III

Differential Equations of First Order: Formation of a Differential Equation, Solution of a Differential Equation, Linear Equations, Bernoulli's Equation, Exact Differential Equations, Equations Reducible to Exact Equations.

Applications: Orthogonal Trajectories, Newton's Law of Cooling.

Linear Differential Equations of Higher Order: Definitions, Operator D, Rules for Finding the Complementary Function, Inverse Operator, Rules for finding Particular Integral, Working Procedure to Solve the Equation.

UNIT IV

Linear Dependence of Solutions, Method of Variation of Parameters, Method of Undetermined Coefficients, Equations Reducible to Linear Equations with Constant Coefficients: Cauchy's Homogeneous Linear Equation, Legendre's Linear Equation, Simultaneous Linear Differential Equations with Constant Coefficients.

Applications: L-C-R Circuits.

TEXT BOOKS

[1] B.S.Grewal , "Higher Engineering Mathematics", Khanna Publishers, 43rd Edition, 2014.

REFERENCE BOOKS

[1].Pal Bhunia, Engineering Mathematics, Oxford University Press, 2015.

[2].Erwin Kreyszig , " Advanced Engineering Mathematics", John Wiley & Sons, 10th Edition, 2015.

[3].B.V.Ramana, "Higher Engineering Mathematics", Tata MC Graw Hill, 1st Edition, 2007.

[4].N.P.Bali, Dr.Manish Goyal, "A Text Book of Engineering Mathematics", Laxmi Publications, 9th Edition, 2014.

E-RESOURCES AND OTHER DIGITAL MATERIAL

[1]. www.nptel videos.com/mathematics/ (Math Lectures from MIT,Stanford,IIT'S)

[2]. nptel.ac.in/courses/122104017

[3]. nptel.ac.in/courses/111105035

[4]. Engineering Mathematics Open Learning Project. www.3.ul.ie/~mlc/support/Loughborough%20website/

17CH1102/17CH1202 ENGINEEERING CHEMISTRY

Course Category: Institutional Core **Credits:** 3

Course Type: Theory **Lecture-Tutorial-Practice:** 3-0-0

Prerequisites: Knowledge of Chemistry at Intermediate level

Continuous Evaluation: 30
Semester end Evaluation: 70
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Analyze various water treatment methods and boiler troubles.

CO2 Apply the principles of spectroscopic techniques to analyse different materials and apply the knowledge of conventional fuels for their effective utilisation.

CO3 Apply the knowledge of working principles of conducting polymers, electrodes and batteries for their application in various technological fields.

CO4 Evaluate corrosion processes as well as protection methods.

Contribution of Course Outcomes towards achievement of Program Outcomes (L-Low, M-Medium,H- High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1		H										
CO2	M											
CO3											H	
CO4			M									

COURSE CONTENT

UNIT – I

Water technology-I: WHO standards - Water treatment for drinking purpose - sedimentation, coagulation, filtration, disinfection by chlorination, breakpoint chlorination and its significance - Desalination of brackish water - principle and process of electrodialysis and reverse osmosis, advantages and disadvantages.

Water technology-II: Boiler troubles - scales-formation, disadvantages and internal conditioning methods - phosphate conditioning, calgon conditioning and sodium aluminate, caustic embrittlement- reasons, mechanism and its control, and boiler corrosion – causes and control.

UNIT II

Spectroscopic Techniques and Applications: Interaction of electromagnetic radiation with matter - Ultraviolet-visible spectroscopy: Frank-Condon principle, types of electronic transitions, Lambert-Beer's law – definition and numerical problems, problems on interpretation of UV-visible spectra of simple molecules of arenes, aldehydes and ketones. Infrared (IR) spectroscopy: Principle, types of vibrations, problems on interpretation of IR spectra of simple molecules of amines, alcohols, aldehydes and ketones.

Fuel technology: Fuel-definition, calorific value- lower and higher calorific values, analysis of coal – proximate analysis and ultimate analysis, refining of petroleum, flue gas analysis by Orsat's apparatus, numericals based on calculation of air required for combustion**.**

UNIT III

Conducting polymers: Definition, examples, classification-intrinsically conducting polymers and extrinsically conducting polymers- mechanism of conduction of undoped polyacetylene, doping of conducting polymers- mechanism of conduction of p-doped and n-doped polyacetylenes – applications of conducting polymers.

Electrochemistry: Construction and working of Calomel electrode, silver-silver chloride electrode and principle, construction and working of glass electrode, determination of pH using glass electrode - Chemistry of modern batteries - Li/SOCl2 battery and LixC/LiCoO2 battery - construction, working and advantages, Chemistry of H2-O2 fuel cell-advantages.

UNIT IV

Corrosion principles: Introduction, definition, reason for corrosion, examples – electrochemical theory of corrosion, types of electrochemical corrosion - hydrogen evolution and oxygen absorption – corrosion due to dissimilar metals, galvanic series – differential aeration corrosion – pitting corrosion and concept of passivity.

Corrosion control methods: Cathodic protection- principle and types - impressed current method and sacrificial anode method, anodic protection-principle and method, corrosion inhibitors – types and mechanism of inhibition – principle, process and advantages of electroplating and electroless plating.

TEXT BOOKS

[1] *Engineering Chemistry - Fundamentals and Applications, Shikha Agarwal, 1st edition (2015), Cambridge University Press, New Delhi.*

REFERENCE BOOKS:

[1] *A Textbook of Engineering Chemistry, Sunita Rattan, First edition 2012, S.K. Kataria & Sons, New Delhi.*

[2] *Engineering Chemistry, P.C. Jain, 15th edition, Dhanpat Rai Publishing Company (P) Limited, New Delhi.*

[3] *Essentials of Physical Chemistry, B.S. Bahl, G. D. Tuli and Arun Bahl, S. Chand and Company Limited, New Delhi.*

[4] Engineering *Chemistry, O. G. Palanna, Tata McGraw Hill Education Pvt. Ltd., New Delhi.*

[5] Text book of Analytical Chemistry, *Y.Anjaneyulu, K. Chandrasekhar and Valli Manickam*, Pharma Book Syndicate, Hyderabad.

[6] Spectroscopy, *H. Kaur*, I Edition, 2001, Pragati Prakashan, Meerut.

E-RESOURCES AND OTHER DIGITAL MATERIAL

[1] http://www.cip.ukcentre.com/steam.htm

[2] http://corrosion-doctors.org/Modi;es/mod-basics.htm

[3] http://nopr.niscair.res.in/bitstream/123456789/5475/1/JSIR%2063%289%29%20715-728.pdf

[4] https://chem.libretexts.org/Core/Analytical_Chemistry/Electrochemistry/Basics_of_Electrochemistry

[5] http://www.filtronics.com/blog/tertiary-treatment/stages-in-typical-municipal-water-treatment/

[6] https://www.khanacademy.org/test-prep/mcat/physical-processes/infrared-and-ultraviolet-visible-spectroscopy/e/infrared-and-ultraviolet-visible-spectroscopy-questions

[7] NPTEL online course, "Analytical Chemistry", offered by MHRD and instructed by Prof. Debashis Ray of IIT Kharagpur.

[8] NPTEL online course, "Corrosion Part-I" offered by MHRD and instructed by Prof. Kallol Mondal of IIT Kanpur

17CS1103 PROBLEM SOLVING METHODS

Course Category:	Institutional Core	**Credits:**	3
Course Type:	Theory	**Lecture -Tutorial-Practice:**	2 -2- 0
Prerequisites:		**Continuous Evaluation:**	30
		Semester end Evaluation:	70
		Total Marks:	100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the Computer problem solving approaches, efficiency and analysis of algorithms

CO2 Apply the factoring methods to solve the given problem

CO3 Apply the array techniques to find the solution for the given problem

CO4 Solve the problems using MATLAB

Contribution of Course Outcomes towards achievement of Program Outcomes
(L – Low, M - Medium, H – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1	**H**	**M**										
CO2	**M**								**M**			
CO3	**M**								**M**			
CO4	**L**										**H**	

COURSE CONTENT

UNIT - I

Introduction to Computer Problem Solving: Programs and Algorithms, characteristics of an algorithm, Requirements for solving problems by computer; Flowchart, pseudo-code **The Problem – Solving Aspect**: Problem definition phase, Getting started on a problem, Similarities among problems, Working backwards

from the solution, General problem-solving strategies; **Top-Down design**: Breaking a problem into sub-problems, Construction of loops, Establishing initial conditions for loops, Finding the iterative construct, Termination of loops;

The Efficiency of Algorithms: Redundant Computations, Referencing array elements, Inefficiency due to late termination, Early detection of desired output conditions, Trading storage for efficiency gains;

Analysis of Algorithms: Computational complexity, The order notation, Worst and average case behavior.

UNIT - II

Fundamental Algorithms: Problem, Algorithm Development, Algorithm Description - Exchanging values of two variables, Counting, Summation of a set of numbers, Factorial computation, Generation of Fibonacci sequence, Reversing the digits of an Integer. Using pseudo-codes and flowcharts to represent fundamental algorithms.

Factoring Methods: Finding the Square Root of a number: Smallest Divisor of an Integer, GCD of two Integers, Generating Prime numbers, Computing the Prime Factors of an Integer, Raising a Number to a Large Power, Pseudo random number generation, Computing n^{th} Fibonacci number.

UNIT – III

Array Techniques: Introduction, Array Order Reversal, Array counting, Finding the maximum number in a set, Removal of duplicates from an ordered array, Partitioning an array, Finding The K^{th} Smallest Element.

Merging, Sorting and Searching: Sorting By Selection, Sorting By Exchange, Linear Search, Binary search;

UNIT – IV

Introduction to MATLAB: MATLAB Environment, **Constants, Variables and Expressions:** Data types, Constants and Variables, Operators, Built-in Functions, **Vectors and Matrices:** Introduction, Scalars and Vectors, Matrix Manipulations, **Control Structures:** Loops, Branches.

Input-Output Statements: Reading/Storing File Data, **MATLAB Graphics:** Introduction, Two-Dimensional Plots.

TEXT BOOKS

[1] R.G. Dromey , "How to Solve it By Computer", Prentice-Hall International Series in Computer Science,1982.

[2] Bansal.R.K, Goel.A.K, Sharma.M.K, "MATLAB and its Applications in Engineering", Pearson Education, 2012.

REFERENCE BOOKS

[1] Michael Schneider, Steven W. Weingart, David M. Perlman, "An Introduction to Programming and Problem Solving With Pascal", John Wiley and Sons Inc ,1984.
[2] David Gries, "The Science of Programming", Springer Verlag, 1981.
[3] ReemaThareja, "Computer Fundamentals and C Programming", Oxford, 2012

E-RESOURCES AND OTHER DIGITAL MATERIAL

MATLAB Getting Started Guide http://www.mathworks.com/help/pdf_doc/ matlab/getstart.pdf

17ME1104A ENGINEERING MECHANICS-I

Course Category:	Engineering Science	**Credits:**	3
Course Type:	Theory	**Lecture -Tutorial-Practice:**	2 - 2 - 0
Prerequisites:	Basic Mathematics, Physical Science	**Continuous Evaluation:**	30
		Semester end Evaluation:	70
		Total Marks:	100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Analyze coplanar concurrent forces

CO2 Analyze coplanar parallel forces and determine centroids for plane figures.

CO3 Analyze coplanar general case of force systems

CO4 Analyze spatial concurrent and parallel forces

Contribution of Course Outcomes towards achievement of Program Outcomes (L – Low, M - Medium, H – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l	PSO I	PSO II
CO1	**H**				**M**									**M**
CO2	**H**				**M**									**M**
CO3	**H**				**M**									**M**
CO4	**H**				**M**									**M**

COURSE CONTENT

UNIT I

Concurrent Forces in a Plane: Principles of statics, Force, Addition of two forces: Parallelogram Law – Composition and resolution of forces – Constraint, Action and Reaction. Types of supports and support reactions. Free body diagram. Equilibrium of concurrent forces in a plane – Method of projections –Moment of a force, Theorem of Varignon, Method of moments.

UNIT II

Parallel Forces in a Plane: Introduction, Types of parallel forces, Resultant. Couple, Resolution of Force into force and a couple. General case of parallel forces in a plane.

Centroids: Introduction, Determination of centroids by integration method, Centroids of composite plane figures. Distributed forces in a plane.

UNIT III

General Case of Forces in a Plane: Composition of forces in a plane – Equilibrium of forces in a plane - Plane Trusses**:** Method of joints

Friction: Introduction, Laws of dry friction. Co-efficient of friction, Angle of friction, Angle of repose, Cone of friction, Frictional forces on wheel, Wedge friction.

UNIT IV

Force System In Space: Components of a force, defining a force by its magnitude and two points on its line of action, components of a vector, work done by a force, Resultant of system of concurrent and parallel forces in space, Moment of a force, Component of a vector and moment about an axis, Equilibrium of concurrent and parallel forces in space.

TEXT BOOKS

[1] S.Timoshenko, D.H.Young, J.V.Rao & Sukumar Pati, "Engineering Mechanics", Vth edition, Mc Graw Hill Education (India) Pvt Ltd, 2013 (For Concepts and symbolic Problems).

[2] A.K.Tayal , "Engineering Mechanics Statics and dynamics", Umesh Publications, XIIIth edition, 2006 (For numerical Problems using S.I.System of Units).

REFERENCE BOOKS

[1] Beer and Johnston, "Vector Mechanics for Engineers Statics and Dynamics", Tata McGraw Hill, IIIrd edition, 2010.

[2] SS Bhavikatti and KG Rajasekharappa, "Engineering Mechanics", New Age International Private Limited, IVth Edition, 2012

[3] K.Vijaya Kumar Reddy and J Suresh Kumar, " Singer's Engineering Mechanics Statics and Dynamics", BS Publications, IIIrd Edition 2010.

E-RESOURCES AND OTHER DIGITAL MATERIAL

[1] http://emweb.unl.edu/, Accessed On 15-06-2017

17ME1105/17ME1205 ENGINEERING GRAPHICS

Course Category:	Institutional Core	**Credits:**	4
		Lecture-Tutorial –Practice:	2-0-6
Course Type:	Theory&Practice	**Continuous Evaluation:**	30
		Semester end Evaluation:	70
Prerequisites:	Nil	**Total Marks:**	100

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

CO1 Understand the Scales, conics and Cycloidal curves.

CO2 Draw Orthographic projections of points, Lines, Planes and Solids

CO3 Understand Sectional views of Solids, Development of surfaces and their representation

CO4 Construct isometric scale, isometric projections, isometric views and convert pictorial views to orthographic projections

Contribution of Course Outcomes towards achievement of Program Outcomes
(L – Low, M - Medium, H – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1	**H**		**H**				**H**					
CO2	**M**		**H**				**H**					
CO3	**M**		**H**				**H**					
CO4	**L**		**H**				**H**					

COURSE CONTENT

UNIT – I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance

Scales: Construction of plain and diagonal Scales

Conic Sections: Construction of ellipse, parabola and hyperbola (Treatment is limited to Eccentricity or General method only)

Engineering Curves: Cycloidal curves - Cycloid, Epicycloid and Hypocycloid

UNIT – II

Orthographic Projections: Principles of Orthographic Projections –Projections of Points, Lines (Treatment is limited to First Angle Projection) and Projections of Plane regular geometric figures (Up to Plane Inclined to both of the Reference planes)

UNIT – III

Projections of Solids: Projections of simple solids such as Cubes, Prisms, Pyramids, Cylinders and Cones with varying positions (Limited to Solid Inclined to one of the Reference planes)

Sections of Solids: Sections of solids such as Cubes, Prisms, Pyramids, Cylinders and Cones. True shapes of sections(Limited to the solids perpendicular to one of the Principal Planes)

UNIT – IV

Development of Surfaces: Lateral development of cut sections of Cubes, Prisms, Pyramids, Cylinders and Cones

Isometric Projections: Isometric Projection and conversion of isometric views into Orthographic Projections (Treatment is limited to simple objects only)

Conventions Auto CAD: Basic principles only (Internal assessment only)

Text Books

[1] N.D. Bhatt & V.M. Panchal, "Elementary Engineering Drawing", Charotar Publishing House, Anand. 49th Edition – 2006

[2] Basanth Agrawal & C M Agrawal," Engineering Drawing", McGraw Hill Education Private Limited, New Delhi

Reference Books

[1] K. L. Narayana & P. Kannaiah, "Text Book on Engineering Drawing", Scitech publications (India) Pvt. Ltd.,Chennai, 2nd Edition - fifth reprint 2006

[2] K. Venugopal, "Engineering Drawing and Graphics + Auto CAD", New Age International, New Delhi

[3] D M Kulkarni, AP Rastogi, AK Sarkar, "Engineering Graphics with Auto CAD", PHI Learning Private Limited, Delhi Edition – 2013

E-Resources and other digital material

[1] http://www.youtube.com/watch?v=XCWJ XrkWco, Accessed On 01-06-2017.

[2] http://www.me.umn.edu/courses/me2011/handouts/drawing/blanco-tutorial.html# isodrawing, Accessed On 01-06-2017.

[3] http://www.slideshare.net, Accessed On 01-06-2017.

[4] http://edpstuff.blogspot.in, Accessed On 01-06-2017.

17CH1151 / 17CH1251 ENGINEERING CHEMISTRY LABORATORY

Course Category:	Institutional Core	**Credits:**	1.5
Course Type:	Lab	**Lecture -Tutorial-Practice:**	0 - 0 - 3
Prerequisites:	Knowledge of chemistry practicals at intermediate level	**Continuous Evaluation:**	30
		Semester end Evaluation:	70
		Total Marks:	100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1	Analyse quality parameters of water samples from different sources and commercial solid samples.
CO2	Analyse samples of acids and bases quantitatively using instrumental methods.
CO3	Apply the knowledge of preparation of polymers, mechanism of corrosion inhibition and photochemical reactions.

Contribution of Course Outcomes towards achievement of Program Outcomes
(L – Low, M - Medium, H – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1		**H**										
CO2											**M**	
CO3					**M**							

COURSE CONTENT

- Volumetric analysis of water samples
- Quantitative determination of commercial samples - boric acid and bleaching powder
- Quantitative analysis of copper and Mohr's salt
- Instrumental analysis using conductometer and pH meter
- Preparation of polymers, determination of effectiveness of corrosion inhibitors, and photochemical reactions

List of Experiments:

1.Determination of total alkalinity of a water sample

2.Determination of purity of a boric acid sample

3.Conductometric analysis of a strong base using a strong acid

4.Determination of total hardness of a water sample

5.Determination of copper in a given sample

6.Chemistry of blueprinting

7.Determination of Mohr's salt - Permanganometry

8.Determination of Mohr's salt - Dichrometry

9.Determination of efficiency of a corrosion inhibitor

10.Determination of available chlorine in a bleaching powder sample

11.Determination of chlorides in a water sample

12.pH metric analysis of a strong base using a strong acid

13.Preparation of urea-formaldehyde resin

REFERENCE BOOKS

[1] *Laboratory Manual on Engineering Chemistry, S.K. Bhasin and Sudha Rani, 2nd edition, Dhanpat Rai Publishing Company, New Delhi.*

[2] Experiments in Applied Chemistry, Sunita Rattan, 2nd edition, S. K. Kataria & Sons, Delhi.

17CS1152 COMPUTING AND PERIPHERALS LABORATORY

Course Category:	Institutional Core	**Credits:**	1
Course Type:	Laboratory	**Lecture -Tutorial-Practice:**	0 - 0 – 2
Prerequisites:		**Continuous Evaluation:**	30
		Semester end Evaluation:	70
		Total Marks:	100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand and Apply MS Office tools

CO2 Configure the components on the motherboard and install different operating systems

CO3 Understand and configure different storage media

CO4 Perform Networking, troubleshooting and system administration tasks

Contribution of Course Outcomes towards achievement of Program Outcomes (L – Low, M - Medium, H – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1	**H**								**M**		**L**	
CO2		**L**							**M**			
CO3	**H**											
CO4		**M**							**M**			

COURSE CONTENT

CYCLE - I:Word Processing, Presentations and Spread Sheets

1. **Word Processing:**

a) Create personal letter using MS Word.

b) Create a resume using MS Word.

c) Creating project abstract**:** Features to be covered:- Table of Content, List of Tables, Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check,Track Changes.

d) Creating a Newsletter: Features to be covered:- Table of Content, List of figures, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphsand Mail Merge in word.

2. **Spread Sheets:**

a) Create a worksheet containing pay details of the employees.

b) Creating a Scheduler: Features to be covered:- Gridlines, Format Cells, Summation, auto fill,Formatting Text

c) Create a worksheet which contains student results: .Features to be covered:- Cell Referencing, Formulae in excel – average, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting

d) Create a worksheet importing data from database and calculate sum of all the columns.

3. Presentations:

a) Create a presentation using themes.

b) Save, edit, print and import images/videos to a presentation.

c) Create a power Point presentation on business by using master layouts, adding animation to a presentation and see the presentation in different views.

4. MS Access:

a) Create simple table in MS Access for results processing.

b) Create a query table for the results processing table.

c) Create a form to update/modify the results processing table.

d) Create a report to print the result sheet and marks card for the result.

CYCLE - II: Hardware Experiments

1. Identification of System Layout: Front panel indicators & switches and Front side & rear side connectors. Familiarize the computer system Layout: Marking positions of SMPS, Motherboard, FDD,HDD, CD, DVD and add on cards. Install Hard Disk. Configure CMOS-Setup. Partition and Format Hard Disk.

2. Install and Configure a DVD Writer or a Blu-ray Disc writer.

3. Install windows operating system and check if all the device (graphics, sound, network etc.) drivers are installed.

4. Install Linux operating system and check the working of all devices (graphics, sound, network etc.) in the computer.

5. Assemble a Pentium IV or Pentium Dual Core Pentium Core2 Duo system with necessary peripherals and check the working condition of the PC.

6. PC system layout: Draw a Computer system layout and Mark the positions of SMPS, Mother Board, FDD, HDD, and CD-Drive/DVD Drive add on cards in table top / tower model systems.

7. Mother Board Layout: Draw the layout of Pentium IV or Pentium Dual core or Pentium Core2 DUO mother board and mark Processor, Chip set ICs. RAM, Cache, cooling fan, I/O slots and I/O ports and various jumper settings.

8. Configure BIOS setup program to change standard and advanced settings to troubleshoot typical problems.

9. Install and configure Printer/Scanner/Web cam/Cell phone/bio-metric device with system. Troubleshoot the problems

CYCLE – III : Networking

1. Prepare an Ethernet/UTP cable to connect a computer to network switch. Crimp the 4 pair cable with RJ45 connector and with appropriate color code.

2. Manually configure TCP/IP parameters (Host IP, Subnet Mask and Default Gateway) for a computer and verify them using IPCONFIG command. Test connectivity to a server system using PING command.

3. Creating a shared folder in the computer and connecting to that folder using Universal Naming Convention (UNC) format. (Ex: computer name share name)

4. Connects computers together via Switch/ Hub

5. Connect different devices via Switch/Hub

6. Statically configure IP address and subnet mask for each computer

7. Examine non-existent IP address and subnet conflicts

8. Configure a computer to connect to internet (using college internet settings) and troubleshoot the problems using PING, TRACERT and NETSTAT commands.

9. Using scan disk, disk cleanup, disk Defragmenter, Virus Detection and Rectifying Software to troubleshoot typical computer problems.

10. Configure DNS to establish interconnection between systems and describe how a name is mapped to IP Address.

11. Remote desktop connections and file sharing.

12. Installation Antivirus and configure the antivirus.

13. Introducing Ethereal , a packet capture tool.

E-RESOURCES AND OTHER DIGITAL MATERIAL

[1] Numerical Methods and Programing by Prof.P.B.Sunil Kumar,Department of Physics, IIT Madras https://www.youtube.com/ watch?v=zjyR9e #1D4&list=PLC5DC6AD60D798FB7

[2]Introduction to Coding Concepts Instructor: Mitchell Peabody View the complete course: http://ocw.mit.edu/6-00SCS11

17MC1106/17MC1206 PROFESSIONAL ETHICS & HUMAN VALUES

Course Category:	Mandatory Learning	**Credits:**	2
Course Type:	Theory	**Lecture -Tutorial-Practice:**	2 - 0 - 0
Prerequisites:		**Continuous Evaluation:**	30
		Semester end Evaluation:	70
		Total Marks:	100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1	Know the moral autonomy and uses of ethical theories.
CO2	Understand morals, Honesty and character.
CO3	Understand about safety, risk and professional rights.
CO4	Know the ethics regarding Global issues related to Environment, Computers and weapon's development.

Contribution of Course Outcomes towards achievement of Program Outcomes
(L – Low, M - Medium, H – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1	**M**											
CO2								**L**				
CO3						**M**						
CO4									**M**			

COURSE CONTENT

UNIT I

Engineering Ethics: Senses of 'Engineering Ethics' - variety of moral issues- types of inquiry - moral dilemmas - moral autonomy - Kohlberg's theory -Gilligan's theory - consensus and controversy - Models of Professional Roles -theories about right action - Self-interest - customs and religion- uses of ethical theories.

UNIT II

Human Values:Morals, Values and Ethics - Integrity- Work Ethic – Service Learning - Civic Virtue - Respect for Others - Living Peacefully - caring – Sharing - Honesty - Courage - Valuing Time - Co-operation - Commitment –Empathy - Self-Confidence - Character - Spirituality .

UNIT III

Engineering as Social Experimentation: Engineering as experimentation – engineers as responsible experimenters - codes of ethics - a balanced outlook on law - the challenger case study, Safety, Responsibilities and Rights: Safety and risk - assessment of safety and risk - risk benefit analysis and reducing risk – the three mile island and chernobyl case studies. Collegiality and loyalty – respect for authority - collective bargaining - confidentiality - conflicts of interest - occupational crime - professional rights - employee rights - Intellectual Property Rights (IPR) - discrimination.

UNIT IV

Global Issues: Multinational corporations- Environmental ethics- computer ethics - weapons development - engineers as managers-consulting engineers-engineers as expert witnesses and advisors -moral leadership- sample code of Ethics (Specific to a particular Engineering Discipline).

TEXT BOOKS

[1] Mike Martin and Roland Schinzinger, "Ethics in engineering", McGraw Hill, New York (1996).

[2] Govindarajan M, Natarajan S, Senthil Kumar V. S., "Engineering Ethics", Prentice Hall of India, New Delhi(2004).

REFERENCE BOOKS

[1] Baum, R.J. and Flores, A., "Ethical Problems in Engineering, Center for the studyof the Human Dimensions of Science and Technology", Rensellae Polytechnic Institute,Troy, New York, 335 pp. eds. (1978)

[2] Beabout, G.R., Wennemann, D.J. , "Applied Professional Ethics: A Developmental Approach for Use with Case Studies", University Press of America Lanham, MD, 175 pp (1994).

17MA1201 LAPLACE TRANSFORMS AND INTEGRAL CALCULUS

Course Category:	Institutional Core	**Credits:**	4
Course Type:	Theory	**Lecture -Tutorial-Practice:**	3 - 2 - 0
Prerequisites:	Vectors, Curve Tracing.	**Continuous Evaluation:**	30
		Semester end Evaluation:	70
		Total Marks:	100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Solve Linear Differential Equations using Laplace Transforms.

CO2 Examine the nature of the Infinite series.

CO3 Evaluate areas and volumes using Double, Triple Integrals.

CO4 Convert Line Integrals to Area Integrals and Surface Integrals to Volume Integrals.

Contribution of Course Outcomes towards achievement of Program Outcomes
(L – Low, M - Medium, H – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1	**H**				**M**						**L**	
CO2	**H**				**M**						**L**	
CO3	**H**				**M**						**L**	
CO4	**H**				**M**						**L**	

COURSE CONTENT

UNIT I

Laplace Transforms: Introduction, Definition, Conditions for Existence, Transforms of Elementary functions, Properties of Laplace Transforms, Transforms of Periodic functions, Transforms of Derivatives,

Transforms of Integrals, Multiplication by t^n, Division by 't', Inverse Transforms, Method of partial fractions, Other methods of finding Inverse Transform, Convolution Theorem, Unit Step and Unit Impulse functions.

Applications: Evaluation of Improper Integrals, Solving Differential equations by Laplace Transform.

UNIT II

Partial Differential Equations: Introduction, Formation of Partial Differential Equations, Solutions of a Partial Differential Equations, Equations Solvable by Direct Integration, Linear Equations of First Order. **Sequence and Series**: Convergence of series, Comparison test, Integral test, D'Alembert's Ratio test, Cauchy's Root Test, Alternating series test, Absolute and Conditional convergence.

UNIT III

Integral Calculus: Double Integrals, Change of Order of Integration, Double Integrals in Polar Coordinates, Triple Integrals, Change of Variables. **Applications:** Area enclosed by Plane Curves, Volumes of Solids.

Special Functions: Beta Function, Gamma Function, Relation between Beta and Gamma Function, Error Function.

UNIT IV

Vector Calculus: Scalar and Vector point functions, Del applied to Scalar point functions, Del applied to Vector point functions, Physical interpretation of Divergence, Del applied twice to point functions, Del applied to products of point functions. Integration of Vectors, Line Integral, Surface Integral, Green's Theorem in a plane, Stokes's Theorem, Volume Integral, Gauss Divergence Theorem, Irrotational Fields.

TEXT BOOKS

[1] B.S.Grewal, "Higher Engineering Mathematics, Khanna Publishers", 43rd Edition, 2014.

REFERENCE BOOKS

[1].Erwin Kreyszig , "Advanced Engineering Mathematics" , John Wiley & Sons, 10th Edition,2015

[2].B.V.Ramana, "Higher Engineering Mathematics", Tata MC Graw Hill, 1st Edition,2007

[3].N.P.Bali, Dr.Manish Goyal, "A Text Book of Engineering Mathematics", Laxmi Publications, 9th Edition,2014

E-RESOURCES AND OTHER DIGITAL MATERIAL

[1]. www.nptel videos.com/mathematics/ (Math Lectures from MIT,Stanford,IIT'S)

[2]. nptel.ac.in/courses/122104017

[3]. nptel.ac.in/courses/111105035

[4]. Engineering Mathematics Open Learning Project. www.3.ul.ie/~mlc/support/Loughborough%20website/

17PH1102 /17PH1202 PHYSICS FOR ENGINEERS

Course Category:	**Institutional Core**	**Credits:**	**3**
Course Type:	**Theory**	**Lecture -Tutorial-Practice:**	**3 - 0 - 0**
Prerequisites:		**Continuous Evaluation:**	**30**
		Semester end Evaluation:	**70**
		Total Marks:	**100**

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1	Analyse and understand various types of crystal structures and their characterization.
CO2	Understand various concepts of acoustics and thermal performance.
CO3	Understand the classification, properties, preparation and applications of various engineering materials.
CO4	Understand the fabrication of nanomaterials and carbon Nanotubes.

Contribution of Course Outcomes towards achievement of Program Outcomes (L – Low, M - Medium, H – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1	**H**	**L**										
CO2	**H**		**M**									
CO3	**H**		**M**									
CO4	**H**		**L**									

COURSE CONTENT

UNIT – I

Crystallography: Introduction, Fundamental terms of crystallography, Types of crystals: Bravais lattices, Miller indices; Relation between inter planar distance and inter atomic distance, Crystal structures of materials: SC, BCC, FCC.

Characterization of materials: Introduction, diffraction of X-rays (Derivation for Bragg's law, Bragg's X-ray spectrometer), Determination of crystal structure by Powder crystal method.

UNIT – II

Acoustics: Introduction, Classification of sound, Sound absorption: Absorption coefficient, Sabine's formula for reverberation time and its limitations, Factors effecting acoustics of building and their remedies and acoustic design of a hall.

Thermal Performance: Heat transfer through fenestrations, thermal insulation and its benefits- heat gain and

heat loss estimation- factors affecting the thermal performance of buildings, thermal measurements, thermal comfort, indices of thermal comfort, climate and design of solar radiation, shading devices-central heating.

UNIT – III

Engineering Materials: Composite materials: Introduction, classification, processing technique for composite materials (Fiber reinforced) and applications.

Ceramics: Introduction, classification, ceramic fabrication (Isostatic pressing) and applications.

Dielectric Materials: Fundamental definitions, Types of Polarization: Electronic and Ionic polarizations, ferroelectric materials and their applications.

Shape memory alloys: Introduction, properties, commercial shape memory alloys (Ni-Ti and copper based alloys) and applications.

UNIT- IV

Nanotechnology: Basic concepts of Nanotechnology, Nano scale, Introduction to nano materials, Surface to volume ratio, General Properties of Nano materials, Fabrication of nano materials: Plasma Arcing, Chemical vapour deposition, Characterization of nano materials: SEM, TEM. Carbon nano tubes: SWNT, MWNT, Formation of carbon nanotubes: Arc discharge, Laser ablation, Properties of carbon nano tubes, Applications of CNT's & Nanotechnology.

TEXT BOOKS

[1]. V. Rajendran, Materials science, Mc Graw Hill Publications, 4th Edition, 2014.

[2]. M.N. Avadhanulu & P.G. Kshirsagar, Engineering Physics, S. Chand publications, Revised Edition, 2014.

REFERENCE BOOKS

[1]. S.O. Pillai, "Solid State Physics", New age international publishers, 7th Edition, 2015.

[2]. M.R. Srinivasan, "Engineering Physics", New age international publishers, First Edition, 2011.

[3]. Severns, W.H. & Fellows, J.R., "Air Conditioning and Refrigeration", John Wiley and sons, London, 1988. (Unit-I).

E-RESOURCES AND OTHER DIGITAL MATERIAL

1. http://nptel.ac.in/courses/112106227/
2. https://ocw.mit.edu/courses/materials-science-and-engineering/3-60-symmetry-structure-and-tensor-properties-of-materials-fall-2005/video-lectures/introduction-to-crystallography-part-1/
3. https://architecture.mit.edu/subject/spring-2014-4431
4. http://freevideolectures.com/Course/3048/Physics-of-Materials/36
5. https://www.peterindia.net/NanoTechnologyResources.html

17CS1203 PROGRAMMING IN C

Course Category:	Institutional Core	**Credits:**	3
Course Type:	Theory	**Lecture -Tutorial-Practice:**	2 -2 – 0
Prerequisites:	Problem Solving Methods	**Continuous Evaluation:**	30
		Semester end Evaluation:	70
		Total Marks:	100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the fundamentals and structure of a C programming language

CO2 Apply the loops, arrays, functions and string concepts in C to solve the given problem.

CO3 Apply the pointers and text input output files concept to find the solution for the given applications.

CO4 Use the Enumerated, Datatypes, Structures and Unions.

Contribution of Course Outcomes towards achievement of Program Outcomes
(L – Low, M - Medium, H – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1	**M**		**L**					**L**				
CO2	**M**		**L**					**L**				
CO3	**H**		**L**					**L**			**L**	
CO4	**H**		**L**					**L**			**L**	

COURSE CONTENT

UNIT - I

Introduction to the C Language : Background, C Programs, Identifiers, Types, Variables, Constants, Input/Output, Programming Examples.

Structure of a C Program: Expressions, Precedence and Associatively, Evaluating Expressions, Type

Conversion, Statements, Sample Programs.

Selection: Storage Class,Logical Data and Operators, Two -Way Selection, Multiway Selection, More Standard Functions

UNIT - II

Repetition: Concept of a Loop Loops In C, Loop Examples, Recursion, The Calculator Program.

Arrays: Concepts, Using Array in C, Inter-Function Communication, Array Applications, Two Dimensional Arrays, Multidimensional Arrays.

Functions: Functions in C, User Defined Functions, Inter Function Communication, Standard Functions, Scope.

Strings: String Concepts, C Strings, String Input/Output Functions, Arrays of Strings, String Manipulation Functions, String- Data Conversion.

UNIT - III:

Pointers: Introduction, Pointers For Inter Function Communications, Pointers to Pointers, Compatibility, Lvalue and Rvlaue.

Pointer Applications: Arrays and Pointers, Pointer Arithmetic and Arrays, Passing an Array to a Function, Memory Allocations Functions, Array of Pointers.

Text Input/output: Files, Streams, Standard Library Input/Output Functions, Formatting Input/output Functions and Character Input/Output Functions, Command-Line Arguments.

UNIT - IV:

Enumerations: The Type Definition(Typedef) , Enumerated Types: Declaring an Enumerated Type , Operations on Enumerated Types, Enumeration Type Conversion, Initializing Enumerated Constants, Anonymous Enumeration: Constants, Input/Output Operators.

Structures: Structure Type Declaration, Initialization, Accessing Structures, Operations on Structures, Complex Structures, Structures and Functions, Sending the Whole Structure, Passing Structures through Pointers.

Unions: Referencing Unions, Initializers, Unions and Structures, Internet Address, Programming Applications.

TEXT BOOKS

[1] Behrouz A. Forouzan & Richard F. Gilberg , "Computer Science A Structured Programming Approach using C" , CENGAGE Learning, Third Edition.

REFERENCE BOOKS

[1] Kernighan and Ritchie , "The C programming language" , The (Ansi C Version), PHI, second edition.

[2] Yashwant Kanetkar , "Let us C" , BPB Publications, 2nd Edition 2001.

[3] Paul J. Dietel and Dr. Harvey M. Deitel, "C: How to Program", Prentice Hall ,7th edition (March 4,2012).

[4] Herbert Schildt, "C:The Complete reference", McGraw Hill, 4th Edition, 2002.

[5] K.R.Venugopal, Sundeep R Prasad, "Mastering C", McGraw Hill, 2nd Edition, 2015

17ME1204 ENGINEERING MECHANICS – II

Course Category:	Engineering Sciences	**Credits:**	3
Course Type:	Theory	**Lecture -Tutorial-Practice:**	2 -2 - 0
Prerequisites:	Basic Mathematics, Physical Science, Engineering Mechanics-I (Statics)	**Continuous Evaluation:**	30
		Semester end Evaluation:	70
		Total Marks:	100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Analyze the rectilinear motion of particles.

CO2 Analyze the curvilinear motion of particles.

CO3 Evaluate the moment of inertia of areas and material bodies.

CO4 Analyze the motion of rigid bodies.

Contribution of Course Outcomes towards achievement of Program Outcomes (L – Low, M - Medium, H – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l	PSO I	PSO II
CO1	**H**				**M**									**M**
CO2	**H**				**M**									**M**
CO3	**H**				**M**									**M**
CO4	**M**				**H**									**H**

COURSE CONTENT

UNIT – I

Kinematics of Rectilinear Translation: Introduction, displacement, velocity and acceleration. Motion with Uniform and Variable acceleration.

Kinetics of Rectilinear Translation: Equations of rectilinear motion. Equations of Dynamic Equilibrium: D'Alembert's Principle. Work and Energy, Conservation of energy, Impulse and Momentum, Impact-Direct

central Impact.

UNIT – II

Kinematics of Curvilinear Motion: Introduction, rectangular components of velocity and acceleration. Normal and Tangential acceleration, Motion of projectiles.

Kinetics of Curvilinear Motion: D'Alembert's Principle, and Work and Energy in curvilinear motion.

UNIT –III

Moment of Inertia of Plane Figures: Moment of Inertia of a plane figure with respect to an axis in its plane – Moment of inertia with respect to an axis perpendicular to the plane of the figure, Radius of gyration – Parallel axis theorem, MI of composite plane figures.

Moment of Inertia of Material Bodies: Moment of inertia of a rigid body – Moment of inertia of slender bar, laminas (2D), Radius of gyration, Parallel axis theorem, Moment of inertia of 3D bodies- cone, cylinder, sphere and parallelepiped.

UNIT – IV

Kinematics of Rigid Body:

Rotation: Linear and angular Velocity, linear and angular acceleration in uniformly accelerated rotation.

Plane motion: Concepts of relative velocity and Instantaneous center.

Kinetics of Rigid Body:

Rotation: Equation of motion for a rigid body rotating about a fixed axis – Rotation under the action of a constant moment.

TEXT BOOKS

[1] S. Timoshenko & D. H. Young , "Engineering Mechanics" , McGraw Hill International Edition. (For Concepts and symbolic Problems), 4th Edition, 2007.

[2] A. K. Tayal, "Engineering Mechanics Statics and dynamics" , Umesh Publication, Delhi, (For numerical Problems using S.I.System of Units),13th Edition, 2006.

REFERENCE BOOKS

[1] Beer and Johnston, "Vector Mechanics for Engineers Statics and Dynamics", Tata McGraw Hill, IIIrd edition 2010.

[2] SS Bhavikatti and KG Rajasekharappa, "Engineering Mechanics", New Age International Private Limited, IVth Edition 2012

[3] K.Vijaya Kumar Reddy and J Suresh Kumar, " Singer's Engineering Mechanics Statics and Dynamics", BS Publications, IIIrd Edition 2010.

E-RESOURCES AND OTHER DIGITAL MATERIAL

[1] http://emweb.unl.edu/, Accessed On 15-06-2017

17HS1105/ 17HS1205 TECHNICAL ENGLISH &COMMUNICATION SKILLS

Course Category:	Institutional Core	**Credits:**	3
Course Type:	Theory	**Lecture -Tutorial-Practice:**	2 - 0- 2
Prerequisites:	Basic understanding of the language skills ,viz Listening, Speaking, Reading and Writing, including Sentence construction abilities	**Continuous Evaluation:**	30
		Semester end Evaluation:	70
		Total Marks:	100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1	Develop administrative and professional compilations including web related(On-line) communication with felicity of expression
CO2	Demonstrate Proficiency in Interpersonal Communication, in addition to standard patterns of Pronunciation
CO3	Apply the elements of functional English with sustained understanding for authentic use of language in any given academic and/or professional environment
CO4	Execute tasks in Technical communication with competence

Contribution of Course Outcomes towards achievement of Program Outcomes
(L – Low, M - Medium, H – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1				**M**		**H**	**H**	**H**	**H**	**H**	**L**	**M**
CO2				**M**		**H**	**H**	**H**	**H**	**H**		**M**
CO3	**M**			**M**		**H**	**H**	**H**	**H**	**H**	**L**	**M**
CO4	**L**			**M**		**H**	**H**	**H**	**H**	**H**	**L**	**M**

COURSE CONTENT

UNIT I

Professional Writing Skills

- Professional Letter- Business, Complaint and Transmittal

- Essay Writing- Descriptive and Analytical
- Administrative and On-line drafting skills –Minutes and Web notes including e-mail

UNIT II

Interpersonal Communication Skills

- **Communicative Facet**- Speech acts- Extending Invitation, Reciprocation, Acceptance, Concurrence, Disagreeing without being disagreeable
- **Articulation-oriented Facet**- Transcription using International Phonetic Alphabet, Primary Stress

UNIT III

Vocabulary and Functional English

- Root words (A Representative collection of 50)
- A basic List of 500 words – Overview
- Verbal analogies, Confusables, Idiomatic expressions and Phrasal Collocations
- Exposure through Reading Comprehension- Skimming, Scanning and Understanding the textual patterns for tackling different kinds of questions
- Functional Grammar with special reference to Concord, Prepositions, use of Gerund and Parallelism

UNIT IV

Technical Communication skills:

- Technical Proposal writing
- Technical Vocabulary- a representative collection will be handled
- Introduction to Executive Summary
- Technical Report writing Informational Reports and Feasibility Report

TEXT BOOKS

[1] Martin Cutts, " Oxford guide to Plain English", Oxford University Press, 7th Impression 2011.
[2] TM Farhathullah, "Communication skills for Technical Students", Orient Longman, I Edition 2002
[3] John Langan, "College Writing Skills", McGraw Hill, IX Edition, 2014.
[4] "Eclectic Learning materials offered by the Department"

REFERENCE BOOKS

[1] Randolph Quirk, "Use of English", Longman, I Edition (1968) Reprinted 2004.
[2] Thomson A.J & A.V, Martinet, "Practical English Grammar", Oxford University Press, III Edition 2001
[3] V.Sethi and P.V. Dhamija, "A Course in Phonetics and Spoken English", PHI, II Edition 2006

E-RESOURCES AND OTHER DIGITAL MATERIAL

[1] https://www.britishcouncil.org/english *Accessed on 15th June 2017*
[2] www.natcorp.ox.ac.uk/Wkshops/Materials/specialising.xml?ID=online *Accessed on 15th June 2017*
[3] https://www.unimarburg.de/sprachenzentrum/selbstlernzentrum /.../apps_for_esl.pdf *Accessed on 15th June 2017*

17HS1106/17HS1206 TECHNOLOGY AND SOCIETY

Course Category:	Institutional Core	**Credits:**	1
Course Type:	Theory	**Lecture -Tutorial-Practice:**	1 - 0 – 0
Prerequisites:		**Continuous Evaluation:**	30
		Semester end Evaluation:	70
		Total Marks:	100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the origins of technology and its role in the history of human progress.

CO2 Know the Industrial Revolution and its impact on Society.

CO3 Interpret the developments in various fields of technology till Twentieth Century.

CO4 Distinguish the impacts of Technology on the Environment and achievements of great scientists.

Contribution of Course Outcomes towards achievement of Program Outcomes
(L – Low, M - Medium, H – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1	**H**								**L**			
CO2	**H**							**M**				
CO3	**H**								**L**			
CO4	**H**							**M**				

COURSE CONTENT

UNIT – I

Introduction: Origins of technology, The Agriculture revolution, Technological contributions of ancient civilizations- Mesopotamian, Egyptians, Greeks, Romans, Indians and Chinese.

UNIT - II

Industrial revolution: The social and political background, The technical background, Steam: The power behind the Industrial Revolution, The revolution in Textile Industry, The Impact of Industrial Revolution on Society.

UNIT - III

The Flowering of modern technology: Manufacturing Technologies, Prime Movers, Internal Combustion engines, Production of Metals and Alloys, The Birth of Electrical Technology, Twentieth Century: The Flowering of modern technology

UNIT - IV

Technology, Science and Society: Impact of technology on society, The Impacts of Technology on the environment, Sustainable development.

Achievements of famous scientists:

(**World**): Einestein, Newton, Faraday, Graham Bell, Edison, S.Hawking.

(**India**): CV Raman, S.Chandrasekhar, Aryabhatta, Homi J Bhabha, Vikram Sarabhai, APJ Abdulkalam, S.Ramanujan, M.Visweswarayya.

TEXT BOOKS

[1] Dr. R.V.G Menon, “Technology and Society”, Pearson Education, 2011

REFERENCE BOOKS

[1] Quan-Haase, A., “ Technology and Society: Inequality, Power, and Social Networks”, Oxford University Press, 2013.

17PH1151 /17PH1251 ENGINEERING PHYSICS LABORATORY

Course Category:	Institutional Core	**Credits:**	1.5
Course Type:	Lab	**Lecture -Tutorial-Practice:**	0 - 0 - 3
Prerequisites:		**Continuous Evaluation:**	30
		Semester end Evaluation:	70
		Total Marks:	100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1	Analyse and understand various types of crystal structures and their characterization.
CO2	Understand various concepts of acoustics and thermal performance.
CO3	Understand the classification, properties, preparation and applications of various engineering materials.

Contribution of Course Outcomes towards achievement of Program Outcomes (L – Low, M - Medium, H – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1		**H**	**L**								**M**	
CO2		**H**	**L**									
CO3		**H**	**L**									

COURSE CONTENT

1. Melde's apparatus- Determine the frequency of tuning fork
2. Wedge method- Measurement of thickness of a foil
3. Variation of magnetic field along the axis of current-carrying circular coil
4. Fibre Optics- Determination of Numerical aperture
5. Photo cell-Study of V-I Characteristics, determination of work function
6. Solar cell –Determination of Fill Factor
7. Torsional Pendulum-Determination of Rigidity modulus
8. Determination of Dielectric constant of a sample
9. Diffraction grating-Measurement of wavelength of mercury source
10. Hall effect –Hall coefficient measurement
11. Compound pendulum-Determination of 'g'
12. Figure of merit of a galvanometer

TEXT BOOKS

[1] Madhusudhan Rao, "Engineering Physics Lab Manual", Ist ed., Scitech Publications, 2015
[2] Ramarao Sri, Choudary Nityanand and Prasad Daruka, "Lab Manual of Engineering Physics"., Vth ed., Excell Books, 2010

E-RESOURCES

[1] http://plato.stanford.edu/entries/physics-experiment
[2] http://www.physicsclassroom.com/The-Laboratory
[3] http://facstaff.cbu.edu/~jvarrian/physlabs.html

VIRTUAL LAB REFERENCES

[1] http://vlab.amrita.edu/?sub=1&brch=201&sim=366&cnt=1
[2] http://vlab.amrita.edu/?sub=1&brch=195&sim=840&cnt=1
[3] http://vlab.amrita.edu/?sub=1&brch=282&sim=879&cnt=1

17CS1252 COMPUTER PROGRAMMING LABORATORY

Course Category:	Institutional Core	**Credits:**	1.5
Course Type:	Laboratory	**Lecture -Tutorial-Practice:**	0 - 0 – 3
Prerequisites:		**Continuous Evaluation:**	30
		Semester end Evaluation:	70
		Total Marks:	100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Implement the use of programming constructs in a structured oriented programming language

CO2 Implement conditional and iterative statements through C Language

CO3 Analyze and implement user defined functions to solve real time problems

CO4 Implement the usage of pointers and file operations on data

CO5 Implement the user defined data types via structures and unions to solve real life problems

Contribution of Course Outcomes towards achievement of Program Outcomes
(L – Low, M – Medium, H – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1	**H**											
CO2	**L**											
CO3	**M**							**L**	**M**		**M**	
CO4	**M**								**M**		**L**	
CO5	**H**								**M**		**L**	

COURSE CONTENT

CYCLE – I : PROGRAMMING CONSTRUCTS AND CONTROL STRUCTURES

1. Introduction to C Programming:
   a) Use of Turbo C IDE

b) The Structure of C Program with Sample program

2. Data Types and Variables:

a) Programs to usage of keywords and identifiers in c

b) Programs on declaration of variables, rules for naming a variable, constants and different type of constants, data types

c) Programs to perform on various operators in C

3. Branching and Selection:

a) To specify the conditions under which a statement or group of statements should be executed.

b) To choose exactly one out of two statements (possibly compound statements) to be executed; specifies the conditions under which the first statement is to be executed and provides an alternative statement to execute if these conditions are not met.

c) To choose one statement (possibly compound) to be executed from among a group of statements (possibly compound); specifies the conditions under which each statement may be executed and may contain a default statement (in an else clause at the end) to be executed if none of these conditions are met. Note that in the absence of a final else clause, it may be the case that none of the statements are executed.

4. Unconditional control Transfer statements in C:

a) Design and develop programs that use of goto Statement

b) Design and develop programs that the use of Break Statement

c) Design and develop programs that use of Continue Statement

5. Looping constructs:

Design and develop programs based on

a) Iterative loops using While, Do While, For, Nested For

b) Selection Statement using the switch-case Statement

c) Multiple way selections that will branch into different code segments based on the value of a variable or expression

6. Arrays

a) Design and develop programs which illustrates the implementation of single-dimensional arrays and Multi dimensional arrays

7. Strings

a) Create programs to initialize strings and usage of them for various input, output operations.

b) Design and develop programs to handle String functions

CYCLE - II: ADVANCED PROGRAMMING CONSTRUCTS

1.Concept of user defined functions

a) Design and develop programs depending on functions both user defined and standard library functions in C with different approaches.

2. File handling operations

a) FILE structure

b) Opening and closing a file, file open modes

c) Reading and writing operations performed on a file

d) File Pointers: stdin, stdout and stderr

e) FILE handling functions: fgetc(), fputc(), fgets() and fputs() Functions

3. Pointers:

a) Programs on declaration of pointers and their usage in C

b) Programs to relate between arrays and pointers and use them efficiently in a program

c) To pass pointers as an argument to a function, and use it efficiently in program

4. Command Line Arguments

a) Design and develop programs that accept arguments from command line to perform different kinds of operations

5. Structures and Unions

a) Programs to define, declare and access structure and union variables

b) Design and develop programs to work with pointers to access data within a structure

Programs to pass structure as an argument to a function

TEXT BOOKS

[1] Ashok N Kamthane, "C And Data Structures", Pearson Education; First edition, 2008

REFERENCE BOOKS

[1] Brain W Kernighan and Dennis Ritchie, "The C Programming language", Pearson Education India,2015

[2] David Griffiths and Dawn Griffiths, "Head First C":A Brain Friendly Guide, O:Reilly media, 2012

E-RESOURCES AND OTHER DIGITAL MATERIAL

[1] Introduction to Programming C: http://nptel.ac.in/courses/106104128/

[2] C-Programming - IIT Kharagpur lectures https://www.youtube.com/watch?v=S47aSEqm_0I&list=PLeCxvb23g7hrw27XlekHtfygUTQ0TmFfP

[3] Numerical Methods and Programing by Prof.P.B.Sunil Kumar, Department of Physics, IIT Madras https://www.youtube.com/watch?v=zjyR9e-N1D4& list=PLC5DC6AD60D798FB7

17ME1153/17ME1253 BASIC WORKSHOP

Course Category:	Engineering Sciences	**Credits:**	1.5
Course Type:	Laboratory	**Lecture -Tutorial-Practice:**	0 - 0 - 3
Prerequisites:		**Continuous Evaluation:**	30
		Semester end Evaluation:	70
		Total Marks:	100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Prepare basic models using wood and familiarize with various fundamental aspects of house wiring.

CO2 Prepare basic models using sheet metal and practice joining of metals using arc welding technique.

CO3 Familiarize with various manufacturing processes such as lathe operations, injection moulding and 3Dprinting

CO4 understand the preparation of PCB

CO5 understand simple IOT Applications using Arduino

Contribution of Course Outcomes towards achievement of Program Outcomes (L – Low, M - Medium, H – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1			**M**					**L**			**H**	**M**
CO2			**M**					**L**			**H**	**M**
CO3			**M**					**L**			**H**	**M**
CO4						**L**						
CO5							**M**					

COURSE CONTENT

Part-A **(9 Sessions)**

Carpentry:

a. . Preparation of Cross half lap joint and use of power tools.

b. b. Preparation of a T joint.

House Wiring:

a. Fundamentals of house wiring and practice of Series wiring.

b. Practice of stair case wiring and connecting a fluorescent Tube.

Sheet metal & soldering:

a. Preparation of complete funnel using sheet metal and practice of soldering.

b. Preparation of a square box using sheet metal and practice of soldering.

Welding:

a. Preparation of Corner Joint using arc welding process.

b. Preparation of "T" joint using arc welding process.

Manufacturing processes:

a. Demonstration of Green sand moulding process.

b. Demonstration of various operations on a lathe machine.

c. Preparation of a small plastic part using injection moulding process.

d. Demonstration of manufacturing a simple model using 3D printing process.

Part-B

Electronic Circuits :

1. **To prepare PCB for the given electronic circuit**

a. To prepare the layout and printing it on copper clad board

b. To etch and drill the holes on PCB

2. **To solder the components on the PCB prepared and test the circuit**

a. To identify and solder the components on the PCB prepared

b. To test the operation of the circuit.

Basic IOT:

1. **Demonstration of Arduino board**

a. Demonstrate different components & pin configuration of Arduino

b. To set up Arduino IDE for programming.

2. **To measure Temperature & Humidity**

a. Interfacing of temperature & humidity sensor with Arduino.

b. Execute the program on Arduino IDE & display the measured values.

3. **To measure Distance**

a. Interfacing of Ultrasonic Sensor with Arduino

b. Execute the program on Arduino IDE & display the measured value.

TEXT BOOKS

[1] Kannaiah P. & Narayana K. C., "Manual on Workshop Practice", Scitech Publications, Chennai, 1999.

[2] Venkatachalapathy, V. S., "First year Engineering Workshop Practice", Ramalinga Publications, Madurai, 1999.

REFERENCE BOOKS

[1] Gopal, T.V., Kumar, T., and Murali, G., "A first course on workshop practice – Theory, Practice and Work Book", Suma Publications, Chennai, 2005

E-resources and other digital material:

1. https://dsceme.files.wordpress.com/2016/08/workshop-practice-manual-2016-17- 1.pdf
2. https://www.protosystech.com/rapid-prototyping.htm
3. https://www.arduino.cc/en/Tutorial/Foundations
4. https://www.tutorialspoint.com/arduino/

17MA1301/D MATHEMATICS FOR MECHANICAL ENGINEERS

Course Category: Programme Core **Credits**: 4

Course Type : Theory **Lecture/Tutorial/ Practice**: 3 /1/ 0

Prerequisites: **Continuous Evaluation**: 30

Algebra of Complex numbers, **Semester end Evaluation**:70

convergence of infinite series, **Total Marks:**100

Basic concepts of probability & statistics

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1: Determine analytic, non-analytic functions and evaluate complex integrals

CO2: Analyze Taylor, Laurent series and evaluate real definite integrals using residue theorem.

CO3: Solve Algebraic and transcendental, system of equations and understand the concept of polynomial interpolation.

CO4: Understand the concept of Normal distribution, sampling distribution and estimate correlation, regression coefficients.

Contribution of Course Outcomes towards achievement of Program Outcomes

PO	a	b	c	d	e	f	g	h	i	j	k	l	PSO I	PSO II
CO1	H	L			M								L	L
CO2	H	L			M								M	M
CO3	H	L			M						L		M	M
CO4	H	M			M						L		M	M

(L-Low, M-Medium, H-High)

UNIT I:

Complex Analysis: Introduction, continuity, Cauchy-Riemann equations. Analytic functions, Harmonic functions, Orthogonal systems, Application to Flow Problems, Complex integration, Cauchy's integral theorem, Cauchy's integral formula

UNIT II:

Taylor's series, Laurent's series, Zeros and singularities. Residue theorem, calculation of residues, evaluation of real definite integrals (by applying the residue theorem).

Standard transformations: Translation - Magnification and Rotation – Inversion and reflection - Bilinear transformation.

UNIT III:

Numerical Methods: Solution of Algebraic and Transcendental Equations: Introduction, Newton - Raphson method, Solution of simultaneous linear equations: Gauss Elimination Method, Gauss - Seidel iterative method.

Interpolation: Introduction, Finite Differences – Forward, Backward, Central Differences, Symbolic Relations, Differences of a polynomial, Missing terms, Newton's formulae for interpolation, Central difference interpolation formulae –Gauss's, Sterling's, Bessel's formulae Interpolation with unequal intervals – Lagrange's and Newton's Interpolation formulae.

UNIT – IV

Probability Densities: Continuous random variables – Normal distribution.

Sampling Distributions: Populations and samples – Sampling distribution of the mean (SD known) – Sampling distribution of the mean (SD unknown) – Sampling distribution of the variance.

Statistics: Method of Least Squares – correlation – Regression.

Text Book:

[1] B.S.Grewal, "Higher Engineering Mathematics", 43rd Edition Khanna Publishers, 2014.
[2] Richard A.Johnson, " Probability and statistics for Engineers"–Prentice Hall of India.

Reference Books:

[1] Krezig, "Advanced Engineering Mathematics", 8th Edition, JohnWiley & Sons.2007,
[2] R.K.Jain and S.R.K.Iyengar, "Advanced Engineering Mathematics", 3rd Edition, Narosa Publishers.
[3] N.P.Bali, Manish Goyal, "A Text book of Engineering Mathematics", 1st Edition, Lakshmi Publications (P) Limited, 2011
[4] H.K.Das, Er. RajnishVerma, "Higher Engineering Mathematics", 1st Edition, S.Chand& Co., 2011.
[5]Rukmangadachari E, "Probability and Statistics", Pearson, 2012

E-resources and other digital material:

[1] faculty.gvsu.edu/fishbacp/complex/complex.html.
[2] nptelvideolectures/iitm.ac.in

17ME3302 MECHANICS OF MATERIALS

Course Category: Programme Core **Credits**: 4

Course Type : Theory **Lecture/Tutorial/ Practice**: 3 /1/ 0

Prerequisites: **Continuous Evaluation**: 30

17ME1104A Engineering Mechanics - I **Semester end Evaluation**:70

17ME1204 Engineering Mechanics - II **Total Marks:**100

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1: Understand stress-strain concepts and analyze axially loaded members.

CO2: Illustrate and analyze the structures subjected to bending & torsion.

CO3: Determine deflections of beams and safe load on columns.

CO4: Analyse plane stress problems.

Contribution of Course Outcomes towards achievement of Program Outcomes

PO	a	b	c	d	e	f	g	h	i	k	j	k	PSO I	PSO II
CO1	H		L		L									M
CO2	M		L		H									M
CO3	M		L		H									M
CO4	M		L		H									M

(L-Low, M-Medium, H-High)

UNIT - I

TENSION, COMPRESSION AND SHEAR : Introduction, Concepts of Normal Stress and Strain, Stress-Strain Diagrams, Elasticity and Plasticity, Linear Elasticity and Hooke's Law, Poisson's Ratio, Shear Stress and Strain, Allowable Stresses and Allowable Loads. Numerical problems on Change in lengths of axially loaded members. Change in lengths under Non-uniform conditions.

TORSION: Introduction, Torsional deformations of Circular Bar, Circular bars of linearly elastic materials, Relationship between Moduli of Elasticity E and G.

UNIT - II

STATICALLY DETERMINATE BEAMS : Introduction, Types of Beams, Loads and Reactions, Shear Force and Bending Moments, Relationships between Load, Shear Force and Bending Moment, Shear Force and Bending Moment Diagrams

STRESSES IN STATICALLY DETERMINATE BEAMS: Introduction, Normal Stresses in Beams, Shear Stresses in Beams of Rectangular cross section.

UNIT – III

DEFLECTIONS OF STATICALLY DETERMINATE BEAMS: Introduction, Differential Equations of the Deflection Curve, Deflections by Integration of the Bending Moment Equation, Macaulay's Method.

COLUMNS: Introduction, Buckling and Stability, Columns with Pinned ends, Columns with other support conditions, Limitations of Euler's Formula, Rankine's Formula.

UNIT – IV

ANALYSIS OF PLANE STRESS: Introduction, Plane Stress, Principal Stresses and Maximum Shear Stress. Mohr's Circle for Plane Stress, Hooke's Law for Plane Stress.

THIN CYLINDRICAL AND SPHERICAL PRESSURE VESSELS: Introduction, Stresses in thin cylindrical and spherical pressure vessels subjected to internal pressure. Effect of internal pressure on the dimensions of the thin cylindrical and spherical pressure vessels.

Text Books:

[1] James M. Gere and Barry J. Goodno, "Mechanics of Materials", Seventh edition, CENGAGE Learning, 2009

[2] R.K.Bansal, "Strength of Materials" Fifth edition, Laxmi Publishers, 2012

Reference books:

[1] Dr. Sadhu Singh,"Strength of Materials", Ninth edition, Khanna Publishers, 2007.

[2] R.K. Rajput,"Strength of Materials",First Edition, S.Chand & Company, 2006.

[3] S.S.Rattan, "Strength of Materials", Second Edition,Tata McGraw Hill Education Private Limited, 2012.

E-resources and other digital material:

[1] Prof. M.S. Sivakumar, IIT Madras, Strength of material, [English], Web
Available: http://nptel.ac.in/courses/112106141/

[2] Dr. Satish C Sharma, IIT Roorkee, Strength of material, [English], Web
Available: http://nptel.ac.in/courses/112107146/

[3] Dr. S. P. Harsha, IIT Roorkee, Strength of material, [English], Video
Available: http://nptel.ac.in/courses/112107147/

17ME3303 BASIC THERMODYNAMICS

Course Category : Programme Core **Credits:** 4

Course Type : Theory **Lecture/Tutorial/Practice:** 3/1/0

Prerequisites : **Continuous Evaluation:** 30

Semester End Evaluation: 70

Total Marks: 100

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1: Understand the basic concepts of thermodynamics and differentiate between work and heat forms of energy.

CO2: Apply mass and energy balance equations for open and closed thermodynamic systems.

CO3: Understand the second law of thermodynamics and the concept of entropy, exergy and irreversibility.

CO4: Evaluate the properties of steam and analyze Rankine steam power cycle.

Contribution of Course Outcomes towards achievement of Program Outcomes

PO	a	b	c	d	e	f	g	h	i	j	k	l	PSO I	PSO II
CO 1	H		L		M								M	
CO 2	M		H		H								M	
CO 3	M		M		H								M	
CO 4	M		M		H								M	

UNIT I:

FUNDAMENTAL CONCEPTS AND DEFINITIONS:

Thermodynamic system and control volume, Macroscopic and microscopic points of view, properties and state of a substance, Thermodynamic equilibrium and Quasistatic Process, thermodynamic path, cycle, Zerothlaw, concept of temperature, Perfect gases. Equation of a state for perfect gas

WORK AND HEAT: Definition of work, units, work done at the moving boundary of a system, work done in various non-flow processes, definition of heat, units, heat transfer in various processes**,** comparison of heat and work.

UNIT II:

FIRST LAW FOR NON-FLOW SYSTEMS: First law of thermodynamics for a system undergoing a cycle and for a change in state of system, internal energy and enthalpy, constant volume and constant pressure specific heats and their relation to internal energy and enthalpy of ideal gases.

FIRST LAW FOR FLOW SYSTEMS: Control mass and control volume, first law of thermodynamics for a control volume, steady state steady flow energy equation and application to engineering equipment.

UNIT III:

SECOND LAW OF THERMODYNAMICS: Limitations of First law of thermodynamics, Heat engines and Refrigerators, Statements of Second law of Thermodynamics, Carnot cycle and the two propositions regarding the efficiency of Carnot cycle, Thermodynamic temperature scale, processes-reversible and irreversible, factors that render a process irreversible

ENTROPY: Inequality of Clausius, Entropy change in reversible process, T-ds relations, Maxwell relations, Entropy change of a system during an irreversible process, Principle of increase of entropy, Entropy change of an ideal gas, Concepts of Exergy, and irreversibility

UNIT IV:

PURE SUBSTANCES: p-v, p-T, T-s and h-s diagrams for a pure substance, Triple point, Critical point, Dryness fraction, Steam tables, problems using steam tables and Mollier chart.

VAPOUR AND AIR POWER CYCLES: Rankine cycle, reheat cycle, regenerative cycle, Otto cycle, Diesel cycle, Dual cycle, Comparison of Otto and Diesel cycles.

TextBooks:

[1] P.K.Nag,"Engineering Thermodynamics" 6th edition,Tata Mc Graw Hill Education Private Limited,2017.
[2] Yunus A.Cengel M. and Michael A.Boles," Thermodynamics – An Engineering Approach", 8th edition,McGrawHillEducation(India)PrivateLimited,2014.

Reference Books:

[1] G.J.Van Wylen& Sonntag, "Fundamentals of Classical Thermodynamics", 4th Edition, Wiley publication 2005.
[2] Mahesh M. Rathore "Thermal Engineering" Mc Graw-Hill education,2010

e- Resources:

[1] www.learnthermo.com/tutorials.php
[2] www.khanacademy.org/science/physics/thermodynamics
[3] www.courseera.org/learn/thermodynamics-intro
[4] www.edx.org/course/thermodynamics-iitbombayx-me209-1x-1
[5] http://nptel.ac.in/courses/112106141
[6] http://nptel.ac.in/courses/112108148

Note: Steam tables are permitted in internal and external examinations

17ME 3304 MANUFACTURING PROCESSES

Course Category : Programme Core **Credits:** 3

Course Type : Theory **Lecture/Tutorial/Practice:** 3/0/0

Prerequisites : **Continuous Evaluation:** 30

17PH1102/1202 Engineering Physics **Semester End Evaluation:** 70

17ME1204 Engineering Mecahnics- II **Total Marks:** 100

17ME1105 Engg. Graphics

Course Outcomes:

Upon successful Completion of the course, the student will be able to:

CO1: Understand the Technology of the casting processes.

CO2: Distinguish various casting methods and their applications.

CO3: Illustrate various joining processes with applications.

CO4: Understand various bulk Metal forming and sheet metal processes.

Contribution of Course Outcomes towards achievement of Program Outcomes

PO	a	b	c	d	e	f	g	h	i	j	k	l	PSO I	PSO II
CO 1	H		H		H									L
CO 2	H		L		L									L
CO 3	H		L		L									L
CO 4	H		H		H									L

(L-Low, M-Medium, H-High)

UNIT I

Metal casting processes:

Introduction to Manufacturing Processes - Selecting manufacturing processes, General method in making a Casting, pattern: types, materials and allowances. Molding materials, equipment, Preparation, control and testing of molding sands. Types of Cores, Fundamentals of Gating system design, Functions of Risers, types of risers.

Cupola Furnace: Description, operation and zones, Electric furnace - Arc

UNIT II:

Special casting methods: Permanent Mold Casting, Die Casting: Hot chamber die casting- Cold chamber die casting, Centrifugal casting: True centrifugal casting, Semi-centrifugal casting and Centrifuging.

Investment casting - Shell Mold Casting - CO2 Process and Continuous casting, Thermocol Pattern casting. Casting defects: causes, remedies and testing.

UNIT III:

Welding:

Gas welding Processes: Principles of oxy-acetylene gas welding,
Arc welding: TIG – MIG - Submerged, arc length, arc blow, duty cycle.
Resistance welding: Principles of resistance welding- types- Butt welding - Spot welding -Seam welding.

Special welding Processes: Thermit Welding -Electro slag welding- Laser beam welding. Under water welding. Welding defects, causes and remedies, Weld design-simple problems. Brazing & Soldering

UNIT IV :

Bulk Metal forming processes: Introduction, Hot and Cold working of metals - Rolling- Forging- Extrusion -Tube making, and Wire drawing.
High Energy Rate Forming Processes: Explosive Forming – Electro Hydraulic
Forming – Electro Magnetic Forming.

Sheet metal working operations: Introduction, Sheet metal Blanking - Punching operations. Clearance and shear as applied to Punching/Blanking operations. Simple related problems. Elastic recovery in bending operation.

Text Books:

[1] Manufacturing Technology by PN RaoVol.1,Edition-3,2009, TMH
[2] Principles of Metal Casting by Heine, Loper, Rosenthal.33rd Reprint,2008,TMH
[3] A course in Work shop technology Vol-I by V.S.Raghuwamshi, 2007, Dhanpatrai & sons.
[4] Mechanical Metallurgy by George. E. Dieter, SI Metric Edition 2000, McGraw Hills.

Reference Books:

[1] Welding and welding Technology by Richard L.Little,1973, Mc Graw Hill
[2] Workshop Technology Vol.1 by S.K.Hazra Chowdary. Khanna publishers.

E-resources and other digital material

[1] http://nptel.iitm.ac.in
[2] http://www.egr.msu.edu
[3] http://www.engr.sjsu.edu
[4] http://mechatronic.me.hfu.edu.tw
[5] http://web.iitd.ac.in

17ME3305 KINEMATICS OF MACHINES

Course Category : Programme Core **Credits:** 3

Course Type : Theory **Lecture/Tutorial/Practice:** 3/0/0

Prerequisites : **Continuous Evaluation:** 30

17ME1104A Engineering Mecahnics- I **Semester End Evaluation:** 70

17ME1204 Engineering Mecahnics- II **Total Marks:** 100

17ME1105 Engg. Graphics

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1: Illustrate the principle of mechanisms.

CO2: Evaluate velocity and acceleration of linkages

CO3: Develop profile & Estimate velocity and acceleration of cams

CO4: Understand the principle of gear design and solve gear train problems

Contribution of Course Outcomes towards achievement of Program Outcomes

PO	a	b	c	d	e	f	g	h	i	j	k	l	PSO I	PSO II
CO 1	H		M		L									L
CO 2	L		M		H									M
CO 3	M		H		M									M
CO 4	M		M		H									M

(L-Low, M-Medium, H-High)

UNIT - I

INTRODUCTION : Mechanisms and machines, Rigid and resistant bodies, Link, Kinematic pair, Types of joints, Constrained motions, Degrees of Freedom, Classifications of Kinematic pairs, kinematic-chain, Linkage, mechanism and structure, Classification of mechanisms, Inversions of Mechanism- Four - Link (bar) chain, Single Slider - Crank Chain, Double – Slider Crank Chain.

UNIT II

VELOCITY AND ACCELERATION ANALYSIS: Introduction, Absolute and Relative Motion, Vectors, Addition and subtraction of Vectors, Motion of a Link, Velocity and Acceleration, Angular velocity and Angular acceleration of Links: Four bar Mechanism, Velocity and Acceleration of Intermediate and offset points. Coriolis acceleration of Slider - Crank Mechanism, Crank and Slotted Lever Mechanism

UNIT Ill

Instantaneous centre, Notation, Number of I - Centres, Kennedy's theorem, Locating I - Centres, Angular velocity by I - Centre Method for simple mechanisms (Four bar and single slider).

CAMS: Introduction, Types of cams, Types of Followers, Definitions, Graphical synthesis of cam profile limited to reciprocating & radial follower. (Knife Edge, Roller and flat faced Followers)

UNIT IV

GEARS: Introduction, Classification of gears, Gear terminology, Law of Gearing, Velocity of Sliding, Forms of Teeth- Cycloidal Profile Teeth, Involute Profile Teeth, Path of contact, Arc of contact, Number of pairs of Teeth in contact, Concept of Interference in Involute Gears. Minimum number of Teeth in Involute Gears, Comparison of Cycloidal and Involute tooth forms.

GEAR TRAINS: Introduction, simple Gear Train, Compound Gear Train, Reverted Gear train, Planetary or Epicyclic Gear Train, Analysis of Epicyclic Gear Train, Tabular method only.

Text Books:

[1] S.S.Rattan, Theory of Machines, 4th Edition, 2014, TMH.
[2] Dr. R. K. Bansal & Dr. J. S. Brar, Theory of Machines 4th Edition, 2009, Lakshmi publications

Reference Books:

[1] C S Sharma and Kamlesh Purohit, Theory of Mechanisms and Machines, Prentice Hall of India.
[2] Ghosh and Mallik, Theory of Mechanisms and Machines, 3rd Edition,2006 East West Press

Additional Resources:

[1] http://nptel.iitg.ernet.in/Mech_Engg/IIT%20Delhi/Kinematics%20of%20Machines.htm
[2] http://freevideolectures.com/Course/2359/Kinematics-of-Machines
[3] http://www.rapidmaniac.com/search/relevant/All/solution-manual-kinematics-and-dynamics-of-machines

17TP1306 LOGIC & REASONING

Course Category: Institutional core **Credits**: 1

Course Type : Learning by Doing **Lecture/Tutorial/ Practice**: 0/0/2

Prerequisites : **Continuous Evaluation**: 100

Semester end Evaluation: 0

Total Marks: 100

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1: Think reason logically in any critical situation

CO2: Analyze given information to find correct solution

CO3: To reduce the mistakes in day to day activities in practical life

CO4: Develop time-management skills by approaching different shortcut methods

CO5: Use mathematical based reasoning to make decisions

CO6: Apply logical thinking to solve problems and puzzles in qualifying exams in any competitive exam.

Contribution of Course Outcomes towards achievement of Program Outcomes

PO	a	b	c	d	e	f	g	h	i	j	k	l	PSO I	PSO II
CO1							M							
CO2					M									
CO3														
CO4												H		
CO5	M								M					
CO6							M							

(L-Low, M-Medium, H-High)

UNIT I :

1. Series Completion,
2. Coding-Decoding,
3. Blood Relation Blood,
4. Puzzles test

UNIT II:

1. Direction sense test,
2. Logical Venn diagrams,
3. Number test, ranking test,
4. Mathematical operations

UNIT III:

1. Arithmetical Reasoning,
2. Inserting missing character,
3. Syllogism.

UNIT IV: Non – Verbal:

1. Water images,
2. Mirror images,
3. Paper folding,
4. Paper cutting,
5. Embedded Figures,
6. Dot situation,
7. Cubes & Dice

TEXT BOOK:

[1] R. S. Aggarwal, " Verbal and non-verbal reasoning", Revised Edition, S Chand publication, 2017 ISBN:81-219-0551-6

17ME3351 SOLID MODELLING LAB

Course Category: Programme Core **Credits**: 1.5

Course Type : Laboratory **Lecture/Tutorial/ Practice**: 0/0/3

Prerequisites : **Continuous Evaluation**: 30

Semester end Evaluation: 70

Total Marks: 100

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1: Construct sketches in modelling software.

CO2: Build part modeling of machine components.

CO3: Develop 2D sketches for machine components

CO4: Combine various parts of Machine and generate their orthographic views.

CO5: Translate geometric models to other file formats.

Contribution of Course Outcomes towards achievement of Program Outcomes

PO	a	b	c	d	e	f	g	h	i	j	k	l	PSO I	PSO II
CO1			M								H			H
CO2			M								H			H
CO3			M								H			H
CO4			M				M				H			H
CO5			M								H			H

(L-Low, M-Medium, H-High)

Course Content:

Lab Exercises:

1. Construction of 2D sketches.
2. Modelling of simple machine components.
3. Assembly of Machine components.
4. Orthographic views of the assembled components.
5. Solid modelling of real components
6. Exporting the files to other file formats
7. Group assignment topics
   i. Part drawing & Assembly of Screw jack
   ii. Part drawing & Assembly of Stuffing Box
   iii. Part drawing of Marine engine connecting rod end
   iv. Part drawing & Assembly of Single tool post
   v. Part drawing & Assembly of Socket and spigot joint
   vi. Part drawing & Assembly of Foot-step bearing
   vii. Develop various types of GI pipe fittings
   viii. Develop double strap diamond butt joint

Text Books:

[1] Pro/Engineer Wildfire 5.0 by Roger Toogood, Jack Zecher, SDC Publications.
[2] Machine Drawing by K.L Narayana, P.Kannaiah, K.Venkata Reddy, Publisher: New Age International

Reference books:

[1] Parametric Modeling with Pro/ENGINEER Wildfire 5.0
[2] Parametric Modeling with Creo Parametric 1.0

E-resources and other digital material:

Web Resources:

[1] http://www.proetutorials.com/
[2] http://learningexchange.ptc.com/tutorials/by_sub_product/ptc-creo-elements-pro-pro-engineer/sub_product_id:1
[3] http://www.eng-tips.com/viewthread.cfm?qid=48209
[4] https://catiatutor.com/
[5] www.v5train.com

NPTEL Video references:

[1] https://www.youtube.com/watch?v=c2VtgkfZ2BQ
[2] https://www.youtube.com/watch?v=hjgGxl4Yk_M
[3] https://www.youtube.com/watch?v=xsKtzWBZ5FY
[4] https://www.youtube.com/watch?v=rIFeKNzm4gE
[5] https://www.youtube.com/watch?v=uCdypjnnKto
[6] https://www.youtube.com/watch?v=YIzwA_Wlj_M

17ME3352 MANUFACTURING PROCESS LAB

Course Category : Programme Core **Credits:** 1.5

Course Type : Laboratory **Lecture/Tutorial/Practice:** 0/0/3

Prerequisites : **Continuous Evaluation:** 30

Semester End Evaluation: 70

Total Marks: 100

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1: Build various joints used in fitting.

CO2: Develop various welding joints

CO3: Build various sand moulds.

CO4: Produce Metal casting.

Contribution of Course Outcomes towards achievement of Program Outcomes

PO	a	b	c	d	e	f	g	h	i	j	k	l	PSO I	PSO II
CO 1	H	H	H								L			L
CO 2	H	H	H								L			L
CO 3	H	H	M								L			L
CO 4	H	H	H								M			M

(L-Low, M-Medium, H-High)

I. FITTING : To make the following joints

a. Half round Joint
b. Stepped Joint
c. Universal Joint

II .WELDING : To make the following welding joints

a. To make Lap Joint using Oxy Acetylene Gas welding
b. To make 'T'– Joint using MIG welding
c. To make spot joint using Resistance welding

III. FOUNDRY :

To make the following sand moulds

a. Single piece pattern (Stepped Rectangular Block)
b. Two piece pattern (Step Cone Pulley)
c. T-Pipe Pattern (Pattern with core)

IV. PROJECT:

To prepare a metal Casting (Automobile component) – Group Assignment.

Text Books:

[1] S.K.Hajra Chowdary, A.K. Hajra Chowdary, Nirjhar Roy, "Elements of Workshop Technology, Vol.I".Media Promoters and Publishers Pvt.Ltd, Mumbai, Scitech Publications, Chennai, 2013

17MC1407A / 17MC1307 B INDIAN CONSTITUTION

Course Category : Humanities elective **Credits:** 1

Course Type : Theory **Lecture/Tutorial/Practice:** 2/0/0

Prerequisites : **Continuous Evaluation:** 100

Semester End Evaluation: 00

Total Marks: 100

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1: Know the fundamental law of the land.

CO2: Understand how fundamental rights are protected

CO3: Perceive the structure and formation of the Indian Government System.

CO4: Explain when and how an emergency can be imposed and what are the consequences..

Contribution of Course Outcomes towards achievement of Program Outcomes

PO	a	b	c	d	e	f	g	h	i	j	k	l	PSO I	PSO II
CO 1						L								
CO 2						M								
CO 3						M								
CO 4						L								

(L-Low, M-Medium, H-High)

UNIT - I

Introduction to Constitution of India: Meaning of the Constitution Law and Constitutionalism, Historical perspective of constitution of India, Salient features of Constitution of India.

UNIT II:

Fundamental rights: Scheme of the fundamental rights, scheme of the fundamental right to equality, scheme of the fundamental right to certain freedoms under Article 19, scope of the right of life and personal liberty under Article 21, writs jurisdiction.

UNIT III:

Nature of the Indian constitution: Federal structure and distribution of legislative and financial powers between the Union and states

Parliamentary form of government in India: The Constitution powers and status of the President of India, Amendment of the Constitutional powers and Procedure, Historical Perspectives of the constitutional amendments in India

Local Self Government: Constitutional Scheme in India

UNIT IV:

Emergency Provisions: National Emergency, President rule, financial emergency

Text Books:

[1] Dr. J.N. Pandey, Constitutional Law of India published by Central law Agency, Allahabad, Edition 2018

Reference Books:

[1] V.N Shukla's, Constitution of India Eastern Book Company, Lucknow.
[2] M.P. jain, Indian Constitution Law, Wadhwa and Company, Nagpur.
[3] D.D. basu, Constitution of India, Wadhwa and Company, Nagpur

E-resources and other digital material

17ME3401 FLUID MECHANICS AND HYDRAULIC MACHINES

Course Category: Programme Core **Credits:** 4

Course Type : Theory **Lecture/Tutorial/Practice:** 3/1/0

Prerequisites : **Continuous Evaluation:** 30

17ME1104A Engineering Mecahnics- I **Semester End Evaluation:** 70

17ME1204 Engineering Mecahnics- II **Total Marks:** 100

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1: Understand the Basic concepts of fluid mechanics.

CO2: Apply the principles of fluid Dynamics to solve pipe flow problems.

CO3: Make use of the momentum principles in impact of jets &Understand Boundary layer concept

CO4: Analyze the performance of hydraulic turbines, pumps and hydraulic devices.

Contribution of Course Outcomes towards achievement of Program Outcomes

PO	a	b	c	d	e	f	g	h	i	j	k	l	PSO I	PSO II
CO 1	H		L		M								L	
CO 2	M		M		H								M	
CO 3	M		L		H								M	
CO 4	M		M		H								M	

(L-Low, M-Medium, H-High)

UNIT – I

FLUID PROPERTIES AND FLUID STATICS: Density, Specific weight, Specific gravity, viscosity, Surface Tension, Capillarity, Types of Fluids, Vapour pressure, compressibility, Pressure and its measurements(Treatment limited to Manometers).

FLUID KINAMETICS: Stream line, path line, streak line, stream tube, classification of flows, one and three dimensional Continuity equation.

UNIT – II

FLUID DYNAMICS: Surface and Body forces - Euler's and Bernoulli's equation for flow along a streamline. Momentum equation, applications of Bernoulli's equation.

INTERODUCTION TO PIPE FLOW: Reynold's experiment –Darcy's equation, Minor Losses in pipes (Treatment limited to explanation), Losses in series and parallel pipe flows, Construction of total energy line and hydraulic gradient line.

UNIT – III

BOUNDARY LAYER CONCEPTS: Definition, Displacement Thickness, Momentum thickness, Energy Thickness and Drag and lift (Treatment limited to concept only).

INTERODUCTION TO TURBO MACHINERY: Review of moment equation, Impact of Jet of water on various configurations and derivation of force applied by jet in all applications, Introduction to velocity triangles and applications.

UNIT – IV

INTERODUCTION TO TURBINES: Classification of turbines, Pelton wheel construction and working principle, Francis turbine and Kaplan turbines details discussion, Heads, Efficiencies and Performance of turbines.

PUMPS AND HYDRAULIC SYSTEMS: Classification of pumps with definition, Working Principles and derivations of Centrifugal and Reciprocating pumps. Hydraulic Systems (Treatment limited to Hydraulic press, lift and Hydraulic ram).

Text Books

[1] R.K.Bansal, "Fluid Mechanics & Hydraulic Machines"Ninth Edition, Laxmi Publications, 2009.

[2] Robert W. Fox , Alan T. McDonald and Philip J. "Fluid Mechanics" Eighth edition, Wiley Publishers.

Reference Books

[1] P.N.Modi& S.M. Seth.,"Hydraulics and Fluid Mechanics", 2nd edition, Standard Book House, 2005.

[2] R.K. Rajput,"Fluid Mechanics & Hydraulic Machines", Fourth Edition, S.Chand& Company, 2008.

[3] D.S.Kumar, "Fluid Mechanics & Fluid Power Engineering", Second Edition,SK.Kataria&SonsPublishers, 2014.

E-Resources and other digital material

[1] Prof. S.K. Som, IIT Kharagpur, Fluid Mechanics & Hydraulic Machines, [English], Web Available:http://nptel.ac.in/courses/112105171/

[2]Prop. Gowtham Biswas, IIT Kharagpur, Fluid Mechanics & Hydraulic Machines, [English], WebAvailable: http://nptel.ac.in/courses/112104118/

[3] Fluid Mechanics & Hydraulic Machines, [English], WebAvailable: http://www.efluids.com/

17ME3402 MACHINE DYNAMICS

Course Category: Programme Core **Credits**: 3

Course Type : Theory **Lecture/Tutorial/ Practice**: 3 /0/ 0

Prerequisites: **Continuous Evaluation**: 30

17ME1104A Engineering Mechanics - I **Semester end Evaluation**:70

17ME1204 Engineering Mechanics - II **Total Marks:**100

Course Outcomes:

Upon successful Completion of the course, the student will be able to:

CO1 Understand the concepts of energy fluctuations in fly wheels.

CO2 Illustrate Principle of governors and analyze gyroscopic effects on vehicles.

CO3 Analyze balancing of rotating and reciprocating masses.

CO4 Evaluate natural frequency for longitudinal, transverse and torsional vibrations.

Contribution of Course Outcomes towards achievement of Program Outcomes

PO	a	b	c	d	e	f	g	h	i	k	j	k	PSO I	PSO II
CO1	M		L		H									M
CO2	M		L		H									M
CO3	M		H		H									M
CO4	M		L		H									M

(L-Low, M-Medium, H-High)

UNIT – I

TURNING MOMENT DIAGRAMS: Introduction, Single - cylinder double – acting steam engine, Single - cylinder four stroke engine, Multi-cylinder engine, Fluctuation of energy, determination of maximum fluctuation of energy, coefficient of fluctuation of energy.

FLY WHEELS: Introduction, Coefficient of fluctuation of speed, energy stored in fly wheel.

UNIT – II

GOVERNORS: Introduction, Watt Governor, Porter Governor, Hartnell Governor, Sensitiveness of a Governor, Hunting, Isochronism, Stability.

GYROSCOPES: Angular Velocity, Angular Acceleration, Gyroscopic Torque, Gyroscopic Effect on Air-planes and Naval Ships

UNIT – III

BALANCING OF ROTATING SYSTEMS: Introduction, Static balancing, Dynamic balancing, Transferring of a Force from one plane to another, Balancing of Several Masses in Different planes.

BALANCING OF RECIPROCATING SYSTEMS: Primary balancing.

UNIT – IV
UNDAMPED FREE VIBRATIONS:
LONGITUDINAL VIBRATION: Introduction, Definitions, Types of vibrations, Basic features of vibrating systems, Degree of freedom, free longitudinal vibrations.
TRANSVERSE VIBRATION: Single concreted load, shaft carrying several loads, whirling of shafts.
TORSIONAL VIBRATION: Single and two rotor systems.

Text Books:

[1] S.S.Rattan, "Theory of Machines", Fourth edition, McGraw Hill Education (India) Private Limited, 2014

[2] Dr.R.K.Bansal & Dr.J.S.Brar," Theory of Machines", Fourth edition, Laxmi Publications (P) Limited, 2009.

Reference books:

[1] R.S.Khurmi & J.K.Guptha," Theory of Machines", 14th Edition, S.Chand & Company, 2006.

[2] V.P.Singh,"Mechanical vibrations", Second Edition, Dhanpat Rai & Co (P) Limited, 2009

E-resources and Other digital material:

[1] Video in web: http://nptel.ac.in/courses/112104114/

[2] Video in web: https://youtu.be/OlZXxPVpmBs

[3] Notes in web: http://www.vssut.ac.in/lecture_notes/lecture1429901026.pdf

17ME3403 ENGINEERING METALLURGY

Course Category: Programme Core **Credits**: 3

Course Type : Theory **Lecture/Tutorial/ Practice**: 3 /0/ 0

Prerequisites: **Continuous Evaluation**: 30

17PH1102/1202 Engineering Physics **Semester end Evaluation**:70

17CH1102/17CH1202) Engineering Chemistry **Total Marks:**100

Course Outcomes:

Upon successful Completion of the course, the student will be able to:

CO1: Understand the importance and concept of materials and solid solutions.

CO2: Illustrate the phase diagrams and TTT diagrams of steels.

CO3: Classify the heat treatment processes and strengthening mechanisms.

CO4: Understand the principles of powder metallurgy and manufacturing methods of different types of composites.

Contribution of Course Outcomes towards achievement of Program Outcomes

PO	a	b	c	d	e	f	g	h	i	j	k	l	PSO I	PSO II
CO1	H		M										L	L
CO2	H		M										L	L
CO3	H		M										L	L
CO4	H		M										L	L

(L-Low, M-Medium, H-High)

UNIT - I

INTRODUCTION TO MATERIAL SCIENCE: Material Science, Classification of materials, Requirement and selection of materials, Mechanical properties of materials.

INTRODUCTION TO CRYSTALLOGRAPHY:
Crystal imperfections, Crystal deformation- Slip and Twinning.

SOLID SOLUTIONS: Introduction, Substitutional solid solutions, Ordered Substitutional solid solutions, Disordered Substitutional solid solutions, Hume Rothery's rule, Interstitial solid solution.

UNIT – II

PHASE DIAGRAMS: Binary phase diagrams – Phase rule – one component system, two component system, isomorphous, eutectic, eutectoid, peritectic and peritectoid systems, Fe-Fe_3C equilibrium diagram.

TTT Diagrams: TTT diagrams for eutectoid, hypo and hyper eutectoid steels.

UNIT – III

HEAT TREATMENT PROCESSES: Annealing, normalizing, hardening, tempering, austempering, martempering, flame Hardening, Induction Hardening & Chemical hardening techniques, hardenability concept and experimental determination.

STRENGTHENING MECHANISMS: Strain hardening, solid solution strengthening, grain refinement, dispersion strengthening.

UNIT – IV

POWDER METALLURGY: Powder metallurgy process, preparation of powders, characteristics of metal powders, mixing, compacting, sintering, Applications of Powder Metallurgy.

COMPOSITE MATERIALS: Introduction, Classification of composites, Advantages and Dis-advantages of composite materials, applications of composite materials, various methods of component manufacture of composites – Hand Lay-up method, Resin transfer moulding, Filament winding process, and continuous pultrusion process.

Text Books:

[1] Kodgirie .V.D and Kodgirie.S.V, "Material Science and Metallurgy", Thirty-seventh Edition, Everest House Publication, 2015.
[2] Raghavan.V, " Material Science and Metallurgy" ,Fifth Edition, PHI Learning Pvt Limited,2013

Reference books:

[1] Avener , "Introduction to Physical Metallurgy", Second Edition, Tata McGraw hill Education (India) Pvt Limited,1997.
[2] Rajput R. K,"Material Science and Engineering", Fourth Edition, S.K.kataria& Sons,2009.

E-resources and other digital material:

[1] Prof.R.N.Ghosh, IIT Kharagpur, Solidification Binary Alloys, Iron-Carbon Phase Diagram,[English] https://www.youtube.com/results?search_query=prof.r.n+ghosh+lecturers
[2] Prof.S.K.Gupta, IIT Delhi, Phase Diagrams, Crystal imperfections [English] Web Available: https://www.youtube.com/watch?v=x3n9ht-eRfg

17ME3404 ELECTRICAL AND ELECTRONIC ENGINEERING

Course Category: Programme Core **Credits**: 4

Course Type : Theory **Lecture/Tutorial/ Practice**: 4 /0/ 0

Prerequisites: **Continuous Evaluation**: 30

Semester end Evaluation:70

Total Marks:100

Course Outcomes:

Upon successful Completion of the course, the student will be able to:

CO1: Understand the fundamentals of electric circuits and Discuss construction, operation and performance of DC Machines.

CO2: Understand the construction, operation of three phase induction motors and Identify meters for measuring electrical quantities.

CO3: Illustrate the operation of various diodes and rectifier circuits.

CO4: Realize the operation of various transistor configurations and FET's.

Contribution of Course Outcomes towards achievement of Program Outcomes

PO	a	b	c	d	e	f	g	h	i	j	k	l	PSO I	PSO II
CO 1	H	M			H									
CO 2		M			M									
CO 3		M	H											
CO 4		M	H											

(L-Low, M-Medium, H-High)

UNIT-I

DC and AC circuits: Kirchoffs laws, simple circuits -Alternating current - waveforms - RMS - Average values-simple R-L-C- circuits, Power factor, 3-phase balanced circuits.

D.C. Machines: DC Machines: Principle of operation, construction and Classification of DC Machines, EMF and Torque equations, Characteristics of Generators and Motors, Principle of starters-3 point starter.

UNIT-II

Three Phase Induction Motor: Principle of Rotating Magnetic Field, construction and Principle of Operation of 3-φ I.M, Torque Equation, Torque-Slip Characteristics of 3-φ I.M.

Measuring Instruments: Classification of instruments, Principles and operation of moving - coil and moving-iron instruments. – Dynamometer –type watt meter.

UNIT-III:

Semiconductor Diode Characteristics : Conductors, Semiconductors, Insulators, p-n Junction as a Diode, The Volt Ampere Characteristics (Forward bias & Reverse bias), Zener diode, characteristics of Zener diode(Forward bias & Reverse bias), Zener diode as a regulator,

Rectifier circuits: Operation of Half wave Rectifier, Full wave Rectifier, Bridge rectifier, Ripple factor derivation (HWR, FWR, Bridge rectifier), Capacitor filter for full wave rectifier, Compare Half wave, Full wave, Bridge rectifiers.

UNIT-IV:

Transistor Characteristics: Operation of the Junction Transistor (PNP & NPN), Transistor as an Amplifier, Transistor as a switch, The Common Base Configuration, The Common Emitter Configuration, The Common Collector Configuration, Comparison of CB, CE, CC configurations.

Filed Effect Transistors: Construction and Characteristics of JFETs, Transfer Characteristics, Depletion-type MOSFET and Enhancement-type MOSFET, Uni-Junction Transistor.

Text Books:

[1] I.J.Nagrath and Kothari, "Theory and problems of Basic Electrical Engineering",Prentice- Hall of India Pvt. Ltd.
[2] V.K.Mehta and Rohit Mehta,Principles of electrical machines,S.Chand publications
[3] S. Salivahanan, N. Suresh Kumar, A. Vallava Raj " Electronic Devices and circuits" Second edition, Tata McGraw Hill Publication.

Reference Books:

[1] Basic Electrical Engineering by Nagsarkar, Sukhija, Oxford Publications, 2nd edition.
[2] BL Theraja, A text book of Electrical Technology, Nirja
[3] Jacob Millman, Christos C. Halkias and Chetan D Parekh, "Integrated Electronics", 2nd Edition, Tata McGraw Hill Publication, 2012.

E-resources and other digital material

[1] http://nptel.ac.in/courses.php?branch=eee
[2] http://en.wikipedeia.org/wiki/electrical
[3] https://embeddedengineers.files.wordpress.com/2015/09/electronic-devices-and-circuits-by-salivahanan.pdf
[4] http://www.nptelvideos.in/2012/12/basic-electronics-drchitralekha-mahanta.html

17HS2405 (A) YOGA & MEDITATION

Course Category: Humanities elective **Credits**: 1

Course Type: Theory **Lecture/Tutorial/ Practice**: 1/0/0

Prerequisites : **Continuous Evaluation**: 100

Semester end Evaluation: 00

Total Marks: 100

Course Outcomes:

Upon successful Completion of the course, the student will be able to:

CO1: Equip better attitude and behavior.

CO2: Imbibe set of values enabling a balanced life focused on an ethical material life.

CO3: Develop levels of concentration through mediation

CO4: Apply conscience for the missions of life

Contribution of Course Outcomes towards achievement of Program Outcomes

PO	a	b	c	d	e	f	g	h	i	j	k	l	PSO I	PSO II
CO1						L								
CO2						L								
CO3								L						
CO4								L						

(L-Low, M-Medium, H-High)

UNIT I

Understanding Yoga : Orientation, Introduction to Values , The positive impact of yoga , Application of Values in real life , Universal values

(**Lec-demo pattern with illustrations representing Yogic Postures and value system related pictorial is followed**)

UNIT II

Yogic Practices: Yoga, Self and Ultimate goal of yoga, Introduction to various types of yoga, Integration of values in Yoga

(Activity based processes with Assasanas and Pranayama are implemented)

UNIT III

Practice of Meditation: Art of Meditation, Observation, Introspection, Contemplation, Meditation and Concentration

(Activity based processes involving Mediation sessions followed by demonstrations are implemented)

UNIT IV:

Towards professional excellence through Yoga and meditation: Stress Management, Choices we make, Excellence and Integration

(Lec-demo pattern is followed)

Text Book(s):

[1] 1.Common Yoga protocol, Ministry of Ayush, Govt of India
[2] Journey of the Soul- Michael Newton, 2003, Llewellyn

Reference Books:

[1] . Lectures from Colombo to Almora, Swami Vivekakanada, 2010 Ramakrishna Mission
[2] Essays of Ralph Waldo Emerson, 1982, Eastern press
[3] Eclectic materials Offered by English Dept.

E-resources and other digital material

[1] www.heartfulness.org accessed on 27th April 2018
[2] www. *ayush.gov.in accessed on* 27th April 2018
[3] www. belurmath.org *accessed on* 27th April 2018

17HS2405 (D) PHILOSOPHY

Course Category: Humanities elective **Credits**: 1

Course Type: Theory **Lecture/Tutorial/ Practice**: 1/0/0

Prerequisites : **Continuous Evaluation**: 100

Semester end Evaluation: 00

Total Marks: 100

Course Outcomes:

Upon successful Completion of the course, the student will be able to:

CO1: Understand major philosophical issues.

CO2: Appreciate the philosophical doctrines of western thinkers.

CO3: Understand the eminence of Indian classical thought.

CO4: Appreciate relation between science and values.

Contribution of Course Outcomes towards achievement of Program Outcomes

PO	a	b	c	d	e	f	g	h	i	j	k	l	PSO I	PSO II
CO1						L								
CO2						L								
CO3						L								
CO4								L						

(L-Low, M-Medium, H-High)

UNIT I

What's Philosophy **:** Definition, Nature, Scope and Branches

UNIT II:

Introduction to Western philosophy **:** Ancient Greek and Modern philosophy

UNIT III:

Introduction to Indian Thought**:** Six systems – Modern philosophers

UNIT IV:

Philosophy of science & Technology : Human values and professional Ethics

Text Book:

[1] " The story of philosophy ",Will Durant, Simon & Schuster 1926

[2] " An Introduction to philosophy ",O.O.Fletcher, Word Public Library,2010

Reference Books:

[1] " Six systems of Indian Philosophy ", DH Dutta ,

[2] " The pleasures of philosophy, Will Duran, Simon & Schuster,1929

E-resources and other digital material

[1]J. K. Author. (day, month, year). Title (edition) [Type of medium]. Available: http://www.(URL)

17HS2405 {I2} FOREIGN LANGUAGE (GERMAN)

Course Category: **Humanities elective** **Credits**: 1

Course Type: Theory **Lecture/Tutorial/ Practice**: 1/0/0

Prerequisites : **Continuous Evaluation**: 100

Semester end Evaluation: 00

Total Marks: 100

Course Outcomes:

Upon successful Completion of the course, the student will be able to:

CO1: Learn basics of German Language.

CO2: Write German Writing

CO3: Understand German Hearing

CO4: Form sentence in Present , past and future tense

Contribution of Course Outcomes towards achievement of Program Outcomes

PO	a	b	c	d	e	f	g	h	i	j	k	l	PSO I	PSO II
CO1							L							
CO2							L							
CO3							L							
CO4							L							

(L-Low, M-Medium, H-High)

UNIT I
Alphabets, Numbers, Exact articles and not exact Articles
UNIT II
Prepositions**,** Present Tense

UNIT III
Past Tense and about family
UNIT IV
Future Tenses

Text Book:
[1] Studio d A1Cornelsen Goyalaas Publications New Delhi.

Reference Books:
E-resources and other digital material

17HS2405 (J) PSYCHOLOGY

Course Category: Humanities elective **Credits**: 1

Course Type: Theory **Lecture/Tutorial/ Practice**: 1/0/0

Prerequisites : **Continuous Evaluation**: 100

Semester end Evaluation: 00

Total Marks: 100

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1: Relate biological and socio-cultural factors in understanding human Behavior.

CO2: Understand the nature of sensory processes, types of attentions.

CO3: Explain different types of learning and the procedures, distinguishes between different types of memory,

CO4: Demonstrate an understanding of some cognitive processes involved in Problem solving and decision-making.

Contribution of Course Outcomes towards achievement of Program Outcomes

PO	a	b	c	d	e	f	g	h	i	j	k	l	PSO I	PSO II
CO1						L								
CO2						L								
CO3											L			
CO4											L	L		

(L-Low, M-Medium, H-High)

UNIT I

Introduction: Psychology as a scientific study of behavior. Biological and sociocultural bases of behavior, fields of psychology

UNIT II:

Sensory and perceptual processes: Sensation, attention and perception

UNIT III:

Cognition and Affect: Learning and memory. Emotion and motivation

UNIT IV:

Thinking, problem solving and decision making**,** Personality and intelligence

Text Book:

[1] Zimbardo, P. G. (2013). Psychology and Life (20th Ed.). New York: Pearson Education

Reference Books:

[1] Baron, R. A. (2006). Psychology (5th Ed.). New Delhi: Pearson Education.

[2] Coon, D., & Mitterer, J. O. (2007). Introduction to Psychology: Gateway to mind and behaviour. New Delhi: Cengage.

[3] Feldman, R. S. (2013). Psychology and your life (2nd Ed.). New York: McGraw Hill.

E-resources and other digital material

17TP1406 ENGLISH FOR PROFESSIONALS

Course Category: Institutional core **Credits**: 1

Course Type : Learning by Doing **Lecture/Tutorial/ Practice**: 0/0/2

Prerequisites : **Continuous Evaluation**: 100

Semester end Evaluation: 0

Total Marks: 100

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1: Present themselves effectively in the professional world

CO2: Introduce themselves as well as others appropriately.

CO3: Use vocabulary to form sentences and narrate stories by using creative thinking skills

CO4: Involve in practical activity oriented sessions.

CO5: Learn about various expressions to be used in different situations

CO6: Respond positively by developing their analytical thinking skills.

Contribution of Course Outcomes towards achievement of Program Outcomes

PO	a	b	c	d	e	f	g	h	i	j	k	l	PSO I	PSO II
CO1						L								
CO2												L		
CO3							L							
CO4											L			
CO5											L	L		
CO6											L			

(L-Low, M-Medium, H-High)

UNIT-I

1. Beginners, Functional, Situational Conversations
2. Practicing on Functional Conversations.

UNIT-II

1. Errors in usage of Parts of Speech with a thrust on Verbs, Adjectives and Conjunctions, Idioms/Phrases.
2. B. Introducing Basic Grammar
3. C. Practicing on Functional Conversations.

UNIT-III

1. Introducing Self & Others
2. Structures and Forming Sentences
3. Telephonic Etiquette, Social Etiquette and Table Manners
4. Practicing on Functional Conversations.

UNIT-IV

1. Direct, Indirect/Reporting Speech
2. Public Speaking Basics
3. Versant Test Preparation
4. Practicing on Situational Conversations.

Methodology: Audio—Visuals / Hand Outs (Compiled/Created by Training Division, T&P Cell, VR Siddhartha Engineering College), Board & Chalk and Interactive Sessions.

17ME3451 COMPUTATIONAL METHODS LABORATORY

Course Category: Programme Core **Credits**: 1.5

Course Type : Laboratory **Lecture/Tutorial/ Practice**: 0/0/3

Prerequisites: **Continuous Evaluation**: 30

14MA1301Complex Analysis and Numerical Methods **Semester end Evaluation**: 70

17MA1101 Matrices and Differential Calculus **Total Marks:** 100

17CS1103 Problem Solving Methods

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1: Illustrate basic commands in Mat lab and perform matrix Operations

CO2: Solve the linear equations and PDE using different numerical Techniques

CO3: Make use of a tool box to solve 2D partial differential equations

CO4: Develop Line and Surface plots

Contribution of Course Outcomes towards achievement of Program Outcomes

PO	a	b	c	d	e	f	g	h	i	j	k	l	PSO I	PSO II
CO1	H												H	
CO2	H				M								H	
CO3	L				H						H		H	
CO4	L	M			H						H		H	

L-Low, M-Medium, H-High

COURSE CONTENT

LIST OF EXERCISES:

1. Basics of MATLAB (Menu Items, Basic Commands).
2. Mathematical operations on matrices. (Addition, Multiplication, and Division), Transpose, determinant and inverse of a matrix
3. Solutions of simultaneous algebraic equations using exact methods
4. Solutions of simultaneous algebraic equations using iteration methods
5. Numerical Differentiation, Integration
6. Solution of 2D PDE using FDM method-Elliptic Equations
7. Solution of 2D PDE using FDM method- Parabolic Equations
8. Solution of 2D PDE using FDM method- Hyperbolic Equations
9. Line and Surface Plots

TEXT BOOKS AND REFERENCE BOOKS

[1] MATLAB programming by Y.Kirani Singh &B.B.Chaudhuri. PHI Publications (2010).
[2] Getting started with MATLAB -a quick reference for scientists & engineers by Rudra Pratap. Oxford University Press (2009).
[3] An introduction to programming and numerical methods in MATLAB by S.R.Otto, J.P. Denier. Springer Publications (2007)
[4] Ordinary and Partial Differential Equation Routines in C, C++, FORTRAN, Java, Maple, and MATLAB by H.J. Lee, W.E. Schiesser.
[5] Graphics and GUIs with MATLAB, Third Edition (Graphics & GUIs with MATLAB) 3rd Edition by O. Thomas Holland, Patrick Marchand.

E-RESOURCES AND OTHER DIGITAL MATERIAL

WEB REFERENCES:

[1] http://www.math.ucsd.edu/~bdriver/21d-s99/matlab-primer.html
[2] http://www.mathworks.in/academia/student_center/tutorials/ launchpad.html
[3] http://www.cyclismo.org/tutorial/matlab/
[4] http://www.mathworks.com/matlabcentral/fileexchange?s_cid=wiki_matlab_17

VIDEOS:

[1] http://www.youtube.com/user/matlab?feature=results_mai
[2] http://www.youtube.com/watch?v=DPLBPdux6bs

17ME3452 ELECTRICAL AND ELECTRONICs ENGINEERING LAB

Course Category : Programme Core **Credits:** 1.5

Course Type : Lab **Lecture/Tutorial/Practice:** 0/0/3

Prerequisites : **Continuous Evaluation:** 30

Semester End Evaluation: 70

Total Marks: 100

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1: Conduct and analyze the parameters of electrical network.

CO2: Analyze the performance of DC and AC machines.

CO3: Appreciate the operation of various diodes and rectifier circuits and obtain its characteristics.

CO4: Realize the operation of various transistor configurations and FET's and obtain its characteristics.

Contribution of Course Outcomes towards achievement of Program Outcomes

PO	a	b	c	d	e	f	g	h	i	j	k	l	PSO I	PSO II
CO 1		H	M											
CO 2		H	M											
CO 3		M	H											
CO 4		M	H											

(L-Low, M-Medium, H-High)

ELECTRICAL ENGINEERING

1. Verification of KCL & KVL
2. Determination of parameters of choke coil
3. Measurement of low and medium resistance.
4. Open circuit characteristics of separately excited generator
5. Brake test on DC shunt motor
6. Brake test on 3-phase Induction motor

ELECTRONIC ENGINEERING

1. Obtain the V-I characteristics of PN junction diode.
2. Obtain the V-I characteristics of Zener diode.
3. Verify the output waveform for full wave bridge rectifier and calculate ripple factor. Compare the result with theoretical value.
4. Obtain the input and output characteristics of transistor in CB configuration.
5. Obtain the input and output characteristics of transistor in CE configuration.
6. Obtain the drain and transfer characteristics of JFET.

Text Books:

[1] I.J.Nagrath and Kothari, "Theory and problems of Basic Electrical Engineering",Prentice- Hall of India Pvt. Ltd.
[2] V.K.Mehta and Rohit Mehta, Principles of electrical machines, S.Chand publications
[3] S. Salivahanan, N. Suresh Kumar, A. Vallava Raj, Electronic Devices and circuits Second edition, Tata McGraw Hill Publication.

Reference Books:

[1] Nagsarkar, Sukhija, Basic Electrical Engineering, Oxford Publications, 2nd edition.
[2] BL Theraja, A text book of Electrical Technology, Nirja
[3] Jacob Millman, Christos C. Halkias and Chetan D Parekh, "Integrated Electronics", 2nd Edition, Tata McGraw Hill Publication, 2012.

Additional Resources:

[1] http://nptel.ac.in/courses.php?branch=eee
[2] http://en.wikipedeia.org/wiki/electrical
[3] https://embeddedengineers.files.wordpress.com/2015/09/electronic-devices-and-circuits-by-salivahanan.pdf

17HS3453 COMMUNICATION SKILLS LAB

Course Category : Programme Core **Credits:** 1

Course Type : Lab **Lecture/Tutorial/Practice:** 0/0/2

Prerequisites : Technical English &Communication skills -17HS1205 **Continuous Evaluation:** 30

Semester End Evaluation: 70

Total Marks: 100

Course Outcomes:

Upon successful Completion of the course, the student will be able to:

CO1: Be proficient in pronunciation of speech sounds including accentuation.

CO2: Enhance the awareness of the elements of listening comprehension.

CO3: Develop the abilities of rational argumentation and skills of public speaking.

CO4: Be aware of the elements of professional communication.

CO5: Be exposed to the items of various competitive exams.

Contribution of Course Outcomes towards achievement of Program Outcomes

PO	a	b	c	d	e	f	g	h	i	j	k	l	PSO I	PSO II
CO 1							H	H	M			L		
CO 2				H		M	H	H	M	H		M		
CO 3	H	H	M	H		H	H	M	M	H	L	H		
CO 4	M	M	M	H	L	H	H	H	H	H	L	H		
CO5		M	M	M	M	H	H	L	H	H	L	L		

(L-Low, M-Medium, H-High)

UNIT I

Elements of Spoken Expression and processes of Listening comprehension:

- Speech Mechanism
- Articulation of vowels and consonants
- Patterns of Accentuation
- Types and processes of Listening comprehension

UNIT II:

Patterns of Substantiation and Refutation in Public Speaking:

- Group Discussion
- Pyramid Discussion
- PNI
- Seminar Talk and Power Point Presentation

UNIT III: Professional Communication:

- Self Affirmation
- Advanced Composition including Memo and e-mail
- Résumé Preparation
- Elements of Non-Verbal Communication

Text Books:

[1] Martin Cutts, Oxford Guide to Plain English, 7th Impression, OUP, 2011

[2] Exercises in Spoken English, Prepared by Department of Phonetics and Spoken English, CIEFL, OUP, 21st Impression, 2003

Reference Books:

[1] Stephen R Covey, The 7 Habits of Highly Effective people, II edition, (Pocket Books) Simon & Schuster UK Ltd, 2004

[2] Eclectic Learning Materials offered by the Department

E-resources and other digital material

[1] ODll Language Learner's Software, 27-6-2012 Orell Techno Systems ,

[2] Visionet Spears Digital Language Lab software Advance Pro , 28-01-2015

[3] *www.natcorp.ox.ac.uk*, British National Corpus, accessed on 28-11-2017

17MC1407A ENVIRONMENTAL STUDIES

Course Category: Institutional Core **Credits**: 0

Course Type : Theory, Mandatory course **Lecture/Tutorial/ Practice**: 2 /0/ 0

Prerequisites: **Continuous Evaluation**: 100

Concern on Conservation and Preservation of Environment **Semester end Evaluation**:00

Total Marks:100

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1: Identify the various natural resources, analyze and explore degradation management

CO2: Understand the Ecosystems and need of Biodiversity.

CO3: Examine the Problems related to Environmental pollution and its management.

CO4: Make use of IT tools to analze social issues, Acts associated with Environment

Contribution of Course Outcomes towards achievement of Program Outcomes

PO	a	b	c	d	e	f	g	h	i	j	k	l	PSO I	PSO II
CO1	L							H						
CO2			H			H		H						
CO3		L		L		H		H						
CO4								H	H	L	L	L		

(L-Low, M-Medium, H-High)

UNIT - I

The Multidisciplinary Nature of Environmental Studies

Definition, scope and importance, Need for public awareness

Natural Resources

Renewable and Non-renewable Resources:

Natural resources and associated problems.

(a) Forest resources: Use and over-exploitation, deforestation. Timber extraction, mining, dams and their effects on forests and tribal people.

(b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

(c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources.

(d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.

(e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources.

(f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

Role of an individual in conservation of natural resources

Equitable use of resources for sustainable lifestyles.

UNIT – II

Ecosystems

Concept of an ecosystem.
Structure and function of an ecosystem.
Producers, consumers and decomposers.
Energy flow in the ecosystem.
Ecological succession.
Food chains, food webs and ecological pyramids.
Introduction, types, characteristic features, structure and function of the following ecosystem:

(a) Forest ecosystem
(b) Grassland ecosystem
(c) Desert ecosystem
(d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and Its Conservation

Introduction, definition: genetic, species and ecosystem diversity.
Biogeographically classification of India.
Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.
Biodiversity at global, National and local levels.
India as a mega-diversity nation.
Hot-spots of biodiversity.
Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.
Endangered and endemic species of India.
Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

UNIT – III

Environmental Pollution

Definition
Causes, effects and control measures of

a) Air Pollution
b) Water pollution
c) Soil pollution
d) Marine pollution
e) Noise pollution
f) Thermal pollution
g) Nuclear Pollution

Solid waste management: Causes, effects and control measures of urban and industrial wastes.
Role of an individual in prevention of pollution.
Disaster management: Floods, earthquake, cyclone and landslides.

UNIT - IV

Social Issues and the Environment

From unsustainable to sustainable development.
Urban problems related to energy.
Water conservation, rain water harvesting, watershed management.
Resettlement and rehabilitation of people; its problems and concerns.
Environmental ethics: Issues and possible solutions.
Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.
Wasteland reclamation.
Consumerism and waste products.

Environment Protection Act.

Air (Prevention and Control of Pollution) Act.
Water (Prevention and Control of Pollution) Act.
Wildlife Protection Act.
Forest Conservation Act.
Issues involved in enforcement of environmental legislation.
Public awareness.

Human Population and the Environment

Population growth, variation among nations.
Population explosion—Family Welfare Programme.
Environment and human health.
Human rights.
Value education.
HIV/AIDS.
Women and Child Welfare.
Role of Information Technology in environment and human health.

Field Work/ Case Studies {NOT TO BE INCLUDED IN SEMESTER END EXAMS**}**

Visit to a local area to document environmental assets—river/forest/grassland/hill/ mountain.
Visit to a local polluted site—Urban/Rural/Industrial/Agricultural.
Study of common plants, insects, birds.
Study of simple ecosystems—pond, river, hill slopes, etc.

Text Books:

[1] Text book for **ENVIRONMENTAL STUDIES** for under graduate courses of all branches of higher education – Erach Bharucha -- For University Grants Commission. First edition 2004.

Reference Books

[1] Anjaneyulu Y. Introduction to Environmental sciences, B S Publications PVT Ltd, Hyderabad 2004

E-resources and other digital material

[1] collegesat.du.ac.in/UG/Envinromental%20**Studies**_ebook.**pdf**