VR20

VELAGAPUDI RAMAKRISHNA SIDDHARTHA ENGINEERING COLLEGE

First Year

B.Tech. Syllabus

VR20

SCHEME OF INSTRUCTION

B.Tech. PROGRAMME [VR20]

Applicable for the batch of students admitted from the Academic Year 2020-21

VELAGAPUDI RAMAKRISHNA
SIDDHARTHA ENGINEERING COLLEGE
(An Autonomous, ISO 9001:2015 Certified Institution)
(Approved by AICTE, Accredited by NAAC, Affiliated to JNTUK, Kakinada)
(Sponsored by Siddhartha Academy of General & Technical Education)
Kanuru, Vijayawada
Andhra Pradesh - 520007, INDIA.
www.vrsiddhartha.ac.in

w.e.f. 2020-21

VELAGAPUDI RAMAKRISHNASIDDHARTHA ENGINEERING COLLEGE
SCHEME OF INSTRUCTION FOR FOUR YEAR UG PROGRAMME [VR20]
GROUP A (CSE, ECE, EIE, IT)

SEMESTER I **CONTACT HOURS: 26**

S. No	Course Code	Course Category	Course Name	L	T	P	Credits
1.	20BS1101	Basic Science	Matrices and Differential Calculus	3	0	0	3
2.	20BS1102A 20BS1102B	Basic Science	Engineering Physics (ECE/EIE) Applied Physics (CSE/IT)	3	0	0	3
3.	20ES1103	Engineering Science	Programming for Problem Solving	3	0	0	3
4.	20ES1104	Engineering Science	Basics of Electrical Engineering	3	0	0	3
5.	20HS1105	Humanities and Social Science	Technical English and Communication Skills	2	0	0	2
6.	20BS1151A	Basic Science	Engineering Physics Laboratory	0	0	3	1.5
7.	20ES1152	Engineering Science	Programming for Problem Solving Laboratory	0	0	3	1.5
8.	20HS1153	Humanities and Social Science	Technical English and Communication SkillsLaboratory	0	0	3	1.5
9.	20ES1154	Engineering Science	Computing and Peripherals Laboratory	0	0	2	1
10.	20MC1106	Mandatory Course	Technology and Society	1	0	0	-
Total				**15**	**0**	**11**	**19.5**
11.	20MC1107	Mandatory Course	Induction Program				-

Category	Credits
Basic Science Courses	3+3+1.5 = 7.5
Engineering Science Courses	3+3+1.5+1 = 8.5
Humanities and Social Science Courses	2+1.5=3.5
Mandatory Courses	0
TOTAL CREDITS	**19.5**

SEMESTER II **CONTACT HOURS: 27**

S.No	Course Code	Course Category	Course Name	L	T	P	Credits
1.	20BS2101	Basic Science	Laplace Transforms and Integral Calculus	3	0	0	3
2.	20BS2102	Basic Science	Engineering Chemistry	3	0	0	3
3.	20ES2103A 20ES2103B	Engineering Science	Object Oriented Programming using Python(CSE/ECE/IT) Python Programming (EIE)	3	0	0	3
4.	20ES2104A 20ES2104B 20ES2104C	Engineering Science	Basic Electronics Engineering (CSE/IT) Circuit Analysis (ECE) Network Theory (EIE)	3	0	0	3
5.	20ES2105	Engineering Science	Engineering Graphics	1	0	4	3
6.	20BS2151B	Basic Science	Engineering Chemistry Laboratory	0	0	3	1.5
7.	20ES2152A 20ES2152B	Engineering Science	Object Oriented Programming using Python Lab(CSE/ECE/IT) Python Programming lab (EIE)	0	0	3	1.5
8.	20ES2153	Engineering Science	Engineering Workshop	0	0	3	1.5
9.	20MC2106	Mandatory Course	Professional Ethics and Practice	1	0	0	-
Total				**14**	**0**	**13**	**19.5**

Category	Credits
Basic Science Courses	3+3+1.5 = 7.5
Engineering Science Courses	3+3+3+1.5+1.5 = 12
Humanities and Social Science Courses	0
Mandatory Courses	0
TOTAL CREDITS	**19.5**

VELAGAPUDI RAMAKRISHNA SIDDHARTHA ENGINEERING COLLEGE
SCHEME OF INSTRUCTION FOR FOUR YEAR UG PROGRAMME [VR20]
GROUP B (CE, EEE, ME)

SEMESTER I — CONTACT HOURS: 27

S.No	Course Code	Course Category	Course Name	L	T	P	Credits
1.	20BS1101	Basic Science	Matrices and Differential Calculus	3	0	0	3
2.	20BS1102	Basic Science	Engineering Chemistry	3	0	0	3
3.	20ES1103	Engineering Science	Programming for Problem Solving	3	0	0	3
4.	20ES1104A 20ES1104B 20ES1104C	Engineering Science	Introduction to Civil Engineering(CE) Mechanics for Engineers (EEE) Engineering Mechanics – I (ME)	3	0	0	3
5.	20ES1105	Engineering Science	Engineering Graphics	1	0	4	3
6.	20BS1151B	Basic Science	Engineering Chemistry Laboratory	0	0	3	1.5
7.	20ES1152	Engineering Science	Programming for Problem Solving Laboratory	0	0	3	1.5
8.	20ES1153	Engineering Science	Engineering Workshop	0	0	3	1.5
9.	20MC1106	Mandatory Course	Technology and Society	1	0	0	-
Total				**14**	**0**	**13**	**19.5**
10.	20MC1107	Mandatory Course	Induction Program				-

Category	Credits
Basic Science Courses	3+3+1.5 = 7.5
Engineering Science Courses	3+3+3+1.5+1.5 = 12
Humanities and Social Science Courses	0
Mandatory Courses	0
TOTAL CREDITS	**19.5**

SEMESTER II — CONTACT HOURS: 26

S. No	Course Code	Course Category	Course Name	L	T	P	Credits
1.	20BS2101	Basic Science	Laplace Transforms and Integral Calculus	3	0	0	3
2.	20BS2102A 20BS2102B	Basic Science	Engineering Physics (EEE) Physics for Engineers (CE/ME)	3	0	0	3
3.	20ES2103B	Engineering Science	Python Programming	3	0	0	3
4.	20ES2104D 20ES2104E 20ES2104F	Engineering Science	Engineering Mechanics(CE) Network Analysis (EEE) Engineering Mechanics – II (ME)	3	0	0	3
5.	20HS2105	Humanities and Social Science	Technical English and Communication Skills	2	0	0	2
6.	20BS2151A	Basic Science Course	Engineering Physics Laboratory	0	0	3	1.5
7.	20ES2152B	Engineering Science	Python Programming Laboratory	0	0	3	1.5
8.	20HS2153	Humanities and Social Science	Technical English and Communication Skills Laboratory	0	0	3	1.5
9	20ES2154	Engineering Science	Computing and Peripherals Laboratory	0	0	2	1
10.	20MC2106	Mandatory Course	Professional Ethics and Practice	1	0	0	-
Total				**15**	**0**	**11**	**19.5**

Category	Credits
Basic Science Courses	3+3+1.5 = 7.5
Engineering Science Courses	3+3+1.5+1 = 8.5
Humanities and Social Sciences	2+1.5 = 3.5
Mandatory Courses	0
TOTAL CREDITS	**19.5**

20BS1101
MATRICES AND DIFFERENTIAL CALCULUS
COMMON TO ALL BRANCHES

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

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 Multivariable 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 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	H	M			L							
CO2	H	M			L							
CO3	H	M			L							
CO4	H	M			L							

COURSE CONTENT

UNIT I

Matrices: Consistency of Linear System of Equations, Linear Transformations, Vectors, Eigen values and Eigen vectors, 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: Fundamental Theorems-Rolle's Theorem, Lagrange's Mean Value Theorem, Cauchy's Mean Value Theorem and Taylor's Theorem, Expansions of functions-Maclaurin's Series and Taylor's Series.
Application: Curvature, Radius of Curvature**.**

Functions of two or more Variables: 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: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

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, Linear Dependence of Solutions, Simultaneous Linear Equations with Constant Coefficients.
Application: L-C-R Circuits.

TEXT BOOK

1. B.S.Grewal , Higher Engineering Mathematics, Khanna Publishers, 44th Edition, 2019.

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/

20BS1102A/20BS2102A
ENGINEERING PHYSICS (For ECE/EEE/EIE Departments)

Course Category:	Institutional Core	**Credits:**	3
Course Type:	Theory	**Lecture -Tutorial-Practice:**	3 - 0 - 0
Prerequisites:	10 + 2 level Physics	**Continuous Evaluation:** **Semester end Evaluation:** **Total Marks:**	30 70 100

COURSE OUTCOMES

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

CO1	Employ physical laws of electrostatics and compute problems related to static electric fields.
CO2	Illustrate the laws of magnetostatics and solve various problems involving static magnetic fields.
CO3	Describe various types of electric and magnetic materials.
CO4	Understand the time varying electric and magnetic fields by applying appropriate Maxwell's equations.

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

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	**H**	**M**										
CO2	**H**	**M**										
CO3	**H**											
CO4	**H**	**L**										

COURSE CONTENT

UNIT – I : Electrostatics

Electrostatics: Coulomb's Law and Field Intensity, Electric Field due to Continuous Charge Distributions, Electric Flux Density, Gauss's Law, Applications of Gauss Law- Line charge, Surface charge, Volume charge, Electric Potential, Relation between E and V, Maxwell's Equation for static electric fields (Qualitative), Potential and Field of Electric Dipole, Energy Density in Electrostatic Fields.

UNIT – II : Magnetostatics

Magnetostatics: Biot-Savart's Law, Ampere's circuit law-Maxwell's equation, Applications of Ampere's law-Infinite line Current, Infinite sheet of current, Magnetic flux density-Maxwell's equation for static magnetic field, Magnetic Vector and Scalar potentials, Force due to magnetic fields - Force on a charged particle, Current element, Force between two current elements, Magnetic dipole, Magnetic Energy.

UNIT – III : Types of Electric and Magnetic Materials

Types of Electric and Magnetic Materials: Properties of electric materials- Conductors and Dielectrics, Convection and Conduction Currents, Polarization in Dielectrics, Dielectric Constant and Strength, Continuity Equation and Relaxation Time, Poisson's and Laplace's Equations, Electro static boundary conditions: Dielectric-Dielectric, Conductor-Dielectric, Conductor-Free Space. Types of magnetic materials, Magnetization in Materials, Magnetic boundary conditions.

UNIT – IV : Time Varying Fields and Electro Magnetic Waves

Time Varying Fields: Faraday's Law, Transformer and Motional Electro motive Forces, Displacement Current, Maxwell's Equations in Final Forms, Time Harmonic Fields.

Electro Magnetic Waves: Wave propagation in lossy dielectrics, lossless dielectrics, free space, good conductors, Poynting Theorem.

TEXT BOOKS

[1]. Resnick, Halliday and Krane, "Physics", 5th edition, Wiley India Pvt. Ltd, New Delhi, 2016.
[2]. Matthew N. O. Sadiku, "Principles of Electromagnetics", 4th edition, Oxford University Press, New Delhi, 2009.

REFERENCE BOOKS

[1]. R.K. Gaur and S.L. Gupta, "Engineering Physics", 8th Edition Reprint,Dhanpat Rai Publications (P) LTD., New Delhi, 2013
[2]. W. H. Hayt and J. A. Buck, "Engineering Electromagnetics", 7th edition, Tata McGraw Hill, New Delhi, 2006
[3]. Joseph A. Edminister, "Electromagnetics – Theory and problems", 2nd edition, Schaum's outline series, MCGraw Hill,1993

E-RESOURCES AND OTHER DIGITAL MATERIAL

1. http://nptel.iitm.ac.in/video.php?subjectId=10810607
2. http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT-%20Guwahati/em/index.htm
3. http://www.mike-willis.com/Tutorial/PF2.htm

20BS1102B
APPLIED PHYSICS (For CSE/IT Departments)

Course Category:	Institutional Core	**Credits:**	3
Course Type:	Theory	**Lecture -Tutorial-Practice:**	3 - 0 - 0
Prerequisites:	10 + 2 level Physics	**Continuous Evaluation:** **Semester end Evaluation:** **Total Marks:**	30 70 100

COURSE OUTCOMES

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

CO1	Understand the importance of quantum mechanics.
CO2	Analyse and understand various types of lasers and their applications.
CO3	Elaborate different types of optical fibers and understand the concept of Superconductivity
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 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	**H**											
CO2	**H**		**M**									
CO3	**H**		**L**									
CO4	**H**				**M**							

COURSE CONTENT

Unit-I : Quantum Mechanics

Quantum Mechanics: Dual nature of light, Matter waves and Debroglie's hypothesis, Davisson-Germer's experiment,G. P. Thomson experiment, Heisenberg's uncertainty principle and its applications (Non existence of electron in nucleus, Finite width of spectral lines), One dimensional time independent and time dependent Schrödinger's wave equations, physical significance of wave function, Particle in a box (One dimension).

Unit-II :Lasers

Lasers: Introduction, Characteristics of laser, Basic Principles of lasers (absorption, spontaneous emission,stimulated emission), Requirements of lasers (pumping, population inversion, cavity resonance), Einstein's coefficients, different types of lasers: solid-state lasers (Ruby, Neodymium), gas lasers (He-Ne, CO_2), Semiconductor laser, applications of lasers in science, engineering and medicine.

Unit- III : Fibre Optics and Superconductivity

Fibre Optics: Introduction, Fundamentals of optic fibre, Propagation of light through optical fiber, Types of optical fibers, Numerical aperture, Fractional Refractive Index change, Fiber optics in communication and its advantages.

Superconductivity: Introduction, Critical parameters, Flux quantization, Meissner effect, Types of Superconductors, BCS theory, Cooper pairs, London's equation- penetration depth, high temperature super conductors, Applications of superconductors.

TEXT BOOKS

[1]. M.N. Avadhanulu & P.G. Kshirsagar, Engineering Physics, S. Chand publications, Revised Edition, 2014
[2]. P.K. Palanisamy, "Applied Physics", Scitech Publications(INDIA) Pvt. Ltd., Fifth Print, 2008.

REFERENCE BOOKS

[1]. B. K. Pandey and S. Chaturvedi, 'Engineering Physics' Cengage Learning', Delhi, 2012.
[2]. O. Svelto, Principles of Lasers, 5th Edition, Springer, London, 2010
[3]. M.R. Srinivasan, "Engineering Physics", New age international publishers, First Edition, 2011.
[4]. Gaur and Gupta, Engineering Physics, Dhanpatrai publishers,8th edition 2008.

E-RESOURCES AND OTHER DIGITAL MATERIAL

1. https://ocw.mit.edu/courses/physics/8-04-quantum-physics-i-spring-2013/lecture-videos/
2. https://ocw.mit.edu/resources/res-6-005-understanding-lasers-and-fiberoptics-spring-2008/laser-fundamentals-i/
3. http://nptel.ac.in/courses/112106198/19
4. https://www.peterindia.net/NanoTechnologyResources.html

20BS1102 / 20BS2102
ENGINEEERING CHEMISTRY

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

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 concept of phase equilibrium to different materials and the knowledge of working of electrodes and batteries in various technological fields.
CO3	Evaluate corrosion processes as well as protection methods.
CO4	Apply the knowledge of conventional fuels and mechanistic aspects of conducting polymers for their effective and efficient utilisation.

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1		**H**										
CO2	**M**											
CO3			**H**									
CO4					**M**							

COURSE CONTENT

UNIT I **(10 hours)**

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 **(10 hours)**

Phase rule and applications: Definition and explanation of the terms – phase, component and degree of freedom, phase rule equation, phase equilibria of single component system – water system, two component system – silver-lead system, applications of phase rule.

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 - $Li/SOCl_2$ battery and $Li_xC/LiCoO_2$ battery – construction, working and advantages.
Fuel cells: General working principle of a fuel cell, examples, chemistry of H_2-O_2 fuel cell.

UNIT III **(10 hours)**

Corrosion principles: Introduction, definition, reason for corrosion, examples – 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.

UNIT IV **(10 hours)**

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.

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

TEXT BOOKS

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

REFERENCE BOOKS

[1] Sunita Rattan , "A Textbook of Engineering Chemistry", S.K. Kataria & Sons, New Delhi, First edition 2012.
[2] P.C. Jain , "Engineering Chemistry", Dhanpat Rai Publishing Company (P) Limited, New Delhi, 15th edition.
[3] B.S. Bahl, G. D. Tuli and Arun Bahl, "Essentials of Physical Chemistry", S. Chand and Company Limited, New Delhi.
[4] O. G. Palanna, " Engineering Chemistry", Tata McGraw Hill Education Pvt. Ltd., New Delhi.

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

20ES1103
Programming for Problem Solving

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

COURSE OUTCOMES

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

CO1	Understand the different types of problem solving approaches
CO2	Apply the selections, loops, arrays, and string concepts in C to solve problems.
CO3	Apply functions and pointer concepts in C to solve problems.
CO4	Solve problems using enum, structures, unions, and file handling functions.

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	H	L												
CO2		M	H										M	
CO3		M	H										H	
CO4		M	H										H	

COURSE CONTENT

UNIT I

Introduction to computer-based problem solving: Requirement of problem solving by computers, problem definition, Use of examples for problem solving, similarities between problems, Problem solving strategies, steps involved in problem solving.

Program design and implementation issues: programs and algorithms, top-down design and step-wise refinement, construction of loops-basic programming constructs, Implementation, programming environment.

Algorithms for problem solving: Exchanging values of two variables, Summation of a set of numbers, decimal to binary base conversion, reversing the digit of an integer, to find greatest common divisor (GCD) of two numbers, to verify whether an integer is prime or not, organize a given set of numbers in ascending order, find the square root of an integer, factorial of a given number, generate the Fibonacci sequence for n terms, evaluate sin(x) as sum of series, to find the value of the power of a number raised by another integer, reverse order elements of an array, find largest number in an array, print elements of upper triangular matrix, multiplication of two matrices, to compute to roots of a quadratic equation $ax^2+bx+c=0$.

UNIT II

Introduction to the C Language: Background of C program, Identifiers, Types, Variables, Constants, Memory Layout, Input/Output, Programming Examples.

Structure of a C Program: Logical Data and Operators, Expressions, Precedence and Associatively, Evaluating Expressions, Type Conversion, Statements, Storage Class.

Selection: Two-way Selection, Multiway Selection, More Standard Functions.

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

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

UNIT III

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

Functions: Functions in C, User Defined Functions, Call by Value, Call Value Reference, Inter-FunctionCommunication, Standard Functions, Scope.

Pointers: Introduction to Pointer, 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.

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.

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

TEXT BOOKS

[1]. Programming and Problem Solving Through "C" Language By HarshaPriya, R. Ranjeet · Firewall media 2006

[2]. Behrouz A. Forouzan and Richard F. Gilberg, “Computer Science A Structured Programming Approach Using C”, CENGAGE Learning, Third Edition

REFERENCE BOOKS

[1]. Anil B. Chaudhuri, “Flowchart and Algorithm Basics: The Art of Programming”, Mercury Learning & Information, 2020.

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

[3]. YashwantKanetkar , “Let us C” , BPB Publications, 16th Edition 2017.

[4]. Kernighan and Ritchie,“The C programming language”, The (Ansi C Version), PHI, second edition.

[5]. Paul J. Dietel and Harvey M. Deitel, “C: How to Program”, Prentice Hall, 8th edition (Jan 19 ,2021).

[6]. K.R.Venugopal, Sundeep R. Prasad, “Mastering C”, McGraw Hill, 2nd Edition, 2015.

E-RESOURCES AND OTHER DIGITAL MATERIAL

[1] Computer Science and Engineering - Noc:problem Solving Through Programming in C. [online] https://nptel.ac.in/courses/106/105/106105171/

[2] Computer Science and Engineering - Noc:introduction To Programming in C. [online] https://-nptel.ac.in/courses/106/104/106104128/

[3] C For Everyone: Structured Programming. [online]https://www.coursera.org/learn/c-structured -programming

[4] Advanced C Programming CourseTim Academy-Jason Fedin. [online] https://www.udemy.com/-course/advanced-c-programming-course/

20ES1104
BASICS OF ELECTRICAL ENGINEERING
(CSE,ECE,EIE,IT)

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

COURSE OUTCOMES

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

CO1	Analyze Electric Circuit fundamentals.
CO2	Understand the basic concepts of Alternating Quantities and MagneticCircuits.
CO3	Analyze the basic concepts of Electric Machines
CO4	Understand Measuring Instruments & Solar Photo Voltaic Systemconcepts

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	H	H			M								L	
CO2	H	H											L	
CO3	M	L			M								L	
CO4	M	L											L	

COURSE CONTENT

UNIT - I

Introduction to Electrical Engineering: Electric Current, Electromotive force,Electric power and energy, Basic circuit components- Resistors-Inductors-Capacitors. Electromagnetic Phenomenon and Related Laws, Kirchhoff's laws.

Network Analysis: Network sources-Ideal independent voltage source, Idealindependent current source, Dependent sources, Practical voltage and current sources, Source conversion, Voltage and Current division rule, series and parallel connection of R, L and C, Star-Delta or, Delta- Star transformation. Mesh andNodal Analysis (with independent sources only).

UNIT – II

Alternating Quantities: Introduction, Generation of a.c. voltages, Waveforms and Basic Definitions, Relationship between frequency, speed and number ofpoles, Root Mean Square and Average values of alternating current and voltages,Form Factor and Peak Factor, Phasor representation of alternating quantities.

Magnetic Circuits: Introduction, Magnetic Circuits, Magnetic Field Strength (H),Magneto motive Force, Permeability, Reluctance, Analogy between Electric andMagnetic Circuits, Magnetic potential drop, Magnetic circuit computations, Selfand Mutual Inductance, Energy in Linear Magnetic Systems

(Derivation for pure inductor).

UNIT - III

DC Machines: Introduction, Construction of dc machines, Armature Windings,Generation of dc voltage and torque production in a dc machine,Operation of a dc machine as a generator, Operation of dc machine as a motor.

Induction Motors: Introduction, Constructional features of three-phase induction motors, Principle of operation of three-phase induction motor- Slip and rotor frequency, Voltage and current equations and equivalent circuit of an induction motor.

UNIT - IV

Measuring Instruments: Introduction, Classification of instruments, Operating Principles, Essential features of measuring instruments, Ammeters and Voltmeters,Measurement of power.

Solar photovoltaic Systems: Solar cell fundamentals, characteristics,classification, module, panel and array construction, Maximizing the solar PVoutput and load matching, Maximum Power Point Tracker Basic Algorithm and Flowchart, PV system components, solar PV systems and solar PV applications.

TEXT BOOKS

[1] T.K. Nagasarkar and M.S. Sukhja, “Basic Electric Engineering”, 2nd ed.,Oxford University press 2011.

REFERENCE BOOKS

[1] B.H.Khan, ”Non Conventional Energy Resources”, 2nd ed., Mc.Graw HillEducation PvtLtd.,New Delhi,2013.
[2] AshfaqHussain, HaroonAshfaq, “ Fundamentals of Electric Engineering” 4th ed., DhanpatRai& Co, 2014.
[3] I.J.Nagarath and Kothari, “Theoy and Problems of Basic Electric Engineering”, 2nd ed., PHI Pvt. Ltd., 2016.

E-RESOURCES AND OTHER DIGITAL MATERIAL

[1]. http://nptel.ac.in/courses/108108076/

20ES1104A
Introduction to Civil Engineering (CE)

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

COURSE OUTCOMES

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

CO1	Understand the classification of structures and buildings
CO2	Know the classification of stones, bricks and tiles
CO3	Recognize the physical properties of cement and aggregates
CO4	Know the classification of timber, types of steel and types of paints

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	H						M							H
CO2	H						M							H
CO3	H						M							H
CO4	H						M							H

COURSE CONTENT

UNIT – I

General Introduction to Civil Engineering – History of Civil Engineering – Relevance of Civil Engineering in the overall infrastructural development of the country.

Types and classification of structures – buildings, towers, chimneys, bridges, dams, retaining walls, water tanks, silos, roads, railways, Railways and pipelines (Brief description only)

Definition and types of buildings as per National Building Code of India (brief description only).

UNIT – II

Stones: Classification of stones – Qualities of good building stones- Quarrying – Dressing – Tests – Specifications – Uses of Common building stones.

Bricks: Composition of good brick earth – Classification – Qualities of good bricks – Field and laboratory tests – Specifications, Flyash bricks, AAC, CLC blocks

Tiles: Classification – Manufacture – properties – Tests – Specifications, ceramic, vitrified.

UNIT III

Cement: Basic Ingredients – Grades – Properties – Tests – Brief explanation.

Aggregates: Fine and Course Aggregate – Properties – Uses.

Cement Mortar: Types and preparation

UNIT IV

Timber: Properties – Uses – Classification – Seasoning – Defects – Preservation – Tests: Hard board and particle board – Manufacture and use, MDF, UPC etc.

Steel: Structural steel and steel as reinforcement – Types – Properties – Uses – Market Forms, rolled steel, cold formed steel, light gauge structural steel, Round Bars, Square Bars, T,I and Angle sections.

Paints: General, Painting, Polishing, wall paper, white washing, colourwashing,emulsion painting.

TEXT BOOKS

1. Rangawala, S.C. and Dalal, K.B. Engineering Materials, Charotar Publishing House.
2. Kandya, A.A., Elements of Civil Engineering, Charotar Publishing House

REFERENCE BOOKS

1. Chen, W-F-and Liew, J.Y.R.,(Eds), The Civil Engineering Handbook, Secons Edition, CRC Press (Taylor and Francis)
2. Dalal. K.R., Essentials of Civil Engineering, Charotar Publishing House
3. Gopi.S., Basic Civil Engineering, Pearson Publishers

20ES1104B
MECHANICS FOR ENGINEERS (EEE Branch)

Course Category:	Engineering Sciences	**Credits:**	3
Course Type:	Theory	**Lecture -Tutorial-Practice:**	3 - 0 - 0
Prerequisites:	Basic Mathematics, Physics at (10 + 2) level	**Continuous Evaluation:** **Semester end Evaluation:** **Total Marks:**	30 70 100

COURSE OUTCOMES

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

CO1	Apply equilibrium equations to analyze planar concurrent and parallel forces
CO2	Analyze coplanar general case of force systems.
CO3	Evaluate centroids and determine Area moment of inertia of plane figures
CO4	Evaluate the moment of inertia of material bodies and analyze the fixed axis rotation of rigid bodies.

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	M	L												L
CO2	M	L												L
CO3	M													L
CO4	M	L												L

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.

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

UNIT II

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, Classification of friction, Laws of dry friction, Co-efficient of friction, Angle of friction, Angle of repose, Cone of friction, Wedge friction

UNIT III

CENTROIDS: Determination of centroids by integration method, Centroids of composite plane figures.

AREA 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, Parallel axis theorem, Moment of inertia for composite areas

UNIT IV

MOMENT OF INERTIA OF MATERIAL BODIES: Moment of inertia of a rigid body – Moment of inertia of laminas- slender bar, rectangular plate, Circular plate, circular ring, Moment of inertia of 3D bodies- cone, solid cylinder, sphere & parallelopiped.

KINEMATICS OF A RIGID BODY IN ROTATION ABOUT A FIXED AXIS: Kinematics of rotation

KINETICS OF A RIGID BODY IN ROTATION ABOUT A FIXED AXIS: – 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, 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 ", XIIIth edition, Umesh Publications , 2006 (For numerical Problems using S.I.System of Units).

REFERENCE BOOKS

[1] Andrew pytel & Jaan Kiwsalaas , " Engineering Mechanics: Statics and Dynamics ", IIIrd edition, Cengage Learning , 2013.

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

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

E-RESOURCES AND OTHER DIGITAL MATERIAL

[1] http://emweb.unl.edu/
[2] https://nptel.ac.in/courses/122/104/122104015/

20ES1104C
Engineering Mechanics-I (ME)

Course Category:	Engineering Science	**Credits:**	3
Course Type:	Theory	**Lecture -Tutorial-Practice:**	3 - 0 - 0
Prerequisites:	Basic Mathematics, Physics at (10 + 2) level	**Continuous Evaluation:** **Semester end Evaluation:** **Total Marks:**	30 70 100

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 evaluate centroid and moment of inertia 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 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	H	M												L
CO2	H	M												L
CO3	H	M												L
CO4	H	H												L

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.

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.

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 and Method of Sections

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, 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] Engineering Mechanics by S. Timoshenko & D. H. Young, 4th Edition, 2007, McGraw Hill International Edition. (For Concepts and symbolic Problems).
[2] Engineering Mechanics Statics and dynamics by A. K. Tayal, 13th Edition, 2006, Umesh Publication, Delhi, (For numerical Problems using S.I.System of Units).

REFERENCE BOOKS

[1] Beer and Johnston, "Vector Mechanics for Engineers Statics and Dynamics",IIIrd edition, Tata McGraw Hill, 2010.
[2] SS Bhavikatti and KG Rajasekharappa, "Engineering Mechanics", IVth Edition, New Age International Private Limited, 2012
[3] K.Vijaya Kumar Reddy and J Suresh Kumar, " Singer's Engineering Mechanics Statics and Dynamics", IIIrd Edition BS Publications, 2010.

E-RESOURCES AND OTHER DIGITAL MATERIAL

[1] http://emweb.unl.edu/
[2] https://nptel.ac.in/courses/122/104/122104015/

20ES1105 / 20ES2105
ENGINEERING GRAPHICS

Course Category:	Institutional Core	**Credits:**	3
Course Type:	Theory & Practice	**Lecture -Tutorial-Practice:**	1 - 0 - 4
Prerequisites:	Nil	**Continuous Evaluation:** **Semester end Evaluation:** **Total Marks:**	30 70 100

COURSE OUTCOMES

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

CO1	Understand the Scales and conics.
CO2	Draw Orthographic projections of points, Lines and Planes.
CO3	Draw Orthographic projections of Solidsand to understand basics of Auto CAD.
CO4	Understand the sections, Developmentsof solids and draw isometric views using Auto CAD.

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
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)

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)

INTRODUCTION TO AUTO CAD: Basic introduction and operational instructions of various commands in AutoCAD.(Internal Evaluation only)

UNIT – IV

Sections and Development of Surfaces of Right Angular Solids:

Sections and sectional views of right angular solids of Prism, Pyramid and Cone, Development of surfaces of Right Regular Solids of Prism, Pyramid and Cone.

Isometric Projections: Conversion of isometric views into Orthographic Projections of simple castingsusing Auto CAD. (Treatment is limited to simple objects only, Internal Evaluation only).

TEXT BOOKS

[1] BasanthAgrawal& C M Agrawal," Engineering Drawing", McGraw Hill Education Private Limited, New Delhi.
[2] N.D. Bhatt "Engineering Drawing", Charotar Publishing House, Anand. 53rd Edition – 2019.

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.
[2] http://www.me.umn.edu/courses/me2011/handouts/drawing/blanco-tutorial.html# isodrawing.
[3] https://onlinecourses.nptel.ac.in/noc20_me79/preview
[4] http://nptel.ac.in/courses/112/103/112103019/

20HS1105/20HS2105
TECHNICAL ENGLISH AND COMMUNICATION SKILLS

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

COURSE OUTCOMES

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

CO1	Develop administrative and professional compilations with felicity of expression
CO2	Demonstrate Proficiency in advanced reading and context oriented writing
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 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1						M				H		
CO2						M			M	H		
CO3						M			M	H		
CO4										H		

COURSE CONTENT

UNIT I

Professional Writing Skills:-

- **Professional Letters**:
  Business, Complaint and Transmittal – Purpose, Style and format with special reference to Block Format and Modified Block Format
- **Paragraph and Essay Writing**:
  Linkers , Descriptive and Analytical with illustrations
- **Effective writing Practice**-
  Appropriateness. Brevity, clarity, cogency and coherence with guided and semi-controlled compilations including the use of Idiomatic expressions

UNIT II

Reading comprehension and Discourse development Skills

- **Analytical and critical reading** - critical, creative and lateral thinking- language and thinking – thinking process and language development.

- **Effective reading Strategies** - Skimming, Scanning, Eye span, fixation, taming Regression, and Issues and Challenges of Vocalization and sub-vocalization.
- **Context-oriented Dialogue/ Argument writing** - Extending Invitation, Reciprocation, Acceptance, Concurrence, Disagreeing without being disagreeable- Discourse/dialogue Development and identification of inconsistencies in pre-prepared dialogues

UNIT III

Vocabulary and Functional English

- **Vocabulary for Competitive examinations** (A list of 500 High frequency words) Synonyms, Antonyms, Matching Homonyms, Homophones and nearer words along with Root words
- **Verbal analogies**(Single Unit) – Synonym Relation, Antonym relation, Object- Operator relation, Object-Obstacle/obstruction relation, Sequence Relation, Place-Monument Relation, Science- area of activity relation, Profession- Tool relation, Gender relation, Diminutive relation, etc
- **Functional Grammar** with special reference to Tense, Concord, Articles, pronoun-referent, Prepositions, use of Gerund ,Parallelism, etc (A Representative collection of 100 sentences)

UNIT IV

Technical Communication skills:

- **Technical Proposal writing**- Characteristics, Proposal Superstructure, Checklist , Formal Proposal
- **Technical Vocabulary**- Basic explanations and Description
- **Technical Report writing**- Informational Reports and Feasibility Report- Types, Components, Style and Formats

TEXT BOOKS

[1] Martin Cutts, Oxford guide to Plain English, 7th Impression, Oxford University Press, 2011
[2] M. Ashraf Rizvi, Effective Technical Communication, Tata McGraw-Hill, New Delhi, 2005.
[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, III Edition, Oxford University Press,2001
[3] V.Sethi and P.V. Dhamija, A Course in Phonetics and Spoken English, II Edition, PHI, 2006

E-RESOURCES AND OTHER DIGITAL MATERIAL

[1] https://www.britishcouncil.org/english
[2] www.natcorp.ox.ac.uk/Wkshops/Materials/specialising.xml?ID=online
[3] https://www.uni-marburg.de/sprachenzentrum/selbstlernzentrum/.../apps_for_esl.pdf

20MC1106
TECHNOLOGY AND SOCIETY

Course Category:	Institutional Core	**Credits:**	--
Course Type:	Mandatory Learning	**Lecture -Tutorial-Practice:**	1 - 0 - 0
Prerequisites:		**Continuous Evaluation:** **Semester end Evaluation:** **Total Marks:**	100 -- 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 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	H							L				
CO2	H				M		L					
CO3	H							L				
CO4	H				M		L					

COURSE CONTENT

UNIT – I **(4 lectures)**

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

UNIT – II **(4 lectures)**

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

UNIT – III **(4 lectures)**

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 like information technology and biotechnology, and its implications on society.

UNIT – IV **(4 lectures)**

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 Abdulkalan 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.

20BS1151A / 20BS2151A
ENGINEERING PHYSICS LAB (ECE,EEE & EIE Departments)

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

COURSE OUTCOMES

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

CO1	Test optical components using principles of interference and diffraction of light
CO2	Use spectrometer, travelling microscope and function generator in various experiments
CO3	Determine the V-I characteristics of photo cells and appreciate the accuracy in measurements

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1				H								
CO2				H								
CO3	M			H								

COURSE CONTENT

1. Figure of merit of a galvanometer
2. LCR circuit-Study of Resonance
3. Variation of magnetic field along the axis of current-carrying circular coil
4. Wedge Method-Measurement of thickness of a foil
5. Solar cell –Determination of Fill Factor
6. AC Sonometer –Verification of vibrating laws
7. B-H Curve Unit- Determination of hysteresis loss
8. Hall effect –Hall coefficient measurement
9. Diffraction grating-Measurement of wavelength
10. Torsional pendulum-Measurment of Rigidity Modulus
11. Photo cell - Study of V-I Characteristics, determination of work function
12. Optical fiber-Determination of Numerical aperture

TEXT BOOKS

[1] Madhusudhan Rao, “Engineering Physics Lab Manual”, Ist ed., Scitech Publications, 2015
[2] Ramarao Sri, ChoudaryNityanand and Prasad Daruka, ”Lab Manual of Engineering Physics”., Vthed., 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

20BS1151A
ENGINEERING PHYSICS LABORATORY (CSE& IT Departments)

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

COURSE OUTCOMES

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

CO1	Use function generator, spectrometer and travelling microscope in various experiments
CO2	Test optical components using principles of interference and diffraction of light
CO3	Determinethe V-I characteristicsof solar cell and photo celland appreciate the accuracy in measurements

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1				H								
CO2				H								
CO3	M			H								

COURSE CONTENT

1. Photo cell-Study of V-I Characteristics, determination of work function
2. Newton's Rings-Radius of curvature of plano convex lens.
3. Compound pendulum-Measurement of 'g'
4. LCR circuit- Study of Resonance
5. AC Sonometer –Verification of vibrating laws
6. Solar cell–Determination of Fill Factor
7. Diffraction grating-Wavelength of laser light
8. Optical fiber-Study of attenuation and propagation characteristics
9. Diffraction grating-Measurement of wavelength of mercury source
10. Hall effect –Hall coefficient measurement
11. Figure of merit of a galvanometer
12. Variation of magnetic field along the axis of current-carrying circular coil

TEXT BOOKS

[1] Madhusudhan Rao, "Engineering Physics Lab Manual", Isted., Scitech Publications, 2015
[2] Ramarao Sri, ChoudaryNityanand 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

20BS1151B/ 20BS2151B
ENGINEERING CHEMISTRY LABORATORY

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

COURSE OUTCOMES

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

CO1	Analyze ores, commercial samples, quality parameters of water samples from different sources
CO2	Perform quantitative analysis using instrumental methods.
CO3	Apply the knowledge of preparation of polymers, separation of ions, mechanism of corrosion and photochemical reactions.

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1		H										
CO2				M								
CO3	M											

COURSE CONTENT

List of Experiments:

1. Determination of MnO_2 in Pyrolusite / Iron in Haematite ore
2. Determination of total alkalinity of a water sample
3. Determination of purity of a boric acid sample
4. Conductometric analysis of a strong base using a strong acid
5. Determination of total hardness of a water sample
6. Determination of copper in a given sample
7. Chemistry of blueprinting
8. Determination of Mohr's salt - Permanganometry
9. Determination of Mohr's salt - Dichrometry
10. Comparison of corrosion rates of different metals
11. Determination of available chlorine in a bleaching powder sample
12. Determination of chlorides in a water sample
13. pH metric analysis of a strong base using a strong acid
14. Preparation of urea-formaldehyde resin
15. Separation of ions by paper chromatography

REFERENCE BOOKS

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

[2] *Sunitha Rattan*, "Experiments in Applied Chemistry", S.K. Kataria & Sons, New Delhi, 2nd edition.

20ES1152
PROGRAMMING FOR PROBLEM SOLVING LABORATORY

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

COURSE OUTCOMES

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

CO1	Implement the use of programming constructs in a structural programming language.
CO2	Apply the selections, loops, arrays, and string concepts in C to solve problems.
CO3	Apply functions, pointer, and Enum concepts in C to solve problems.
CO4	Solve problems using structures, Unions, and file handling functions.

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	L		H											
CO2		L	H										L	
CO3		L	H										H	
CO4		L	H										H	

COURSE CONTENT

WEEK – 1 : Introduction to C Programming

a) The Structure of C Program with a sample program.
b) Use identifiers, data types, format specifiers, constants, and variables declaration and initialization to write simple C programs.
c) Write simple C programs using preprocessor commands and simple I/O statements.

WEEK – 2 : Data Types and Variable Declarations

a) Use void, integral and floating point data types in different scenarios to write programs.
b) Use various primitive data types for performing different mathematical operations.
c) Programs to perform mathematical operations using various operators in C

WEEK – 3 : Selection – Making Decisions

a) Write programs using the if...else selection statements.

b) Use nested if...else statement to solve problems that need multi-level selection making decisions.
c) Write programs that use switch...case and else...if multi way statements to select one out of several options.

WEEK – 4 : Looping Constructs and Their Applications

a) To have a clear idea on loop initialization, validation and updation.
b) Write programs using the while, for, or do...while loops.
c) To understand the logic and adopt best looping construct for different kinds of problems.
d) Design and develop programs based on Iterative loops using While, Do While, For, Nested For.

WEEK – 5 : Unconditional Control Transfer Statements

a) Write programs using of (break, and continue) unconditional control transfer statements.
b) Use the goto statement to transfer the control from one part to another part of a program and the use of return statement to end the execution of a called function.

WEEK – 6 : Arrays and Their Applications

a) To utilize one dimensional and multi-dimensional arrays to solve problems that use set(s) of similar type input data.
b) To write programs that perform multiple classical operations like searching, sorting, updation, or deletion on array elements.

WEEK – 7 : Strings, String I/O and Manipulation Functions

a) To write programs that work on read, write and manipulate fixed length and variable-length strings and/or arrays of strings
b) To write programs that use predefined string I/O functions.
c) To write programs that use string manipulation functions from the string library.

WEEK – 8 : Concepts of User Defined Functions

a) Design and develop programs depending on functions both user defined andstandard library functions in C with different approaches.
b) To write a program using more than one function with or without parameters and function return type.

WEEK – 9 : Pointers and Their Applications

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 a program.
d) To write programs using static and dynamic memory allocation.

WEEK – 10 : Structure, Union, and Enumeration

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
c) Programs to pass structure as an argument to a function
d) To write C programs using enumeration data types, an easiest way of mapping symbolic names to integer values.

WEEK – 11 : File Handling Operations

a) Programs to open and close text and binary files using file I/O commands.
b) Write programs to perform read and write operations using the formatting I/O and character I/O

functions.

c) Apply file positioning, status and system commands based on a problem requirements.

WEEK – 12 : Command Line Arguments

a) To use command line arguments to pass inputs in a single line while executing a program through the DOS command prompt or Linux terminal.

b) To use atoi function to convert a default string value argument to an integer value inside the main function in a program.

c) To use atof function to convert a default string value argument to a float value inside the main function in a program.

Text Book(s)

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

REFERENCE BOOKS

[1] Anil B. Chaudhuri, "Flowchart and Algorithm Basics: The Art of Programming", Mercury Learning & Information, 2020.

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

[3] YashwantKanetkar , "Let us C" , BPB Publications, 16th Edition 2017.

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

[5] Paul J. Dietel and Harvey M. Deitel, "C: How to Program", Prentice Hall, 8th edition (Jan 19, 2021).

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

E-RESOURCES AND OTHER DIGITAL MATERIAL

1] Computer Science and Engineering - Noc:problem Solving Through Programming in C. [online] https://nptel.ac.in/courses/106/105/106105171/

[2] Computer Science and Engineering - Noc:introduction To Programming in C. [online] https://-nptel.ac.in/courses/106/104/106104128/

[3] C For Everyone: Structured Programming. [online]https://www.coursera.org/learn/c-structured -programming

[4] Advanced C Programming CourseTim Academy-Jason Fedin. [online] https://www.udemy.com/-course/advanced-c-programming-course/

20HS1153 / 20HS2153
TECHNICAL ENGLISH AND COMMUNICATION SKILLS LABORATORY

Course Category:	Institutional Core	**Credits:**	1.5
Course Type:	Practical	**Lecture -Tutorial-Practice:**	0 - 0 - 3
Prerequisites:	Basic understanding of the language skills viz Listening, Speaking, Reading and Writing, including Sentence construction abilities	**Continuous Evaluation:** **Semester end Evaluation:** **Total Marks:**	30 70 100

COURSE OUTCOMES

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

CO1	Develop active and authentic listening comprehension skills relevant for the professional world.
CO2	Execute web related(On-line) communication with felicity of expression
CO3	Apply relevant speech patterns including standard pronunciation
CO4	Demonstrate Proficiency in Interpersonal Communication with fluency and accuracy

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1						H				H		
CO2									M	H		
CO3										H		
CO4									M	H		

COURSE CONTENT

UNIT I

Listening Skills:

- **Exposure to structured and open talks**- Active listening, Appreciative listening, Biased listening, Critical listening Empathetic listening, Judgmental listening
- **Content-oriented Listening Skills** :
  Short Conversations- 5-10 minute duration- components, statistics, nominal and other references
- **Concept oriented/ purposive Listening skills**:
  Long Conversations- 10-30minute duration -
- **Problems in comprehension & retention** – Note-taking practice – Listening tests-
- **Overcoming Barriers to listening**: Physical & psychological – Steps to overcome them with demonstration and practice

Unit-II

Professional and On-line drafting skills:

- **Professional drafting skills** : Circular, Notice, Executive summary
- **E-mail etiquette**- Awareness with Illustrations and practice
- **Elements of Chat-room interaction**- courtesy, techniques of argumentation
- **Written Response to web-content**- conciseness with accountability
- **Data interpretation-** compiling analytical, comparative and critical observations by interpreting graphs, charts, etc.

UNIT III

Phonetics and Speech patterns:

- **Speech Mechanism** – Organs of speech and patterns of articulation of speech sounds.
- **Vowels, Consonants and Diphthongs**- Transcription using International Phonetic Alphabet
- **Word Stress and Rhythm-** practice
- **Intonation pattern practice**- Tones , Tone group boundaries and Tonal variations
- **Strong forms and weak forms in Connected speech** **-** Illustrations and Practice

UNIT IV

Interpersonal Spoken communication skills:

- **Fluency & accuracy in speech** –Improving self-expression
- **Listener oriented speaking** - Interpersonal Conversation- Manner and Temper
- **Developing persuasive speaking skills-** Role play
- **Overcoming Barriers to speaking** – Building self-confidence– through Conversation practice
- **Improving responding capacity** - Extempore speech practice

TEXT BOOKS

1. Garner, Bryan A, HBR Guide to Better Business Writing, Harvard Business Review Press, Boston, Massachusetts, 2013.
2. Exercises in Spoken English, Prepared by Department of Phonetics and Spoken English, CIEFL,(Currently English and Foreign Languages University) OUP, 21st Impression, 2003

REFERENCE BOOKS

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

E-RESOURCES AND OTHER DIGITAL MATERIAL

1. ODll Language Learner's Software, Orell Techno Systems
2. Visionet Spears Digital Language Lab software Advance Pro
3. www.natcorp.ox.ac.uk, *British National Corpus*

ENGINEERING WORKSHOP
20ES1153 / 20ES2153

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

COURSE OUTCOMES

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

CO1	Understand the basic joints 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 injection moulding and 3D printing
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 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1			**M**					**L**			**H**	**M**		**M**
CO2			**M**					**L**			**H**	**M**	**M**	**M**
CO3			**M**					**L**			**H**	**M**		
CO4						**L**							**L**	**L**
CO5							**M**						**L**	**L**

COURSE CONTENT

PART-A

Carpentry:

a. Demonstration of Cross half lap and T joints. (1 class)
b. Demonstration of power tools.

Electrical Wiring:

a. Fundamentals of Electric wiring and practice of Series wiring. (1 class)

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. (2 classes)

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

Welding:

a. Preparation of Corner Joint using arc welding process. (1 class)

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

Manufacturing processes:

a. Preparation of a small plastic part using injection moulding process. (1 class)

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

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 classes)

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. (2 classes)

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.

PART-B

GROUP ACTIVITY (4 classes)

Students must prepare a Working model / Assembly using the knowledge gained from the above trades.

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 MATERIALL

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/

20ES1154/20ES2154
COMPUTING AND PERIPHERALS LABORATORY

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

COURSE OUTCOMES

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

CO1	Able to assemble a PC and install operating system and other software.
CO2	Able to trouble shoot hardware and software issues.
CO3	Able to configure network settings to connect to internet.
CO4	Able to createdocuments, presentations and spread sheets using office productivity tools.

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	H	H										
CO2	H	M							H			
CO3	H			L	M							
CO4	H									M		

COURSE CONTENT

PC Hardware/Software

Week 1 – Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Week 1– Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also, students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Week 2 – Task 1: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Week 2 – Task 2: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Week 3 – Task 1: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the

computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

Week 3 – Task 2: Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Networks, Internet & World Wide Web

Week 4: Types of Network cables, connectors, crimping straight and crossover cables, identification of network devices (Hubs, Switches, Routers).

Week 5: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally, students should demonstrate, to the instructor, how to access the websites and email.

Week 6: Wifi router configuration, connecting to internet, Static/Dynamic IP address configuration, DNS, Gateway, Security configuration.

Productivity tools

LaTeX and Word

Week 7– Word Orientation: The mentor needs to give an overview of Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that would be covered in word – Accessing, overview of components of toolbars, saving files, Using help and resources, rulers, format painter.

Week 8- Latex: Using LaTeX to create project certificate. Features to be covered: Formatting Fonts, Drop Cap, Applying Text effects, Using Character Spacing, Borders and Colours, Inserting Header and Footer, Using Date and Time option in both LaTeX.

Week 9: Creating project abstract Features to be covered: Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Excel

Week 10 - Task 1 - Excel Orientation: The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the two tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Week 10 – Task2: Calculating GPA -Features to be covered: Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting

Power Point or equivalent (FOSS) tool

Week 11– Task1: Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes: PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and Power point. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

Week 12 - Task 3: Concentrating on the in and out of Microsoft power point. Helps them learn best practices in designing and preparing power point presentation. Topics covered during this week includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide master, notes etc), Inserting – Background, textures, Design Templates, Hidden slides.

TEXT BOOKS

REFERENCE BOOKS

1. LaTeX Companion – Leslie Lamport, PHI/Pearson.
2. Introduction to Computers, Peter Norton, 6/e Mc Graw Hill Publishers.
3. Upgrading and Repairing, PC's 18th e, Scott Muller QUE, Pearson Education
4. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
5. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.
6. PC Hardware and A+ Handbook – Kate J. Chase PHI (Microsoft)

E-RESOURCES AND OTHER DIGITAL MATERIALL

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/

20BS2101
LAPLACE TRANSFORMS AND INTEGRAL CALCULUS
COMMON TO ALL BRANCHES

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

COURSE OUTCOMES

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

CO1	Solve the Linear differential equations using Laplace Transforms.
CO2	Evaluate areas and volumes using Double, Triple Integrals.
CO3	Evaluate Grad, Div & Curl of scalar and vector point functions.
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 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
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 the 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 Integrals, Solving Differential Equations by Laplace Transforms.

UNIT II

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.

UNIT III

Vector Differential Calculus: Scalar and Vector point functions, Del applied to Scalar point functions-Gradient, Del applied to Vector point functions, Physical interpretation of Divergence and Curl, Del applied twice to point functions, Del applied to products of point functions.

UNIT IV

Vector Integral Calculus: Integration of Vectors, Line Integral, Surface Integral, Green's Theorem in the plane, Stokes's Theorem, Volume Integral, Gauss Divergence Theorem, Irrotational Fields.

TEXT BOOK

B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th Edition, 2019.

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/

20BS2102B
PHYSICS FOR ENGINEERS (For CE/ME Departments)

Course Category:	Institutional Core	**Credits:**	3
Course Type:	Theory	**Lecture -Tutorial-Practice:**	3 - 0 - 0
Prerequisites:	10 + 2 Level Physics	**Continuous Evaluation:** **Semester end Evaluation:** **Total Marks:**	30 70 100

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 production & detection of Ultrasonics
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 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	**H**											
CO2	**H**		**M**									
CO3	**H**		**M**									
CO4	**H**				**M**							

COURSE CONTENT

Unit – I : Crystallography and Characterization of materials

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 and Ultrasonics

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.

Ultrasonics: Introduction,Properties of ultrasonic waves,Production of ultrasonic waves(Magnetostriction method and Piezo electric method), Detection of ultrasonic waves (Kundt's tube method,thermal method,sensitive flame method), Applications of ultrasonic waves.

Unit – III : Engineering Materials

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

Superconductors: Introduction, Critical parameters, Meissner effect, Types of Superconductors, BCS theory, Cooper pairs, Applications of superconductors.

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

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

Unit- IV: Nanotechnology

Nanotechnology: Basic concepts of Nanotechnology, Nanoscale, Introduction to nano materials, General properties of Nano materials, Significance of the nanoscale (Surface to volume ratio,Quantum confinement effect), 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.
[3]. D.Thirupathi Naidu and M.Veeranjaneyulu, Engineering Physics, VGS Techno Series publications, 4th Revised Edition,2016.

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.

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

20ES2103A
OBJECT ORIENTED PROGRAMMING USING PYTHON (CSE/ECE/IT)

Course Category:	Engineering Science	**Credits:**	3
Course Type:	Theory	**Lecture -Tutorial-Practice:**	3- 0 - 0
Prerequisites:	20ES1103Programming for Problem Solving 20ES1152Programming for ProblemSolving Laboratory	**Continuous Evaluation:** **Semester end Evaluation:** **Total Marks:**	30 70 100

COURSE OUTCOMES

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

CO1	Interpret the python syntax and semantics of control flow statements
CO2	Apply functions, modules and string handling in Python to solve problems
CO3	Determine the methods to create and manipulate programs with Python data structures
CO4	Analyse the concepts of object oriented approach to solve problems

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	M	M	L		M						L		H	
CO2			L		M						L		L	
CO3		L	L		L						L		M	
CO4		H	M		M						M		H	

COURSE CONTENT

UNIT I

Introduction to Object Oriented Programming: Features of Object Oriented Programming, Merits and demerits of object oriented programming languages, applications of object oriented programming, comparison between commonly used programming languages.

Basics of Python Programming: Features, History, future of python, , writing and executing first python program, Literal constants, variables and identifiers, data types, input operation, comments, reserved words, indentation, operators and expressions, expressions, Type conversion

Decision control statements: Introduction, Selection/conditional branching statements, Basic loop

structures/iterative statements, Nested loops, break, continue and pass statements

UNIT II

Functions and Modules: Introduction, function declaration and definition, function definition, function call, variable scope and lifetime, the return statement, recursive functions, modules, packages in python.

Strings: Concatenating, appending and multiplying strings, immutability, String formatting operator, built-in string methods and function, slice operation.

Lists: access and update values in lists, nested and cloning lists, basic list operations, List methods, Using lists as Stack and Queues, list comprehensions, loping in lists.

Tuple: Creating tuple, utility of tuples, accessing values in a tuple, updating tuple, deleting elements in tuple, basic tuple operations

UNIT III

Sets: Creating a Set and set operations

Dictionaries: Creating a dictionary, accessing values, add, modify, delete, sort items in a dictionary, looping over a dictionary.

Classes and Objects: Introduction, classes and objects, class method and self argument, init() method, class and object variables, del() method, other special methods, public and private data members, private methods, calling a class method from another class method, built-in class attributes, garbage collection, class and static methods

Inheritance: Introduction, inheriting classes in python, types of inheritance, composition/containership/complex objects, abstract classes and interfaces, Meta class.

UNIT IV

Operator Overloading: Introduction, implementing operator overloading, reverse adding, overriding __getitem__() and __setitem__() methods, overriding the in operator, overriding miscellaneous functions, overriding the _call__() method.

Error and Exception Handling: Introduction to errors and exceptions, handling exceptions, multiple except blocks, multiple exceptions in a single block, except block without exception, the else clause, raising exceptions, built-in and user-defined exceptions, the finally block.

Self-Study:

String functions: ord(), chr() functions, in and not in operators
Standard Library modules, Globals(), Locals(), Reload(),date,time,sys
Comparing, iterating string, the String module, Regular expressions, meta characters in regular expression.
Re-raising exception, Assertions in python

TEXT BOOKS:

[1]. ReemaThareja,"Python ProgrammingUsing Problem Solving Approach", Oxford University Press, 2019.

REFERENCE BOOKS:

[1]. Zed Shah, “Learn PythonThe Hard Way”, Third edition, Addison-Wesley, 2013.
[2]. Charles Severance, " Python for Informatics- Exploring Information", 1st edition Shroff Publishers, 2017.
[3]. John V. Guttag, “Introduction to Computation and Programming Using Python”, The MIT Press, 2013
[4]. W.Chun , "Core Python Programming", 2nd Edition, Prentice Hall, 2006.

E-resources and other digital material:

[1]. Charles Severance: University of Michigan,Python for Everybody [COURSERA]. (05-01-2021), Available: https://www.coursera.org/
[2]. Prof. SudarshanIyengar, IIT Ropar, Prof. Yayati Gupta, IIIT Dharwad, The Joy Of Computing Using Python [NPTEL], (05-01-2021), Available:https://nptel.ac.in/courses/106/106/106106182/#
[3]. Prof KannanMoudgalya, Professor, IIT Bombay, Python 3.4.3, [SWAYAM], (05-01-2021), Available: https://onlinecourses.swayam2.ac.in/aic20_sp33/preview
[4]. Corey Schafer,Python OOP Tutorials - Working with Classes, (05-01-2021), Available: Python OOP Tutorials - Working with Classes - YouTube

20ES2103B
PYTHON PROGRAMMING (CE/EEE/EIE/ME)

Course Category:	Engineering Science	**Credits:**	3
Course Type:	Theory	**Lecture -Tutorial-Practice:**	3- 0 - 0
Prerequisites:	20ES1103Programming for Problem Solving 20ES1152Programming for ProblemSolving Laboratory	**Continuous Evaluation:** **Semester end Evaluation:** **Total Marks:**	30 70 100

COURSE OUTCOMES

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

CO1	Interpret the python syntax and semantics of control flow statements
CO2	Apply functions and modules in Python to solve a problem
CO3	Apply 3rd party packages for developing solutions for real time problems.
CO4	Implement the problems in terms of real world objects using OOPs concept.

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	H	M	M						M			H	M	L
CO2	M	M	M						M			H	L	M
CO3	M	M	M						M			H	H	M
CO4	M	M	M						M			H	H	L

COURSE CONTENT

UNIT I

Introduction: History-Origins of python, Features of Python- why choose python,what can I do with python, Installing, Python 2 & 3 installation on windows

Variables, Expressions & Statements: Variables, Variable names & keywords,Operators & operands, Expressions, Order of operations, Modulus Operator, StringOperations.

Conditional Execution: Boolean expressions, Logical operators, Conditionalexecution, Alternative execution, Chained conditionals, Nested conditionals,exceptions using try and except, Short circuit evaluation of logical expressions.

Iterations: The while statement, Infinite loops, “Infinite loops” and break,finishing iterations with continue,

Definite loops using for.

UNIT II

Functions: Function Calls, Built-in functions, type conversion functions, randomnumbers, math functions, adding new functions, definition and uses, flow ofexecution, parameters & arguments, fruitful and void functions, why functions?, recursion, scope of a variable.
Modules: Packages small description about modularity, Third Party Packages, Abrief tour of standard library, command line arguments, Error output redirectionand program termination, String pattern matching, Mathematics, Internet Access,Dates & times, Data Compressions.

UNIT III

Lists: Syntactically, accessing element from list, slicing a list, lists are mutable sequences, deleting items in a list and deleting list, methods, searching
Dictionaries: Creating a dictionary, Dictionary operations, Dictionary methods,
Aliasing and copying
Tuples: Tuples are immutable, comparing tuples, Tuple assignment, Dictionaries and tuples, Multiple assignment with dictionaries, Using tuples as keys in dictionaries
Strings: A string is a sequence, Getting the length of a string using len, Traversal through a string with a loop, String slices, Strings are immutable, Looping and counting, The in operator, String comparison, string methods
Sets: Modifying a Set, removing items from set, set operations.

UNIT IV

Object Oriented Programming in Python: Python Classes, Methods, Constructors, Class variables & Instance Variables, Basic inheritance, Special methods, Data Hiding.

TEXT BOOKS:

[1]. VamsiKurama, "Python Programming: A Modern Approach", Pearson India, 2017.

[2]. Charles Severance, " Python for Informatics- Exploring Information", 1st edition Shroff Publishers, 2017.

REFERENCE BOOKS:

[1]. Mark Lutz,"Learning Python", 5th edition, Orielly, 2013.

[2]. Allen Downey "Think Python, How to Think Like a Computer Scientist",2nd edition, Green Tea Press, 2015.

[3]. W.Chun , "Core Python Programming", 2nd Edition, Prentice Hall, 2006.

[4]. Kenneth A. Lambert, "Introduction to Python", 1st edition, CengageLearning, 2011.

E-resources and other digital material:

[1]. Charles Severance: University of Michigan,Python for Everybody [COURSERA]. (05-01-2021), Available: https://www.coursera.org/

[2]. Prof. SudarshanIyengar, IIT Ropar, Prof. Yayati Gupta, IIIT Dharwad, The Joy Of Computing Using Python [NPTEL], (05-01-2021), Available:https://nptel.ac.in/courses/106/106/106106182/#

[3]. Charles Russell Sevarance, University of Michigan, Python for Everybody, 2019 https://www.coursera.org/learn/python

20ES2104A
BASIC ELECTRONICS ENGINEERING (CSE/IT)

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

COURSE OUTCOMES

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

CO1	Comprehend the fundamentals of electronic components, devices, transducers
CO2	Understand and apply the principles of digital electronics
CO3	Learn the principles of various communication systems.

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	H	H			M									
CO2	H	H												
CO3	M				M									

COURSE CONTENT

UNIT I

Electronic Components: Passive components - resistors, capacitors &inductors (properties, common types, I-V relationship and uses). Semiconductor Devices: Semiconductor Devices - Overview of Semiconductors - basic principle, operation and characteristics of PN diode, Zener diode, BJT, JFET, optoelectronic devices (LDR, photodiode, phototransistor, solar cell, photo couplers).

UNIT II

Transducers: Transducers - Instrumentation - general aspects, classification of transducers, basic requirements of transducers, passive transducers - strain gauge, thermistor, Hall-Effect transducer, LVDT, and active transducers - piezoelectric and thermocouple -DHT, ULTRASONIC , PIR..sensors

UNIT III

Digital Electronics: Number systems - binary codes - logic gates Boolean algebra, laws & theorems - simplification of Boolean expression - Implementation of Boolean expressions using logic gates – standard forms of Booleanexpression.

UNIT IV

Digital Communication: Block diagram of a basic communication system - frequency spectrum - need for modulation, Types of communication-Analog and Digital communication-Advantages and Disadvantages of Digital Communication, Time and frequency domain representation of signals, Sampling theorem, Nyquist

rate and Nyquist interval, Pulse code modulation, Line coding-Various formats, Generation of digital modulation techniques-ASK,FSK,PSK

TEXT BOOKS

[1] Thyagarajan.T, SendurChelvi.K.P, Rangaswamy, "Engineering Basics: Electrical, Electronics and computer Engineering", T.R, New Age International, Third Edition, 2007. (UNIT- I&II)

[2] Thomas L. Floyd, "Electronic Devices", Pearson Education, 9thEdition, 2011. (UNIT- III)

[3] Dr. Sanjay Sharma, "Communication Systems(Analog & Digital)", S.K.Kataria& Sons (KATSON Books), 6th edition, 2014 (UNIT- IV)

REFERENCE BOOKS

[1] M. Morris Mano, Michael D. Ciletti, ―Digital Design‖, 4th edition, Prentice Hall, 2007.

[2] S. Salivahanan, N.Suresh Kumar & A. Vallavaraj, "Electronic Devices & Circuits", 2nd Edition, Tata McGraw Hill,2008.

[3] Simon Haykin. ―Communication Systems, 4th edition, 2000, John Wiley and Sons

E-RESOURCES AND OTHER DIGITAL MATERIAL

[1] https://nptel.ac.in/courses/117/103/117103063/

[2] https://nptel.ac.in/courses/108/105/108105132/

[3] https://nptel.ac.in/courses/108/102/108102096/

20ES2104B
CIRCUIT ANALYSIS (ECE)

Course Category:	Engineering Science	**Credits:**	3
Course Type:	Theory	**Lecture -Tutorial-Practice:**	3 - 0 - 0
Prerequisites:	14EE1105: Basics of Electrical Engineering	**Continuous Evaluation:** **Semester end Evaluation:** **Total Marks:**	30 70 100

COURSE OUTCOMES

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

CO1	Analyze the AC and DC circuits by applying appropriate theorems
CO2	Analyze two-port network parameters
CO3	Design different resonant circuits for the given specification
CO4	Analyze the DC transient response of RL, RC and RLC circuits

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	H													
CO2	H		L											
CO3	H		M											
CO4	H													

COURSE CONTENT

UNIT I

D.C Circuits & Network Theorems: Superposition theorem, Reciprocity theorem, Thevenin's theorem, Norton's theorem, Tellegen's theorem, Millman's theorem and Maximum Power Transfer Theorem.

A.C Circuits & Network Theorems: Nodal and Loop methods of analysis, Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer Theorem. (12Hrs)

UNIT II

Two Port Network: Relationship of two port variables, Short circuit admittance parameters, Open circuit impedance parameters, Transmission parameters, Hybrid parameters, Relation between parameter sets, Parallel connection of two port networks. (12Hrs)

UNIT III

Steady State Analysis of AC Circuits: Response to sinusoidal excitation – series RL, RC and RLC circuits, parallel RL, RC and RLC with complex impedance and phasor notation

Resonance: Series resonance, Parallel resonance, concept of band width and Q factor. (12Hrs)

UNIT IV

Transient Analysis : First order differential equations, definition of time constant, RL circuit, RC circuit with DC excitation, evaluating initial condition procedure, second order differential equations, homogeneous and non-homogeneous problem solving using RLC elements with DC excitation. (9Hrs)

TEXT BOOKS

1. Jr William H Hayt & Jack Kemmerly "Engineering Circuit Analysis", 9th edition, McGraw-Hill, 2000.

REFERENCE BOOKS

1. M. E.Van Valkenburg "Network Analysis" 3rd edition, PHI, 2009.
2. A Sudhakar and SP Shyam Mohan, "Circuits and Networks: Analysis and Synthesis", 4th edition, TMH, 2002.

E-RESOURCES AND OTHER DIGITAL MATERIAL

1. http://nptel.iitm.ac.in/courses/webcoursecontents/IIT%20kharagp ur/basic%20electrical%
2. http://nptel.iitm.ac.in/video.php?subjectId=108102042
3. http://www.ece.umd.edu/class/enee204.../LectureNotes/LectureM ain.htm

20ES2104C
NETWORK THEORY (EIE)

Course Category:	Programme core	**Credits:**	3
Course Type:	Theory	**Lecture -Tutorial-Practice:**	3 - 0 - 0
Prerequisites:	Calculus, Basics of Electrical Engineering	**Continuous Evaluation:** **Semester end Evaluation:** **Total Marks:**	30 70 100

COURSE OUTCOMES

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

CO1	Determine the basic parameters in DC circuits
CO2	Analyze DC electrical circuit using- Mesh analysis, Nodal analysis and network theorems
CO3	Analyze AC electrical circuit using- Mesh analysis, Nodal analysis and network theorems
CO4	Analyze resonance and DC transient behavior of RLC circuits and calculate the parameters of two port network

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	L	H											L	
CO2		H		L									M	
CO3		H		L									M	
CO4		H											M	

COURSE CONTENT

UNIT- I

Introduction of Circuit Elements: Circuit concepts, Active and passive circuit elements; Ideal, Practical and dependent sources and their V-I characteristics, Source transformation, Voltage and current division; V-I characteristics of passive elements and their series / parallel combination; Star Delta transformations and problems. Energy stored in inductors and capacitors,

UNIT - II

Network Theorems: Mesh and nodal analysis having independent and dependent sources with problems; Application of theorems to DC circuits. Superposition theorem, Thevenin's and Norton's theorems, Reciprocity, Maximum power transfer theorems.

UNIT - III

Sinusoidal Steady State Analysis: 'j' notation and concept of phasor, Phasor notation of voltage, Current and circuit elements in single phase and three phase circuits, Mesh and nodal analysis of obtaining steady state response of R,L,C circuits with problems, Application of

network theorems such as superposition theorem, Thevenin's and Norton's theorems, Maximum power transfer theorems to AC circuits. Computation of active power, Power factor.

UNIT - IV

Resonance and Transients: Series and parallel resonance, Selectivity, Bandwidth and Q factor, Series and parallel RLC circuits. Transient analysis of RL, RC, RLC circuits with DC using Laplace transforms.

Two-port networks: Calculation ofZ, Y and h parameters and their conversions.

TEXT BOOKS

[1] A Sudhakar and S.P.Shyam Mohan, "Circuits and Networks: Analysis and Synthesis", 2nd Ed., TMH, 2002

REFERENCE BOOKS

[1] FraklinF.Kuo, "Network Analysis and Synthesis", 2nd Ed., John Wiley & Sons, 2003
[2] William H. Hayt, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuit Analysis", 6thEd., TMH, 2002

20ES2104D
ENGINEERING MECHANICS (CE)

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

COURSE OUTCOMES

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

CO1	Analyze coplanar concurrent and parallel forces
CO2	Determine centroids for plane figures and evaluate the moment of inertia of areas and material bodies.
CO3	Explore coplanar general case of force systems and understand the friction concepts and applications
CO4	Study and analyze the rectilinear motion of particles and rigid bodies

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	H				M									
CO2	H				M									
CO3	H				M									
CO4	H				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.

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.

UNIT-II

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

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

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

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 and Method of Sections

Friction: Introduction, Laws of dry friction. Co-efficient of friction, Angle of friction, Angle of repose

UNIT-IV

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

Kinematics of Rigid Body: Plane motion: Concepts of relative velocity and Instantaneous center.

TEXT BOOKS

[1] S.Timoshenko, D.H.Young, J.V.Rao&SukumarPati, "Engineering Mechanics", 5th 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, 8th 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, 3rd Edition, 2010.

[2] S.S. Bhavikatti and K.G. Rajasekharappa, "Engineering Mechanics", New Age International Private Limited, 4thEdition, 2012.

[3] K. Vijaya Kumar Reddy and J. Suresh Kumar, "Singer's Engineering Mechanics Statics and Dynamics", B S Publications, 3rdEdition 2010.

E-resources and other digital material

http://emweb.unl.edu/

20ES2104E
NETWORK ANALYSIS-I (EEE)

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

COURSE OUTCOMES

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

CO1	Understand DC and AC circuit concepts.
CO2	Apply network theorems for circuit analysis.
CO3	Understand series and parallel resonance concepts and analyze coupled circuits.
CO4	Analyze poly-phase circuits and apply different power measurement techniques.

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	**H**	**H**			**M**								**L**	
CO2	**H**	**H**											**L**	
CO3	**M**	**H**			**M**								**L**	
CO4	**M**	**H**											**L**	

COURSE CONTENT

UNIT-I **[Text Book-1]**

Basic components and electric circuits: Charge, current, voltage and power, voltage and current sources-independent and dependent sources, ohm's law, series and parallel connected sources, circuit elements-resistance, inductance and capacitance, series and parallel combination of circuit elements, star-delta transformations, voltage and current division, source transformations, power & energy calculations.

Sinusoidal steady state analysis: Introduction, characteristics of sinusoids, Steady state response to sinusoidal functions, complex forcing functions, phasor, phasor relationship for R, L and C series RL circuit, RC circuit and RLC circuit, parallel AC circuits, impedance, admittance, Kirchhoff's voltage and current laws, basic mesh and super mesh analysis, basic nodal and super node analysis. Instantaneous power, average power, calculation of average power for periodic wave forms, effective values of current and voltage, complex power.

UNIT-II **[Text Book-1]**

Network Theorems to DC & AC Circuits: Superposition theorem, Thevenin's theorem, Norton's

theorem, Maximum power transfer theorem, Reciprocity theorem, Millman's theorem, Tellegen's theorem and Compensation theorem.

UNIT-III **[Text Book-1]**

Series and Parallel Resonance: Series resonance, resonant frequency, voltages and currents in a series resonant circuit, bandwidth of an RLC series circuit, quality factor (Q) and its effect on bandwidth, magnification in series resonance, parallel resonance, resonant frequency of parallel RLC circuit, reactance curves in parallel resonance, Q factor of parallel resonance,bandwidth of parallel RLC circuit, resonant frequency for a tank circuit, magnification in parallel resonance.

Coupled Circuits: Introduction-self-inductance, mutual inductance, coefficient of coupling, inductances in series and parallel, dot convention, coupled circuits, conductively coupled equivalent circuits.

UNIT-IV **[Text Book-1&2]**

Poly-phase Circuits: Poly-phase system, advantages of three-phase system, generation of three-phase voltages, phase sequence, inter connection of three-phase sources and loads, voltage, current and power in a star connected system, voltage, current and power in a delta connected system, three-phase balanced and unbalanced circuits.

Power Measurement in Three-Phase Circuits: Power in three phase circuits-two wattmeter and three watt meter methods, power factor of balanced circuits by two watt meter method, variation in watt meter readings with load power factor (lag and lead p.f. loads), measurement of reactive power with two watt meter.

TEXT BOOKS

[1] W.H.Hayt, J.E.kemmerly and S.M.Durbin, "*Engineering Circuit Analysis*", Tata Mc.Graw-Hill, New Delhi 8th edition,2012.
[2] A.Chakrabarti.," *Circuit Theory (Analysis and Synthesis*",DhanpatRai& Co. Delhi,6th edition,2010.

REFERENCE BOOKS

[1] Charles K. Alexander, Matthew N. O. Sadiku , "*Fundamentals of. Electric Circuits"*, McGraw-Hill,New York, 5th edition, 2013.
[2] Ravish R Singh, "*Network Analysis and Synthesis"*, McGraw-Hill Education (India) Pvt. Ltd., 1st edition, 2013.
[3] A.Sudhakar and ShyammohanS.Palli , "*Circuits & Networks Analysis and Synthesis"* Tata McGraw-Hill, New Delhi , 3rd edition,2007.
[4] Van valeken berg, "*Network Analysis and Synthesis",*Prentice Hall of India,3rd edition.

E-RESOURCES AND OTHER DIGITAL MATERIAL

[1] http://nptel.ac.in/courses.php?branch=eee
[2] http://ocw.mit.edu/courses/audio-video-courses/#electrical-engineering-and-computer-science.

20ES2104F
ENGINEERING MECHANICS – II (ME)

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

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 material bodies and analyze the fixed axis rotation of rigid bodies.
CO4	Analyze the plane motion of rigid bodies.

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	H	M												L
CO2	H	M												L
CO3	H	M												L
CO4	H	M												L

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 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.

Kinematics of Rigid Body: Rotation: Linear and angular Velocity, linear and angular acceleration in uniformly accelerated rotation.

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

UNIT – IV

Kinematics of Rigid Body: Plane motion: Concepts of relative velocity and Instantaneous center

Kinetics of Rigid Body: Plane motion: Equations of motion, Dynamic equilibrium of symmetrical rolling bodies.

TEXT BOOKS

[1] Engineering Mechanics by S. Timoshenko & D. H. Young, 4th Edition, 2007, McGraw Hill International Edition. (For Concepts and symbolic Problems).
[2] Engineering Mechanics Statics and dynamics by A. K. Tayal, 13th Edition, 2006, Umesh Publication, Delhi, (For numerical Problems using S.I.System of Units).

REFERENCE BOOKS

[1] Beer and Johnston, "Vector Mechanics for Engineers Statics and Dynamics",IIIrd edition, Tata McGraw Hill, 2010.
[2] SS Bhavikatti and KG Rajasekharappa, "Engineering Mechanics", IVth Edition, New Age International Private Limited, 2012
[3] K.Vijaya Kumar Reddy and J Suresh Kumar, " Singer's Engineering Mechanics Statics and Dynamics", IIIrd Edition BS Publications, 2010.

E-RESOURCES AND OTHER DIGITAL MATERIAL

[1] http://emweb.unl.edu/
[2] https://nptel.ac.in/courses/122/104/122104015/

20MC2106
PROFESSIONAL ETHICS & PRACTICE

Course Category:	Mandatory Learning	**Credits:**	--
Course Type:	Theory	**Lecture -Tutorial-Practice:**	1 - 0 - 0
Prerequisites:		**Continuous Evaluation:** **Semester end Evaluation:** **Total Marks:**	100 -- 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 Engineering as Experimentation
CO3	Understand about safety, risk and professional rights.
CO4	Know the ethics regarding Global issues related to Environment, Computers and weapon's development. Understand general principles of contracting.

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	**M**											
CO2					**H**							
CO3					**H**							
CO4											**M**	

COURSE CONTENT

UNIT I **(4 lectures)**

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 **(4 lectures)**

Engineering as Social Experimentation: Engineering as experimentation – engineers as responsible experimenters - codes of ethics - a balanced outlook on law - the challenger case study

UNIT III **(4 lectures)**

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 **(4 lectures)**

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).

General principles of contracts management : Indian contract act,1972 and amendments covering general principles of contracting.

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).

[3] Dutt (1994) Indian Contract Act, Eastern Law House.

20BS2151A
ENGINEERING PHYSICS LABORATORY (CE& ME Departments)

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

COURSE OUTCOMES

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

CO1	Use spectrometer and travelling microscope in various experiments
CO2	Determinethe V-I characteristicsof solar cell and photo celland appreciate the accuracy in measurements
CO3	Test optical components using principles of interference and diffraction of light

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1				H								
CO2				H								
CO3	M			H								

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", Isted., Scitech Publications, 2015
[2] Ramarao Sri, ChoudaryNityanand 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

20ES2152A
Object Oriented Programming using Python Laboratory (CSE/ECE/IT)

Course Category:	Engineering Science	**Credits:**	1.5
Course Type:	Lab	**Lecture -Tutorial-Practice:**	0 - 0 - 3
Prerequisites:	20ES1103 Programming for Problem Solving 20ES1152 Programming for Problem Solving Laboratory	**Continuous Evaluation:** **Semester end Evaluation:** **Total Marks:**	30 70 100

COURSE OUTCOMES

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

CO1	Demonstrate the usage of Python syntax and semantics in solving the problems
CO2	Develop python programs using functions and built in modules
CO3	Implement Python data structures to solve the complex problems
CO4	Apply object oriented concepts to design solution to real world scenarios

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	M	M	L		M						L		H	
CO2			L		M						L		L	M
CO3		L	L		L						L		M	M
CO4		M	M		M						M		H	

COURSE CONTENT

Week 1: Understanding Object Oriented Programming, Python installation

a. Differentiate procedure oriented and Object Oriented Programming
b. Identify a simple real world scenario using the concept of classes and objects
c. Demonstrate different types of inheritance in the scenario identified
d. Practice Python Installation

Week 2: Declaration of Variables, identifiers and type conversions

a. Write simple programs by defining variables and assigning values of different basic data types
b. Write programs to know data type of a variable using Type statement
c. Write programs to do multiple assignments at a time
d. Write programs for writing multiple statements in a single line
e. Use Input statement, type conversion
f. Use different operators in programs

Week 3: Python programs on Decision Control Statements

a. Write programs using selection statements
b. Implement programs on and conditional branching statements

Week 4: Python programs on looping control structures

a. Design and develop programs using Iterative statements- while, for , nested loops
b. Use Break, continue, pass statements in programs
c. Understand the usage of else statement in loops with a case study

Week 5 & 6: Identify the need and importance in the creation of Python Functions and Modules

a. Write programs for defining and calling functions
b. Understand Scope of a variable and Use global statement
c. Differentiate fruitful and void functions through a case study
d. Apply recursive and Lambda functions
e. Understand different kinds of arguments through a case study
f. Installing and usage of standard library modules
g. Use python packages

Week 7: Solve the problems using Strings and understanding the methods and operations on Lists

a. Apply string formatting operator
b. Use built in string methods, functions and regular expressions
c. Define a list and write programs to access and modify elements of a list
d. Practice basic list operations, methods
e. Write programs to use list as a stack and queue

Week 8:Programs on the implementation of methods and operations of List data structure

a. Define a list and write programs to access and modify elements of a list
b. Practice basic list operations, methods
c. Write programs to use list as a stack and queue

Week 9: Implement programs to solve the problems using Python other data structures:Tuples and Dictionaries

a. Write programs to define a dictionary and write programs to modify values, adding new keys
b. Apply looping over a dictionary
c. Use built in dictionary methods, functions
d. Create a tuple and assign values
e. Use basic tuple operations and comparisons

Week 10& 11: Implement the Python Classes and Objects to address the real world scenarios

a. Define classes and objects using python for the real world scenario
b. Defining constructors and using Self
c. Understand public and private members
d. Practice calling class methods from another class
e. Write built in functions to check, get, set and delete attributes

Week 12&13: Develop the programs to implement parent-child relationship

a. Demonstrate different inheritance types
b. Apply polymorphism and method overriding
c. Create abstract classes

Week 14: Write the programs to address the exceptions via exception handling in the development of solutions and implement operator overloading

a. Write a simple exception handling program with try- except
b. Write a program for catching multiple exceptions
c. Demonstrate raising and re raising exceptions
d. Apply else and finally clauses
e. Demonstrate the usage of polymorphism in overloading of operators

TEXT BOOKS

[1]. ReemaThareja,"Python ProgrammingUsing Problem Solving Approach", Oxford University Press, 2019.

REFERENCE BOOKS

[1]. Zed Shah, "Learn PythonThe Hard Way", Third edition, Addison-Wesley, 2013.
[2]. Charles Severance, " Python for Informatics- Exploring Information", 1st edition Shroff Publishers, 2017.
[3]. John V. Guttag, "Introduction to Computation and Programming Using Python", The MIT Press, 2013
[4]. W.Chun , "Core Python Programming", 2nd Edition, Prentice Hall, 2006.

E-RESOURCES AND OTHER DIGITAL MATERIAL

[1]. Charles Severance: University of Michigan,Python for Everybody [COURSERA]. (05-01-2021), Available: https://www.coursera.org/
[2]. Prof. SudarshanIyengar, IIT Ropar, Prof. Yayati Gupta, IIIT Dharwad, The Joy Of Computing Using Python [NPTEL], (05-01-2021), Available:https://nptel.ac.in/courses/106/106/106106182/#
[3]. Prof KannanMoudgalya, Professor, IIT Bombay, Python 3.4.3, [SWAYAM], (05-01-2021), Available: https://onlinecourses.swayam2.ac.in/aic20_sp33/preview
[4]. Corey Schafer,Python OOP Tutorials - Working with Classes, (05-01-2021), Available: Python OOP Tutorials - Working with Classes - YouTube

20ES2152B
Python Programming Lab (CE/EEE/EIE/ME)

Course Category:	Engineering Science	**Credits:**	1.5
Course Type:	Lab	**Lecture -Tutorial-Practice:**	0 - 0 - 3
Prerequisites:	20ES1103 Programming for Problem Solving 20ES1152 Programming for Problem Solving Laboratory	**Continuous Evaluation:** **Semester end Evaluation:** **Total Marks:**	30 70 100

COURSE OUTCOMES

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

CO1	Implement python programming constructs to build small to large applications.
CO2	Implement the problems in terms of real-world objects using OOPs concept.
CO3	Evaluate and handle the errors during runtime involved in a program.
CO4	Extract and import packages for developing different solutions for real time problems.

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	H		M						M			H	M	L
CO2	H	M	M						M			H	L	M
CO3	M	M	M						M			H	H	M
CO4	M	M	M						M			H	H	L

COURSE CONTENT

Week 1: Fundamental programs

Running instructions in Interactive interpreter and a Python Script

Write a program to purposefully raise Indentation Error and Correct it

Week 2: Operations

Develop Python programs using basic operations in Python

Week 3 & 4: Conditional &Control Flow

Develop Python programs that makes use of conditional and control flow structures

Week 5: Functions

Develop Python programs using recursive and non-recursive functions

Week 6,7 & 8: Data Structures

Develop Python programs using suitable Data structures

Week 9: Modules

Illustrate installing packages via PIP and develop python programs using modules

Week 10 & 11:

Application oriented Case Studies

Week 12: Classes, Inheritance

Illustrate Class variables and instance variable

Develop Python programs to exemplify the concepts of inheritance and overloading.

TEXT BOOKS

[1]. VamsiKurama, "Python Programming: A Modern Approach", Pearson India, 2017.

[2]. Charles Severance, " Python for Informatics- Exploring Information", 1st edition Shroff Publishers, 2017.

REFERENCE BOOKS

[1]. Mark Lutz,"Learning Python", 5th edition, Orielly, 2013.

[2]. Allen Downey "Think Python, How to Think Like a Computer Scientist",2nd edition, Green Tea Press, 2015.

[3]. W.Chun , "Core Python Programming", 2nd Edition, Prentice Hall, 2006.

[4]. Kenneth A. Lambert, "Introduction to Python", 1st edition, CengageLearning, 2011.

E-RESOURCES AND OTHER DIGITAL MATERIAL

[1].Charles Severance: University of Michigan,Python for Everybody [COURSERA]. (05-01-2021), Available: https://www.coursera.org/

[2].Prof. SudarshanIyengar, IIT Ropar, Prof. Yayati Gupta, IIIT Dharwad, The Joy Of Computing Using Python [NPTEL], (05-01-2021), Available:https://nptel.ac.in/courses/106/106/106106182/#

[3].Charles Russell Sevarance, University of Michigan, Python for Everybody, 2019 https://www.coursera.org/learn/python