FIRST YEAR CURRICULUM AND SYLLABUS

(REGULATIONS 2019)

FOR

UNDER GRADUATE PROGRAMMES

CHOICE BASED CREDIT SYSTEM

(Applicable to the students admitted from the Academic Year 2019-20 onwards)

B.E. – AUTOMOBILE ENGINEERING
B.E. – BIOMEDICAL ENGINEERING
B.E. – CIVIL ENGINEERING
B.E. – COMPUTER SCIENCE AND ENGINEERING
B.E. – ELECTRONICS AND COMMUNICATION ENGINEERING
B.E. – ELECTRICAL AND ELECTRONICS ENGINEERING
B.E. – ELECTRONICS AND INSTRUMENTATION ENGINEERING
B.E. – MECHANICAL ENGINEERING
B.E. – ROBOTICS AND AUTOMATION
B.Tech. – ARTIFICIAL INTELLIGENCE AND DATA SCIENCE
B.Tech. – INFORMATION TECHNOLOGY

AUTONOMOUS

EASWARI ENGINEERING COLLEGE

(AUTONOMOUS INSTITUTION)

Bharathi Salai, Ramapuram, Chennai – 600 089

(Version 2.0 dated 15.07.2020)

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FIRST SEMESTER CURRICULUM

Common for all Branches

I SEMESTER								
S. No	Course Code	Course Title	Category	Hours / Week				Credits
				L	T	P	R	
Theory								
1	191LEH101T	Technical English	HS	3	-	-	-	3
2	191MAB101T	Engineering Mathematics - I	BS	3	2	-	-	4
3	191PYB101T	Engineering Physics	BS	3	-	-	-	3
4	191CYB101T	Engineering Chemistry	BS	3	-	-	-	3
5	191GES101T	Engineering Graphics	ES	2	-	4	-	4
6	191GES102T	Problem Solving through Python Programming	ES	3	-	-	-	3
Laboratory								
7	191GEB111L	Physics and Chemistry Laboratory	BS	-	-	4	-	2
8	191GES111L	Python Programming Laboratory	ES	-	-	3	1	2
Mandatory Course								
9	191GEM101L	Induction Training [&]	MC	-	-	2	-	1[&]
Total				**17**	**2**	**13**	**1**	**24**

[&] Mandatory to attend Induction training and earn one credit (the credit not included for CGPA calculation).

DISTRIBUTION OF FIRST SEMESTER SUBJECTS

Sem	S. No	Course Code	Course Title	Hours / Week				Credits
				L	T	P	R	
HUMANITIES AND SCIENCE COURSES								
1	1	191LEH101T	Technical English	3	-	-	-	3
BASIC SCIENCE COURSES								
1	2	191MAB101T	Engineering Mathematics - I	3	2	-	-	4
1	3	191PYB101T	Engineering Physics	3	-	-	-	3
1	4	191CYB101T	Engineering Chemistry	3	-	-	-	3
1	5	191GEB111L	Physics and Chemistry Laboratory	-	-	4	-	2
ENGINEERING SCIENCE COURSES								
1	6	191GES101T	Engineering Graphics	3	-	2	-	4
1	7	191GES102T	Problem Solving through Python Programming	3	-	-	-	3
1	8	191GES111L	Python Programming Laboratory	-	-	3	1	2
MANDATORY COURSES								
1	9	191GEM101L	Induction Training	-	-	2	-	1

SYLLABUS FOR FIRST SEMESTER SUBJECTS

191LEH101T	TECHNICAL ENGLISH	L	T	P	R	C
		3	0	0	0	3

(Common to all branches of Engineering and Technology)

OBJECTIVE:

- To develop the basic writing skills of the First year Engineering students.
- To help learners develop their listening skills, which will, enable them to listen to lectures and enhance their ability to comprehend by asking questions and seeking clarification.
- To help learners develop their speaking skills and help them to speak fluently.
- To inculcate reading habit and to develop effective reading skills.
- To help students improve their active and passive vocabulary.

UNIT I **9 Hours**

Short comprehension passages – skimming, scanning, predicting and inference of the passage – Tips for effective writing –Hints development – Purpose of a good conversation – Tips for improving Conversation – Active and Passive listening – Types of listening – Barriers to listening – listening for specific purposes – Listening to lectures and note taking - Parts of Speech - Tenses – WH Questions – Yes/No questions – Prefixes and Suffixes – Word formation.

UNIT II **9 Hours**

Longer Comprehension passages - Questions – multiple choice –short questions – open-ended questions – Sentence structure - Types of paragraph – Short narrative paragraphs– Comparison and contrast – argumentative paragraph – analytical paragraph – Techniques for writing precisely - Introducing your friend – Exchange information – Expressing opinion/ agreeing /disagreeing **-** Telephonic conversation - If Clause – Subject verb agreement – degrees of comparison – Pronouns - adverbs.

UNIT III **9 Hours**

Short texts – Cloze passage guessing from context – Note making – Use of reference words – Discourse markers – Connectives – Jumbled sentences –Product description–Process description - Prepositions - Direct/Indirect speech – Connotations – One word substitution – Idiomatic expressions.

UNIT IV **9 Hours**

Different types of texts – Newspapers/ magazines/short stories - Inference – Tips for effective writing – Letter writing –– Letter to the Editor - Speaking about oneself/ hometown – Review of books – listening to native speakers – American accent and neutral accent - Countable/Uncountable nouns – Articles – Synonyms and Antonyms – Phrasal verbs.

UNIT V **9 Hours**

Reading for specific purpose – Short essays – developing an outline –Group discussion – Giving advice – Modal verbs – Instructions and Recommendations - Collocations.

TOTAL: 45 HOURS

OUTCOME:

1. Listen, Understand and Respond to others in different situations.
2. Speak correctly and fluently in different situations using appropriate communication strategies.
3. Read and Comprehend a range of texts adopting different reading skills.
4. Write with clarity in simple, apt and flawless language with coherence and cohesion.
5. Use their communicative competency with purpose and clarity in the context of Science and Technology.

TEXTBOOKS

1. Sanjay Kumar, Pushp Lata. English Language and Communication Skills for Engineers, Oxford University Press 2018

REFERENCE BOOKS

1. Bailey, Stephen. Academic Writing: A practical guide for students. New York: Rutledge, 2011.
2. Dutt P. Kiranmai and Rajeevan Geeta. Basic Communication Skills, Foundation Books: 2013
3. Means,L. Thomas and Elaine Langlois. English & Communication for Colleges. Cengage Learning USA: 2007

WEBSITES:

https://www.usingenglish.com
http://grammarbook.com

JOURNALS:

National Council for Teachers of English
https://www2.ncte.org/resources/journals/college-english/

EXTENSIVE READER:

Spencer Johnson, Who Moved My Cheese, Putnam Adult, 1998

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191MAB101T	ENGINEERING MATHEMATICS - I	L	T	P	R	C
		3	2	0	0	4

(Common to all branches of Engineering and Technology)

UNIT I : MATRICES **12 Hours**

Overview of system of Linear Equations - Eigen values and Eigen vectors of a real matrix – Characteristic equation – Properties of Eigen values and Eigen vectors – Cayley-Hamilton theorem – Diagonalization of matrices – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms.

UNIT II : DIFFERENTIAL CALCULUS **12 Hours**

Limit of a function - Continuity - Derivatives – Differentiation Rules – Mean Value Theorem – Interval of increasing and decreasing functions – Maxima and Minima - Interval of concavity and convexity –Taylor's Series for one variable.

UNIT III: MULTIVARIABLE CALCULUS **12 Hours**

Limits and Continuity – Partial derivatives – Total derivative – Differentiation of implicit functions – Jacobian and properties – Taylor's series for functions of two variables – Maxima, minima and saddle points - Method of Lagrange multipliers.

UNIT IV : INTEGRAL CALCULUS **12 Hours**

Definite Integrals and its properties –Fundamental theorem of Calculus - Techniques of integration for Indefinite Integrals using basic integration formulas – Integration by parts – Trigonometric Substitutions – Integration of Rational functions by Partial Fractions.

UNIT V : MULTIPLE INTEGRATION **12 Hours**

Double integrals – Change the order of integration in double integrals - Change of variables (Cartesian to polar) - Applications: areas and volumes - Triple integrals (Cartesian, Cylindrical and Spherical coordinates).

TOTAL: 60 HOURS

COURSE OUTCOMES:

The Course aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

The students will learn:

- To express large amounts of data and functions in an organized and concise form apart from diagonalizing matrices.
- To solve maxima and minima problems using differentiation.

- Apply functions of several variables to solve problems in engineering and technology.
- To evaluate integrals by using Fundamental Theorem of Calculus.
- Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change the order and change of variables.

TEXT BOOKS:

1. Joel Hass, Christopher Heil and Maurice D.Weir "Thomas' Calculus", 14th Edition, Pearson.
2. Grewal B.S., - Higher Engineering Mathematics, Khanna Publishers, New Delhi, 43rd Ed., 2014.

REFERENCE BOOKS:

1. Bali N.P.and Manish Goyal " Engineering Mathematics" (For Semester I) Third Edition, University Science Press.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons.
3. Fritz John and Richard Courant, "Introduction to Calculus and Analysis" Springer.
4. James Stewart, "Calculus: Early Transcendental", Cengage Learning, 7th Edition, New Delhi, 2015.
5. Veerarajan T., Engineering Mathematics, Tata McGraw-Hill, New Delhi.

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191PYB101T	ENGINEERING PHYSICS	L	T	P	R	C
		3	0	0	0	3

(Common to all branches of Engineering and Technology)

OBJECTIVES:

To enhance the fundamental knowledge in Physics and its applications relevant to various streams of Engineering and Technology.

UNIT I : PROPERTIES OF MATTER **9 Hours**

Stress - Strain relationship, Hooke's law, Elastic moduli, Stress - Strain diagram for various engineering materials, Ductile and Brittle materials - Torsional pendulum – Beam, Expression for bending moment - Cantilever, Uniform and Non-uniform bending, Theory and Experimental determination of Young's modulus.

UNIT II : SOUND WAVES AND VIBRATIONS **9 Hours**

Propagation, Intensity, Loudness of sound waves – Determination of absorption coefficient, Reverberation, Sabine's formula for reverberation time - Factors affecting acoustics of buildings and their remedies - Acoustic Quieting: Aspects, Methods, Quieting for Specific observers, Mufflers, Soundproofing - Ultrasonic waves and properties, Methods of Ultrasonic production, Applications of Ultrasonic in engineering and medicine.

UNIT III : THERMAL PHYSICS **9 Hours**

Fundamentals of thermal energy – Expansion joints - Bimetallic strips - Thermal conductivity, conductions in solids, Differential equation of one dimensional heat flow- Forbe's and Lee's disc method - Conduction through compound media – Thermal insulation – thermal shock resistance - Applications: Solar water heater- tempered glass- cryogenic materials.

UNIT IV : QUANTUM MECHANICS **9 Hours**

Inadequacies of Classical Mechanics – Black body radiation- Planck's theory of radiation - Dual nature of electromagnetic radiation – De Broglie hypothesis for matter waves – Heisenberg's uncertainty principle – Schrodinger's time dependent and independent wave equation, significance of wave function - Born interpretation - Particle confinement in 1D box.

UNIT V : APPLIED OPTICS **9 Hours**

Spontaneous and Stimulated emission - Einstein co-efficients (derivation) – Spatial and Temporal coherence – Schawlow-Townes condition for population inversion (Qualitative study) - Types of lasers – Nd:YAG, Semiconductor - Applications of Laser in science, engineering and medicine. Principle and propagation of light in optical fibre, Derivation for Numerical

aperture and Acceptance angle - Types and losses of optical fibre - Fibre Optical Communication (Block diagram) - Active and Passive sensors - Medical endoscope.

TOTAL: 45 HOURS

OUTCOMES:

At the end of this course,

- The students will gain knowledge on the basics of properties of matter and its applications,
- The students will acquire knowledge on the concepts of sound waves and vibrations.
- The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and solar water heaters,
- The students will get knowledge on advanced physics concepts of quantum theory,
- The students will acquire knowledge on the concepts of optical devices and their applications in fibre optics.

TEXT BOOKS

1. Bhattacharya D.K & T.Poonam, **Engineering Physics ,** Oxford University Press, 2015.
2. Pandey B.K.& S.Chaturvedi, **Engineering Physics**, Cengage Learning India, 2012.
3. Senthilkumar, G.**Engineering Physics I**, VRB Publishers, 2011.

REFERENCES

1. Aruldhas G, **Quantum Mechanics,** PHI Learning Pvt. Ltd.,New Delhi, 2011.
2. Arthur Beiser,**Concepts of Modern Physics, 6**th edn.,McGraw Hill 2003.
3. Gaur R.K & S.L.Gupta, **Engineering Physics**, Dhanpat Rai Publishers, 2012.
4. Halliday D, R.Resnick & J.Walker, **Principles of Physics**, Wiley, 2015.
5. Serway R.A & J.W.Jewett, **Physics for Scientists and Engineers**, Cengage Learning, 2010.
6. Tipler P.A & G.Mosca, **Physics for Scientists and Engineers with Modern Physics**, W.H.Freeman, 2007.
7. Zeemansky M.W and R.H.Dittman, **Heat and Thermodynamics**, 8th edn., Mc.Graw Hill, NewYork, 2017.

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191CYB101T	ENGINEERING CHEMISTRY	L	T	P	R	C
		3	0	0	0	3

(Common to all branches of Engineering and Technology)

OBJECTIVES:

- To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
- To get the basic idea about the polymers and applications of polymers and polymer reinforced composites.
- It deals with the information about the types of fuels, calorific value calculationsand manufacture of solid, liquid and gaseous fuels.
- It enable the students to gain information about Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells
- To impart knowledge about the nanomaterials synthesis, properties and applications

UNIT I - Water Treatment and Technology **9 Hours**

Introduction – characteristics - alkalinity - types and determination – hardness – types only -boiler feed water-requirements-boiler troubles – scale & sludge -disadvantages (wastage of fuels, decrease in efficiency, boiler explosion) - softening of hard water - external treatment process - demineralization and zeolite, internal treatment - boiler compounds (phosphate, calgon, carbonate and colloidal conditioning methods) – desalination of brackish water –reverse osmosis.

UNIT II – Polymers and Reinforced plastics **9 Hours**

Introduction- classification of polymers - Natural and synthetic - Thermoplastic and Thermosetting, Functionality–Degree of polymerization,types - addition and condensation polymerization – free radical polymerization mechanism - Preparation, properties and uses of PVC, Nylon 6,6, Teflon and Epoxy resin. Plastics - Compounding of plastics – moulding methods –injection, extrusion and compression – FRP – carbon and glass – applications.

UNIT III- Fuels and combustion **9 Hours**

Classification - Coal – proximate and ultimate analysis, - carbonization -metallurgical coke –manufacture by Otto Hoffmann method – petroleum – refining - cracking –synthetic petrol by Bergius process - knocking in petrol and diesel engines- octane and cetanerating of fuels-synthesis – advantages and commercial application of power alcohol and biodiesel- Gaseous fuels- liquefied petroleum gases (LPG)- compressed natural gas (CNG)- Combustion of fuels:Introduction - calorific value–higher & Lower– theoretical calculation - Flue gas analysis by Orsat method.

UNIT IV – Energy Sources and Storage Devices **9 Hours**

Energy – Types – Non-renewable energy - Nuclear energy –fission and fusion reactions - differences between nuclear fissionand fusion - nuclear chain reactions - light water nuclear reactor for power generation – breeder reactor – renewable energy - solar energy conversion - solar cells - wind energy

Electrochemical cells – reversible and irreversible cells –Cell construction and representation - Batteries -types of batteries – characteristics – construction and working of primary battery (dry cell) - secondary battery (lead acid battery and lithium-ion-battery) - fuel cells (H_2-O_2)

UNIT V – Concepts of Nano chemistry and Green chemistry **9 Hours**

Nano chemistry introduction – basics –general properties - distinction between nanoparticles, molecules and bulk materials–size-dependent properties. Synthesis: precipitation, thermolysis, hydrothermal, solvothermal, electro deposition, chemical vapour deposition, laser ablation - properties of nanoparticles – Types of Nanoparticles:nano cluster, nano rod, nanowire and nano tube – Carbon Nano Tube (Synthesis, properties and applications) – applications of nanoparticles.

Green chemistry introduction - Principles - Applications

Total : 45 HOURS

OUTCOMES:

- The knowledge gained on water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.
- The knowledge gained on water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.
- Students can get knowledge about various fuels and its applications based on its calorific value.
- It provides the students to understand about conventional and non-conventional energy sources and its applications
- It provides the students to gain knowledge about the recent trentds in nano materials.

Text Books:

1. Kannan P and Ravikrishnan A, “Engineering Chemistry”, Sri Krishna, Hitech publishing Company Pvt. Ltd, 2014
2. Jain P.C. and Monika Jain, “Engineering Chemistry” Dhanpat Rai, Publishing Company (P) Ltd.,New Delhi, 2015.

Reference Books:

1. Dara S.S &S.S Umare, “A Text book of Engineering Chemistry”, S.Chand & Company Ltd., New Delhi, 2015.
2. Palanna O.G, “Engineering Chemistry”, McGraw Hill Education (India)Pvt. Ltd, Chennai,2017
3. Vairam S ,P. Kalyani and Suba Ramesh., “Engineering Chemistry”,Wiley India PVT, Ltd, New Delhi, 2013.

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191GES101T	ENGINEERING GRAPHICS	L	T	P	R	C
		2	0	4	0	4

(Common to all branches of Engineering and Technology)

OBJECTIVES:

- To develop students, graphic skills for communication of concepts, ideas and design of engineering products.
- To expose them to existing National standards related to technical drawings.
- To Familiarize with basic geometrical constructions and orthographic projections.
- To make the students to draw the different projections of the solids.
- * To view the true shape and apparent shape of the sectioned solids and their developments.
- To get an idea about 3D views through isometric projections.

UNIT 0 : CONCEPTS AND CONVENTIONS USED **2 Hours**

Principles of Engineering graphics and their significance - Use Of drawing Instruments-BIS conventions and specifications-Size, Layout and folding of drawing sheets-Lettering and Dimensioning.

UNIT I:PLANE CURVES, PROJECTION OF POINTS **17 Hours**

Conic Sections - Construction of Ellipse, Parabola & hyperbola by eccentricity method – Construction of cycloid – Introduction to Scales. Introduction of Orthographic projection - Principal planes - First angle projection - projection of points.

UNIT II: PROJECTION OF LINES AND PLANES **17 Hours**

Projection of straight lines inclined to both the principal planes by rotating line method. Projection of simple planes inclined to both the principal planes by rotating object method.

UNIT III: PROJECTION OF SOLIDS **17 Hours**

Projection of simple solids like Prism, Pyramid, Cylinder & Cone when the axis is inclined to one of the principal planes by rotating object method.

UNIT IV: SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES **17 Hours**

Sectioning of simple solids (Prism, Pyramid, Cylinder & Cone) in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section. Development of surfaces of right regular and sectioned solids.

UNIT V: ISOMETRIC AND ORTHOGRAPHIC PROJECTIONS **17 Hours**

Principles of Isometric projections-Isometric scale- Isometric Views of simple and truncated solids – combination of two solid objects in simple vertical positions. Conversion of Isometric views to Orthographic views of the objects.

UNIT VI: COMPUTER AIDED DRAFTING :(Demonstration Only, Not for Exam**)** **3 Hours**

The Concepts of Computer Aided Drafting for Engineering drawing, Computer graphics & Geometrical modeling (2D Orthographic Views) and 3D drafting (Isometric Views) using AutoCAD.

TOTAL : 90 HOURS

OUTCOMES:

On successful completion of this course, the student will be able to

- Familiarize with the fundamentals and standards of Engineering graphics
- Perform basic geometrical constructions and principles of orthographic projections.
- Project orthographic projections of lines and plane surfaces.
- Draw projections of solids and development of surfaces.
- Visualize and to project isometric views and conversion of Isometric views to Orthographic views.

- Understand the basics of AUTO CAD and fundamentals of perspective projections.

TEXT BOOKS :

1. Natarajan K.V., “A text book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2009.
2. Jayapoovan T, “Engineering Graphics using AUTOCAD”, Vikas Publishing ,7 th Edition.
3. Venugopal K. and Prabhu Raja V., “Engineering Drawing with AUTOCAD and building drawing”, New Age International (P) Limited, 2018, 5^{TH} edition.

REFERENCES:

1. Basant Agarwal and Agarwal C.M., “Engineering Drawing”, Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
2. Bhatt N.D. and Panchal V.M., “Engineering Drawing”, Charotar Publishing House, 50th Edition, 2010.
3. Dinesh Kumar S, K.Sivakumar and R.Ramadoss, “ Engineering Graphics”, Maruthi Publishers, Chennai,2019.
4. Gopalakrishna K.R., “Engineering Drawing” (Vol. I&II combined), Subhas Stores, Bangalore, 2007.
5. Parthasarathy N S and Vela Murali, “Engineering Graphics”, Oxford University, Press, New Delhi, 2015.
6. Shah M.B., and Rana B.C., “Engineering Drawing”, Pearson, 2nd Edition, 2009.

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191GES102T PROBLEM SOLVING THROUGH PYTHON PROGRAMMING

L	T	P	R	C
3	0	0	0	3

(Common to all branches of Engineering and Technology)

OBJECTIVES :

The course on Python Programming is intended to enhance the computational and logical thinking of students. Upon completion of the course, the students would be able to master the principles of Python programming and demonstrate significant experience in problem solving.

UNIT I : ALGORITHMIC PROBLEM SOLVING **9 Hours**

Algorithms, building blocks of algorithms (statements, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Case study: Towers of Hanoi, insertion sort, guess an integer number in a range.

UNIT II : CONTROL FLOW STATEMENTS **9 Hours**

Python interpreter, interactive mode and script mode; variables, expressions, statements; values and data types; Operators and Precedence of operators, comments; Conditionals: conditional, alternative, chained conditional, nested conditional; Iterations: while, for, break, continue.

UNIT III : FUNCTIONS AND STRINGS **9 Hours**

Modules and functions: function definition and use, flow of execution, parameters and arguments; Fruitful functions: return values, composition, recursion; Strings: string slices, immutability, Looping and counting, String methods.

UNIT IV : LIST, TUPLE AND DICTIONARIES **9 Hours**

Lists: list operations, list slices, list methods, traversing, mutability, aliasing, list arguments, list comprehension; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and functions, Looping and dictionaries, histogram.

UNIT V : FILES, EXCEPTIONS **9 Hours**

Files: text files, reading and writing files, format operator, filenames and paths; Exceptions: handling exceptions, multiple exception blocks, finally block; Case study: tkinter.

TOTAL: 45 HOURS

COURSE OUTCOMES:

Upon completion of the course, the students would be able to

- Design solutions to simple computational problems
- Read, write and execute Python programs.
- Decompose a Python program into functions
- Implement compound data using Python lists, tuples, and dictionaries.
- Read and write data from/to files in Python Programs.
- Understand the GUI concepts and implement in Python.

TEXT BOOKS:

1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist‘‘, Version 2.0.17 edition, Updated for Python 3, Shroff/O‘Reilly Publishers, (http://greenteapress.com/wp/thinkpython/)
2. Reema Thareja “Python Programming using Problem solving Approach”, Oxford University Press.

REFERENCES:

1. Paul Gries, Jennifer Campbell and Jason Montojo, —Practical Programming: An Introduction to Computer Science using Python 3‖, Second edition, Pragmatic Programmers, LLC, 2013.
2. Robert Sedgewick, Kevin Wayne, Robert Dondero, —Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.
3. Timothy A. Budd, —Exploring Python‖, Mc-Graw Hill Education (India) Private Ltd. 2015.

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191GEB111L	PHYSICS AND CHEMISTRY LABORATORY	L	T	P	R	C
		0	0	4	0	2

(Common to all branches of Engineering and Technology)

(A) PHYSICS LABORATORY

OBJECTIVE

The purpose of this course is to develop scientific temper in experimental techniques and to reinforce the physics concepts among the engineering students

INSTRUCTIONAL OBJECTIVES

1. To gain knowledge in the scientific methods and learn the process of measuring different Physical variables
2. Develop the skills in arranging and handling different measuring instruments
3. Get familiar on experimental errors in various physical measurements and to plan/ suggest on how the contributions could be made of the same order, so as to minimize the errors.

ANY FIVE EXPERIMENTS

1. Torsion Pendulum – Rigidity modulus of wire and moment of inertia of disc.
2. Non Uniform Bending – Young’s modulus determination.
3. Spectrometer – Wave length of spectral lines using grating.
4. Lee’s Disc – Thermal Conductivity of bad conductor.
5. Semiconductor Laser –Wavelength of laser light, Size of particle and Numerical aperture of optical fiber.
6. Air Wedge – Measurement of thickness of thin wire.
7. Determination of the Band gap of a semiconductor.
8. Ultrasonic Interferometer - Velocity of sound and Compressibility of liquid.

TOTAL: 30 HOURS

TEXT BOOKS

1. G.Rajkumar, **Physics laboratory Practical**, McGraw Hill publication, 2019.
2. R.K.Shukla and Anchal Srivastava, **Practical Physics**, 1st Edition, New Age International (P) Ltd, New Delhi, 2006.
3. Physics Laboratory Manual, Faculty Members, Department of Physics, Easwari Engineering College, Chennai.

REFERENCES

1. Chattopadhyay D, P.C.Rakshit and B.Saha, **An Advanced Course in Practical Physics**, 2nd ed., Books & Allied Ltd., Calcutta, 1990.
2. Souires G L , **Practical Physics**, 4th Edition, Cambridge University, UK, 2001.

(B) CHEMISTRY LABORATORY

OBJECTIVES:

- To make the student to acquire practical skills in the determination of water quality parameters.
- To acquaint the students with the determination of molecular weight of polymer by using viscometer.

Any Five Experiments

1. Determination of chloride content of water sample by Argentometric method
2. Determination of strength of given HCl using pH meter
3. Determination of strength of acid in a mixture using conductivity meter.
4. Determination of permanent, total and temporary hardness of water sample.
5. Estimation of Fe^{2+} by Potentiometric titration
6. Determination of molecular weight of PVA using Ostwald viscometer
7. Determination of alkalinity in water sample
8. Estimation of Iron content in water sample using spectrophotometer (1,10 – Phenanthroline/thiocyanate method)
9. Conductometric titrations of strong acid Vs strong base
10. Determination of DO Content of water sample by Wrinkles method
11. Determination of BOD and COD in water sample

TOTAL: 30 HOURS

OUTCOMES:

- The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.

REFERENCES:

1. Dr. C. Ravichandran, “Engineering Chemistry Laboratory-I” Global publications, 2019.
2. Furniss B.S. Hannaford A.J, Smith P.W.G and Tatchel A.R., “Vogel’s Textbook of practical organic chemistry, LBS Singapore (1994).
3. Jeffery G.H, Bassett J., Mendham J. and Denny R.C., “Vogel’s Text book of quantitative analysis chemical analysis”, ELBS 5th Edn. Longman, Singapore publishers, Singapore, 1996.
4. Daniel R. Palleros, “Experimental organic chemistry” John Wiley & Sons, Inc.,New York (2001).

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191GES111L	PYTHON PROGRAMMING LABORATORY	L	T	P	R	C
		0	0	3	1	2

(Common to all branches of Engineering and Technology)

OBJECTIVE:

The course on Python programming laboratory is used to write, test and debug simple Python programs. Upon completion of the course, the students would be able to master the concepts of data types, loops, functions, list, tuples, dictionary , files and GUI.

LIST OF PROGRAMS:

1. LCM of two numbers.
2. Sum of squares of first n natural numbers
3. Fibonacci series.
4. Armstrong number
5. Sum of Digits in a Number.
6. First n prime number.
7. Factorial of a number using recursion
8. Count the number of vowels in a string
9. Matrix multiplication.
10. Simple calculator
11. Linear search
12. Selection sort
13. Insertion sort
14. Word count.
15. Mini Project (any ONE): Design GUI for
    - Airline reservation system
    - Feedback system
    - Employee management system
    - Student management system
    - Banking system

TOTAL: 60 HOURS

COURSE OUTCOMES:

Upon completion of the course, the students would be able to

- Write, test, and debug simple Python programs.
- Implement Python programs with conditionals and loops.
- Use functions for structuring Python programs.
- Represent compound data using Python lists, tuples, dictionaries.
- Read and write data from/to files in Python
- Design GUI applications.

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SECOND SEMESTER CURRICULUM

II semester - AUTOMOBILE ENGINEERING

II SEMESTER								
S. No	Course Code	Course Title	Category	Hours / Week				Credits
				L	T	P	R	
Theory								
1	191LEH201T	Professional Communication / BEC Certification	HS	3	-	-	-	3
2	191MAB201T	Engineering Mathematics - II	BS	3	2	-	-	4
3	191PYB203T	Material Science	BS	3	-	-	-	3
4	191GES201T	Basic Electrical and Electronics Engineering	ES	3	-	-	-	3
5	191GES202T	Engineering Mechanics	ES	3	2	-	-	4
Laboratory								
6	191GES211L	Engineering Practices Laboratory	ES	-	-	4	-	2
7	191GES212L	Basic Electrical and Electronics Engineering Lab	ES	-	-	3	1	2
Mandatory Course								
8	191CYM201T	Environmental Science &&	MC	3	-	-	-	3 &&
9	191GEM211L	NSS / NCC / YRC - Phase - I *	MC	-	-	2	-	1 *
Total				**18**	**4**	**9**	**1**	**21**

II semester - BIOMEDICAL ENGINEERING

II SEMESTER								
S. No	Course Code	Course Title	Category	Hours / Week				Credits
				L	T	P	R	
Theory								
1	191LEH201T	Professional Communication/ BEC Certification	HS	3	-	-	-	3
2	191MAB201T	Engineering Mathematics - II	BS	3	2	-	-	4
3	191GES201T	Basic Electrical and Electronics Engineering	ES	3	-	-	-	3
4	191GES202T	Engineering Mechanics	ES	3	2	-	-	4
5	191EIC201T	Electric Circuit Analysis	PC	3	2	-	-	4
Laboratory								
6	191GES211L	Engineering Practices Laboratory	ES	-	-	4	-	2
7	191GES212L	Basic Electrical and Electronics Engineering Laboratory	ES	-	-	3	1	2
Mandatory Course								
8	191CYM201T	Environmental Science &&	MC	3	-	-	-	3 &&
9	191GEM211L	NSS / NCC / YRC - Phase - I *	MC	-	-	2	-	1 *
Total				**18**	**6**	**9**	**1**	**22**

&& Mandatory to register for the course and earn three credits

* The student may opt for any one. They have to complete the respective Phase II and Phase III. Those who are not opting NSS/NCC/YRC have to opt for Foreign language / Indian constitution in the sixth semester.

II semester - CIVIL ENGINEERING

II SEMESTER								
S. No	Course Code	Course Title	Category	Hours / Week				Credits
				L	T	P	R	
Theory								
1	191LEH201T	Professional Communication / BEC Certification	HS	3	-	-	-	3
2	191MAB201T	Engineering Mathematics - II	BS	3	2	-	-	4
3	191GES201T	Basic Electrical and Electronics Engineering	ES	3	-	-	-	3
4	191GES202T	Engineering Mechanics	ES	3	2	-	-	4
5	191CES201T	Material Science for Civil Engineering	ES	3	-	-	-	3
Laboratory								
6	191GES211L	Engineering Practices Laboratory	ES	-	-	4	-	2
7	191CES211L	Computer Aided Building Drawing	ES	-	-	3	1	2
Mandatory Course								
8	191CYM201T	Environmental Science &&	MC	3	-	-	-	3 &&
9	191GEM211L	NSS / NCC / YRC - Phase - I *	MC	-	-	2	-	1 *
Total				**18**	**4**	**7**	**1**	**21**

II semester - COMPUTER SCIENCE AND ENGINEERING

II SEMESTER								
S. No	Course Code	Course Title	Category	Hours / Week				Credits
				L	T	P	R	
Theory								
1	191LEH201T	Professional Communication / BEC Certification	HS	3	-	-	-	3
2	191MAB201T	Engineering Mathematics - II	BS	3	2	-	-	4
3	191PYB202T	Physics for Information Science	BS	3	-	-	-	3
4	191GES201T	Basic Electrical and Electronics Engineering	ES	3	-	-	-	3
5	191GES204T	Programming in C	ES	3	-	-	-	3
Laboratory								
6	191GES211L	Engineering Practices Laboratory	ES	-	-	4	-	2
7	191GES213L	C Programming Lab	ES	-	-	3	1	2
Mandatory Course								
8	191CYM201T	Environmental Science &&	MC	3	-	-	-	3 &&
9	191GEM211L	NSS / NCC / YRC - Phase - I *	MC	-	-	2	-	1 *
Total				**18**	**2**	**9**	**1**	**20**

&& Mandatory to register for the course and earn three credits

* The student may opt for any one. They have to complete the respective Phase II and Phase III. Those who are not opting NSS/NCC/YRC have to opt for Foreign language / Indian constitution in the sixth semester.

II semester - ELECTRONICS AND COMMUNICATION ENGINEERING

II SEMESTER								
S. No	Course Code	Course Title	Category	Hours / Week				Credits
				L	T	P	R	
Theory								
1	191LEH201T	Professional Communication/ BEC Certification	HS	3	-	-	-	3
2	191MAB201T	Engineering Mathematics - II	BS	3	2	-	-	4
3	191PYB201T	Physics for Electronics Engineereing	BS	3	-	-	-	3
4	191GES203T	Basic Civil and Mechanical Engineering	ES	3	-	-	-	3
5	191ECC201T	Electric Circuits and Electronic Devices	PC	3	2	-	-	4
Laboratory								
6	191GES211L	Engineering Practices Laboratory	ES	-	-	4	-	2
7	191ECC211L	Circuits and Devices Lab	PC	-	-	3	1	2
Mandatory Course								
8	191CYM201T	Environmental Science &&	MC	3	-	-	-	3 &&
9	191GEM211L	NSS / NCC / YRC - Phase - I *	MC	-	-	2	-	1 *
Total				**18**	**4**	**9**	**1**	**21**

II semester - ELECTRICAL AND ELECTRONICS ENGINEERING

II SEMESTER								
S. No	Course Code	Course Title	Category	Hours / Week				Credits
				L	T	P	R	
Theory								
1	191LEH201T	Professional Communication/ BEC Certification	HS	3	-	-	-	3
2	191MAB201T	Engineering Mathematics - II	BS	3	2	-	-	4
3	191PYB201T	Physics for Electronics Engineereing	BS	3	-	-	-	3
4	191GES203T	Basic Civil and Mechanical Engineering	ES	3	-	-	-	3
5	191EEC201T	Circuit Theory	PC	3	2	-	-	4
Laboratory								
6	191GES211L	Engineering Practices Laboratory	ES	-	-	4	-	2
7	191EEC211L	Electric Circuits Laboratory	PC	-	-	3	1	2
Mandatory Course								
8	191CYM201T	Environmental Science &&	MC	3	-	-	-	3 &&
9	191GEM211L	NSS / NCC / YRC - Phase - I *	MC	-	-	2	-	1 *
Total				**18**	**4**	**9**	**1**	**21**

&& Mandatory to register for the course and earn three credits

* The student may opt for any one. They have to complete the respective Phase II and Phase III. Those who are not opting NSS/NCC/YRC have to opt for Foreign language / Indian constitution in the sixth semester.

II semester - ELECTRONICS AND INSTRUMENTATION ENGINEERING

II SEMESTER								
S. No	Course Code	Course Title	Category	Hours / Week				Credits
				L	T	P	R	
Theory								
1	191LEH201T	Professional Communication/ BEC Certification	HS	3	-	-	-	3
2	191MAB201T	Engineering Mathematics - II	BS	3	2	-	-	4
3	191PYB201T	Physics for Electronics Engineereing	BS	3	-	-	-	3
4	191GES203T	Basic Civil and Mechanical Engineering	ES	3	-	-	-	3
5	191EIC201T	Electric Circuit Analysis	PC	3	2	-	-	4
Laboratory								
6	191GES211L	Engineering Practices Laboratory	ES	-	-	4	-	2
7	191EIC211L	Electric Circuits Laboratory	PC	-	-	3	1	2
Mandatory Course								
8	191CYM201T	Environmental Science &&	MC	3	-	-	-	3 &&
9	191GEM211L	NSS / NCC / YRC - Phase - I *	MC	-	-	2	-	1 *
Total				**18**	**4**	**9**	**1**	**21**

II semester - MECHANICAL ENGINEERING

II SEMESTER								
S. No	Course Code	Course Title	Category	Hours / Week				Credits
				L	T	P	R	
Theory								
1	191LEH201T	Professional Communication/ BEC Certification	HS	3	-	-	-	3
2	191MAB201T	Engineering Mathematics - II	BS	3	2	-	-	4
3	191PYB203T	Material Science	BS	3	-	-	-	3
4	191GES201T	Basic Electrical and Electronics Engineering	ES	3	-	-	-	3
5	191GES202T	Engineering Mechanics	ES	3	2	-	-	4
Laboratory								
6	191GES211L	Engineering Practices Laboratory	ES	-	-	4	-	2
7	191GES212L	Basic Electrical and Electronics Engineering Lab	ES	-	-	3	1	2
Mandatory Course								
8	191CYM201T	Environmental Science &&	MC	3	-	-	-	3 &&
9	191GEM211L	NSS / NCC / YRC - Phase - I *	MC	-	-	2	-	1 *
Total				**18**	**4**	**9**	**1**	**21**

&& Mandatory to register for the course and earn three credits

* The student may opt for any one. They have to complete the respective Phase II and Phase III. Those who are not opting NSS/NCC/YRC have to opt for Foreign language / Indian constitution in the sixth semester.

II semester – ROBOTICS AND AUTOMATION

II SEMESTER								
S. No	Course Code	Course Title	Category	Hours / Week				Credits
				L	T	P	R	
Theory								
1	191LEH201T	Professional Communication/ BEC Certification	HS	3	-	-	-	3
2	191MAB201T	Engineering Mathematics - II	BS	3	2	-	-	4
3	191PYB203T	Material Science	BS	3	-	-	-	3
4	191GES201T	Basic Electrical and Electronics Engineering	ES	3	-	-	-	3
5	191GES202T	Engineering Mechanics	ES	3	2	-	-	4
Laboratory								
6	191GES211L	Engineering Practices Laboratory	ES	-	-	4	-	2
7	191GES212L	Basic Electrical and Electronics Engineering Lab	ES	-	-	3	1	2
Mandatory Course								
8	191CYM201T	Environmental Science &&	MC	3	-	-	-	3 &&
9	191GEM211L	NSS / NCC / YRC - Phase - I *	MC	-	-	2	-	1 *
Total				**18**	**4**	**9**	**1**	**21**

II semester - ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

II SEMESTER								
S. No	Course Code	Course Title	Category	Hours / Week				Credits
				L	T	P	R	
Theory								
1	191LEH201T	Professional Communication/ BEC Certification	HS	3	-	-	-	3
2	191MAB201T	Engineering Mathematics - II	BS	3	2	-	-	4
3	191GES201T	Basic Electrical and Electronics Engineering	ES	3	-	-	-	3
4	191GES205T	Programming and Data Structures using C	ES	3	-	-	-	3
5	191GES206T	Data Essentials	ES	3	-	-	-	3
Laboratory								
6	191GES211L	Engineering Practices Laboratory	ES	-	-	4	-	2
7	191GES214L	Programming and Data Structures using C Laboratory	ES	-	-	3	1	2
8	191GES215L	Data Essentials Laboratory	ES	-	-	2	-	1
Mandatory Course								
8	191CYM201T	Environmental Science &&	MC	3	-	-	-	3 &&
9	191GEM211L	NSS / NCC / YRC - Phase - I *	MC	-	-	2	-	1 *
Total				**18**	**4**	**9**	**1**	**21**

&& Mandatory to register for the course and earn three credits

* The student may opt for any one. They have to complete the respective Phase II and Phase III. Those who are not opting NSS/NCC/YRC have to opt for Foreign language / Indian constitution in the sixth semester.

II semester - INFORMATION TECHNOLOGY

II SEMESTER								
S. No	Course Code	Course Title	Category	Hours / Week				Credits
				L	T	P	R	
Theory								
1	191LEH201T	Professional Communication/ BEC Certification	HS	3	-	-	-	3
2	191MAB201T	Engineering Mathematics - II	BS	3	2	-	-	4
3	191PYB202T	Physics for Information Science	BS	3	-	-	-	3
4	191GES201T	Basic Electrical and Electronics Engineering	ES	3	-	-	-	3
5	191GES204T	Programming in C	ES	3	-	-	-	3
Laboratory								
6	191GES211L	Engineering Practices Laboratory	ES	-	-	4	-	2
7	191GES213L	C Programming Lab	ES	-	-	3	1	2
Mandatory Course								
8	191CYM201T	Environmental Science &&	MC	3	-	-	-	3 &&
9	191GEM211L	NSS / NCC / YRC - Phase - I *	MC	-	-	2	-	1 *
Total				**18**	**2**	**9**	**1**	**20**

&& Mandatory to register for the course and earn three credits

* The student may opt for any one. They have to complete the respective Phase II and Phase III. Those who are not opting NSS/NCC/YRC have to opt for Foreign language / Indian constitution in the sixth semester.

DISTRIBUTION OF SECOND SEMESTER SUBJECTS

Sem	S. No	Course Code	Course Title	Hours / Week				Credits
				L	T	P	R	
HUMANITIES AND SOCIAL SCIENCE COURSES								
2	1	191LEH201T	Professional Communication/ BEC Certification	3	-	-	-	3
BASIC SCIENCE COURSES								
2	2	191MAB201T	Engineering Mathematics - II	3	2	-	-	4
2	3	191PYB201T	Physics for Electronics Engineereing	3	-	-	-	3
2	4	191PYB202T	Physics for Information Science	3	-	-	-	3
2	5	191PYB203T	Material Science	3	-	-	-	3
ENGINEERING SCIENCE COURSES								
2	6	191GES201T	Basic Electrical and Electronics Engineering	3	-	-	-	3
2	7	191GES202T	Engineering Mechanics	3	2	-	-	4
2	8	191GES203T	Basic Civil and Mechanical Engineering	3	-	-	-	3
2	9	191GES204T	Programming in C	3	-	-	-	3
2	10	191GES205T	Programming and Data Structures using C	3	-	-	-	3
2	11	191GES206T	Data Essentials	3	-	-	-	3
2	12	191CES201T	Material Science for Civil Engineers	3	-	-	-	3
2	13	191GES211L	Engineering Practices Laboratory	-	-	4	-	2
2	14	191GES212L	Basic Electrical and Electronics Engineering Laboratory	-	-	3	1	2
2	15	191GES213L	C Programming Laboratory	-	-	3	1	2
2	16	191GES214L	Programming and Data Structures using C Laboratory	-	-	3	1	2
2	17	191GES215L	Data Essentials Laboratory	-	-	2	-	1
2	18	191CES211L	Computer Aided Building Drawing	-	-	3	1	2
PROFESSIONAL CORE COURSES								
2	19	191EIC201T	Electric Circuit Analysis	3	2	-	-	4
2	20	191ECC201T	Electric Circuits and Electronic Devices	3	2	-	-	4
2	21	191EEC201T	Circuit Theory	3	2	-	-	4
2	22	191ECC211L	Circuits and Devices Laboratory	-	-	3	1	2
2	23	191EEC211L	Electric Circuits Laboratory	-	-	3	1	2

2	24	191EIC211L	Electric Circuits Laboratory	-	-	3	1	2
MANDATORY COURSES								
2	25	191CYM201T	Environmental Science	3	-	-	-	3 &&
2	26	191GEM211L	NSS / NCC / YRC	-	-	2	-	1 *

SYLLABUS FOR SECOND SEMESTER SUBJECTS

191LEH201T	PROFESSIONAL COMMUNICATION	L	T	P	R	C
		3	0	0	0	3

(Common to all branches of Engineering and Technology)

OBJECTIVES:

- To strengthen their listening skills which help them comprehend lectures and talks in their areas of specialization
- To develop their speaking skills to make technical presentations, participate in Group Discussions.
- To develop strategies and skills to enhance their ability to read and comprehend engineering and technology texts.
- To foster their ability to write convincing job applications
- To equip with appropriate skills for writing effective reports.

UNIT I **9 Hours**

Communication – Process of Communication – Different forms of communication – Communication flow- Barriers of communication - Purpose and Function expressions – Extended definitions – Cause and Effect expressions - Compound nouns- Homonyms/homophones

UNIT II **9 Hours**

Listening to technical talks - Body language pertaining to Presentation– countering stage fright – Preparing PPT for presentation – Interpreting charts/graphs/pie charts/ bar diagram/tabular column/ tree diagram – Words often confused – Active/ Passive/ Impersonal Passive Voice – Numerical adjectives.

UNIT III **9 Hours**

Etiquette of Group discussion – discussing GD topics - reading journals and paraphrasing – Report Writing – Accident report/– Industrial visit report – Words often Misspelt – Describing a process using sequence words – Words used as different parts of speech

UNIT IV **9 Hours**

Small talk – review on films and books – email etiquette - Cover letter & Resume – Calling for quotations – Placing order – Letter of complaint - escalation letter - Feasibility report - Project report – - Abbreviations and Acronyms pertaining to Science and Technology – Types of Essays - Argumentative, Analytical, Descriptive & Expository.

UNIT V **9 Hours**

Writing Statements of Purpose-format, Sample – Modifiers, Redundancies-Direct indirect speech-Project Proposal – Minutes of Meeting - Verbal Analogies – Case studies relating to Goal Setting- Writing articles

TOTAL: 45 HOURS

OUTCOME:

1. Learners can draft effective formal letters and emails.
2. Listen and comprehend different technical/non-technical excerpts critically and infer the implied meaning.
3. Write ungrammatically and help in organizing ideas logically on a topic using a wide range of vocabulary
4. Read different genres of texts and evaluate them for content and structure.
5. Be proactive in using the language confidently and effectively for personal and professional growth.

TEXTBOOKS

2. Raymond Murphy, English Grammar in Use: Reference and Practice for Intermediate Students, Cambridge : CUP, 2004

REFERENCE BOOKS

1. M. Ashraf Rizvi ‘Effective Technical Communication’, Tata McGraw-Hill, New Delhi, 2005
2. Richard Johnson - Sheehan, Technical Communication Today, Longman Publishing Group, 2011
3. Golding S.R. ‘Common Errors in English Language’, Macmillan, 1978

WEBSITES:

https://owl.purdue.edu
https:www.hellolingo.com

JOURNALS:

IEEE/transactions on Professional Communication
https://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=47

EXTENSIVE READER:

Stephen R. Covey, The Seven Habits of Highly Effective People, Free Press, 1989

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191MAB201T	ENGINEERING MATHEMATICS - II	L	T	P	R	C
		3	2	0	0	4

(Common to all branches of Engineering and Technology)

OBJECTIVES :

- The objective of this course is to familiarize the prospective engineers with techniques in ordinary differential equations, complex variables and complex integration.
- The Study of Laplace transform help to solve the differential equations that occur in various branches of engineering disciplines.
- Vector calculus can be widely used for modelling the various laws of physics.
- The various methods of complex analysis can be used for efficiently solving the problems that occur in various branches of engineering disciplines.

UNIT 1: ORDINARY DIFFERENTIAL EQUATIONS **12 Hours**

Basic concepts - Separable differential equations - Exact differential equations - Integrating factors - Linear differential equations – Second order linear differential equations with constant coefficients – Particular Integral using operator method and Method of variation of parameters – Homogenous equation of Euler‘s and Legendre‘s type.

UNIT 2: LAPLACE TRANSFORMS **12 Hours**

Existence conditions – Transforms of elementary functions –Transform of unit step function and unit impulse function – Basic properties – Shifting theorems -Transforms of derivatives and integrals – Transform of periodic functions - Inverse transforms: Convolution theorem (Statement only) and Partial Fractions - Application to solution of linear second order ordinary differential equations with constant coefficients.

UNIT 3: VECTOR CALCULUS **12 Hours**

Gradient and directional derivative – Divergence and curl – Irrotational and Solenoidal vector fields – Line integral – Surface integral - Area of a curved surface - Green’s, Gauss divergence and Stokes’ theorems in evaluating line, surface and volume integrals (Planar, Cylindrical and Spherical Surfaces).

UNIT 4 : COMPLEX VARIABLES **12 Hours**

Analytic functions – Necessary and sufficient conditions for analyticity in Cartesian form - Properties – Harmonic conjugates – Construction of analytic function – Conformal mapping – Mapping by function

$w = z + c,\ cz,\ \frac{1}{z},\ z^2$ - Bilinear transformation.

UNIT 5 : COMPLEX INTEGRATION **12 Hours**

Complex integral - Cauchy’s integral theorem – Cauchy’s integral formula – Taylor’s and Laurent’s series – Singularities – Residues – Residue theorem – Application of residue theorem for evaluation of real integrals – Use of circular contour and semicircular contour (No poles on the real axis).

TOTAL: 60 HOURS

TEXT BOOKS:

1. Grewal B.S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 43rd Edition, 2014.
2. Joel Hass, Christopher Heil and Maurice D.Weir Thomas’ Calculus , 14th Edition, Pearson.

REFERENCE BOOKS:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons.
2. N.P.Bali and Manish Goyal “ Engineering Mathematics”(For Semester II) Third Edition, University Science Press .
3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi.
4. O’Neil, P.V. “Advanced Engineering Mathematics”, Cengage Learning India Pvt., Ltd, New Delhi, 2007 .
5. James Stewart, "Calculus: Early Transcendentals", Cengage Learning, 7th Edition, New Delhi, 2015.

COURSE OUTCOMES:

The Course aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.

The students will learn:

1. The effective mathematical tools to obtain the solutions of first and second order differential equations that model physical processes.
2. Gradient, divergence and curl of a vector point function and related identities. Evaluation of line, surface and volume integrals using Gauss, Stokes and Green’s theorems and their verification.
3. The tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineering problems.
4. Analytic functions, conformal mapping and complex integration.
5. Laplace transform and inverse transform of simple functions, properties, various related theorems and application to solve the differential equations with constant coefficients.

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		L	T	P	R	C
191PYB201T	**PHYSICS FOR ELECTRONICS ENGINEERING**	**3**	**0**	**0**	**0**	**3**

(Common to first year ECE, EEE and EIE)

OBJECTIVES

To enrich the understanding of various types of materials and their applications in electronics, communication, electrical and instrumentation engineering.

UNIT I CONDUCTING MATERIALS 9 Hours

Conductors – classical free electron theory of metals – Expression for electrical and thermal conductivity – Wiedemann-Franz law – Lorentz number – Draw backs of classical theory – Quantum theory – Fermi distribution function – Effect of temperature on Fermi Function – Density of energy states – carrier concentration in metals.

UNIT II SEMICONDUCTING MATERIALS 9 Hours

Direct and indirect semiconductors - Intrinsic Semiconductors – Carriers concentration in intrinsic semiconductors (derivation) – extrinsic semiconductors (Qualitative study) - variation of Fermi level with temperature and impurity concentration in n and p type semiconductors – Carrier transport: Velocity-electric field relations – drift and diffusion transport – Hall effect and devices – Zener and avalanche breakdown in p-n junctions - Ohmic contacts – tunnel diode - Schottky diode – MOS capacitor - Power transistor.

UNIT III MAGNETIC AND SUPERCONDUCTING MATERIALS 9 Hours

Magnetism in materials – magnetic field and induction – magnetization - magnetic permeability and susceptibility – types of magnetic materials – Ferromagnetism: origin and exchange interaction - saturation magnetization and Curie temperature - Domain theory - Hysteresis based on domain theory-Hard and soft magnetic materials–Applications:

Transducer-Hard disc-Magneto optical recording.
Superconductivity: Properties – Type I and Type II superconductors – BCS theory of superconductivity (Qualitative) - High Tc superconductors – Applications of superconductors – SQUID, Cryotron, Magnetic levitation.

UNIT IV DIELECTRIC MATERIALS 9 Hours

Electrical susceptibility – dielectric constant –Types of polarization (Quantitative) – Frequency and temperature dependence of polarisation – Internal field – Claussius–Mosotti equation – dielectric loss - dielectric breakdown - Uses of dielectric materials in Capacitor and Transformer– Ferroelectricity and applications.

UNIT V ADVANCED ENGINEERING MATERIALS 9 Hours

Metallic glasses: preparation, properties and applications. Shape memory alloys (SMA): characteristics, properties and applications of Ni:Ti alloy – Nanomaterials - Quantum size effect - Quantum dot, Wire and Well - Carbon nanotube and its types, Potential uses of nanomaterials in electronics, robotics, computers, sensors, mobile electronic devices – NLO materials – Birefringence - optical Kerr effect – Classification of Biomaterials and its applications.

TOTAL: 45 HOURS

OUTCOMES

At the end of the course, the students will able to

- gain knowledge on classical and quantum electron theories, and energy band structures,
- acquire knowledge on basics of semiconductor physics and its applications in various devices,
- get knowledge on magnetic and dielectric properties of materials,
- have the necessary understanding on the functioning of advanced materials

TEXTBOOKS

1. P.K.Palanisamy, **Materials Science**, SCITECH Publishers, 2011.
2. S.O.Pillai, **Solid State Physics**, New Age International(P) Ltd., publishers, 2009.
3. V.Rajendran**, Materials Science**, Mc Graw Hill Education (India) Private Ltd., 2017.

REFERENCES

1. S.O.Kasap, **Principles of Electronic Materials and Devices**, McGraw- Education, 2007.
2. Umesh K Mishra and Jasprit Singh,**Semiconductor Device Physics and Design**, Springer, 2008.
3. M.A.Wahab, **Solid State Physics: Structure and Properties of Materials**, Narosa Publishing House, 2009.
4. Arthur Beiser,**Concepts of Modern Physics, 6**th edn.,McGraw Hill 2003.
5. T.Pradeep, **Nano: The Essentials**, Mc Graw Hill Publishing Co. Ltd., 2007.
6. Charles P. Poole Jr., Frank J. Owens, **Introduction to nano technology**, Wiley, 2003.

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191PYB202T PHYSICS FOR INFORMATION SCIENCE

L	T	P	R	C
3	0	0	0	3

(Common to first year CSE and IT)

OBJECTIVES

To enrich the understanding of various types of materials and their applications in Engineering and Technology.

UNIT I CONDUCTING MATERIALS 9 Hours

Conductors – Classical free electron theory of metals – Expression for Electrical and Thermal conductivity – Wiedemann – Franz law – Lorentz number – Drawbacks of classical theory – Quantum theory – Fermi distribution function – Effect of temperature on Fermi function – Density of energy states – Carrier concentrations in metals.

UNIT II SEMICONDUCTING MATERIALS 9 Hours

Direct and Indirect band gap semiconductors, Intrinsic Semiconductors - Carriers concentration in Intrinsic Semiconductor (derivation) - Extrinsic Semiconductors (Qualitative study) - Variation of Fermi level with temperature and impurity

concentration in n and p type – Carrier transport: Velocity, Electric field relations, Drift and Diffusion transport – Hall effect and Devices – Zener and Avalanche Breakdown in p-n junctions - Ohmic contacts – Tunnel diode - Schottky diode. MOS capacitor - Power transistor.

UNIT III MAGNETIC AND SUPERCONDUCTING MATERIALS 9 Hours

Magnetism in materials – Magnetic field and Induction – Magnetization - Magnetic permeability and susceptibility – types of Magnetic materials – Ferromagnetism, origin and exchange interaction, Saturation magnetization, Curie temperature, Domain theory - Hard and Soft magnetic materials – Applications in Transducer, Hard disc, Magneto optical recording. Superconductivity: Type I and Type II superconductors, BCS theory of Superconductivity (Qualitative), High T_c Superconductors, Applications in SQUID, Cryotron and Magnetic levitation.

UNIT IV OPTICAL AND MODERN ENGINEERING MATERIALS 9 Hours

Classification of Optical materials - Photo Detectors – Principle and working of LED - OLED - LCD - Photo Conducting materials – Laser Diode – Optical Data Storage techniques. Modern Engineering Materials: Smart Materials - Shape Memory Alloys - Metallic Glasses.

UNIT V NANO MATERIALS 9 Hours

Background, Definition and Basic concepts of Nanotechnology, Size dependent property, Quantum size effect - Quantum dot, Wire and Well – Bucky balls - Graphene – Carbon nanotubes, Types, Applications- Potential uses of nanomaterials, carbon nano tube computers, nano sensors, actuators - Medical applications of Nanomaterials, NEMS.

TOTAL: 45 HOURS

OUTCOMES:

At the end of this course,

- the students will acquire knowledge on basics of semiconductor physics and its applications in various devices
- the students will get knowledge on magnetic properties of materials and their applications in data storage devices,
- the students will have the necessary understanding on the functioning of optical materials for optoelectronics,
- the students will understand the basics of carbon structures and their applications in electronics.

TEXTBOOKS:

1. P.K.Palanisamy, **Materials Science**. SCITECH Publishers, 2011.
2. S.O.Pillai, **Solid State Physics**. New Age International(P) Ltd., publishers, 2009
3. V.Rajendran, **Materials Science**, McGraw Hill Education (India) Private Ltd., 2017

REFERENCES:

1. Arthur Beiser,**Concepts of Modern Physics, 6**th edn.,McGraw Hill 2003.
2. S.O.Kasap, **Principles of Electronic Materials and Devices**, McGraw-Hill education, 2007.
3. Yoshinobu Aoyagi and Kotaro Kajikawa, **Optical Properties of Advanced Materials**, Springer, 2013.
4. Charles P. Poole Jr., Frank J. Owens, **Introduction to nano technology**, Wiley, 2003.
5. T.Pradeep, **Nano: The Essentials**, Mc Graw Hill Publishing Co. Ltd., 2007.

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191PYB203T MATERIALS SCIENCE

L	T	P	R	C
3	0	0	0	3

(Common to first year Automobile Engineering, Mechanical Engineering and Robotics and Automation)

OBJECTIVES

To disseminate to the students, the concepts of phases in solid solutions, electrical and thermal properties of solids, materials science, theories of solid state physics in the development of materials and its properties and facilitate students to apply in their area of specialization.

UNIT I PHASE EQUILIBRIA IN MATERIALS **9 Hours**

Solid solutions - Hume-Rothery rules and intermediate phases - phase rule- phase diagrams- single component system – Tie line rule – Lever rule - binary isomorphous - binary eutectoid, peritectoid systems - Iron carbon equilibrium diagram - Fick's laws of diffusion- mechanisms of diffusion, temperature dependence of diffusivity - steady and non-steady state diffusion - factors that influence diffusion – Properties and applications of copper alloys, aluminium alloys and titanium alloys.

UNIT II CONDUCTING MATERIALS **9 Hours**

Conductors – classical free electron theory of metals – Expression for electrical and thermal conductivity – Wiedemann – Franz law – Lorentz number – draw backs of classical theory – Quantum theory – Fermi distribution function – Effect of temperature on Fermi Function – Density of energy states – carrier concentration in metals.

UNIT III SEMICONDUCTING MATERIALS **9 Hours**

Direct and indirect semiconductors - Carriers concentration in intrinsic semiconductor – Extrinsic semiconductors (Qualitative study) - variation of Fermi level with temperature and impurity concentration in n and p types – Carrier transport: Velocity-electric field relations – drift and diffusion transport – Hall Effect and determination of Hall Coefficient.

UNIT IV MAGNETIC AND SUPERCONDUCTING MATERIALS **9 Hours**

Magnetism in materials – magnetic field and induction – magnetization - magnetic permeability and susceptibility – types of magnetic materials – Ferromagnetism: origin and exchange interaction - saturation magnetization and Curie temperature – Domain Theory - Hard and soft magnetic materials – Applications. Superconductivity: properties – Type I and Type II superconductors – BCS theory of superconductivity (Qualitative) - High T_c superconductors – Applications of superconductors – SQUID, cryotron, magnetic levitation.

UNIT V ADVANCED ENGINEERING MATERIALS **9 Hours**

Polymer matrix composites (PMC): classification, role of matrix and reinforcement, fillers, processing of fiber reinforced PMCs, applications – Metallic glasses: types, glass forming ability of alloys, melt spinning process, applications - Shape memory alloys: phases, shape memory effect, pseudo elastic effect, Ni:Ti alloy, applications – nano materials: Bucky balls - Graphene – Carbon nanotubes, types, applications – High Entropy Alloys (HEA) and Super alloys (SA).

TOTAL: 45 HOURS

OUTCOMES:

At the end of this course,

- The students will have knowledge on various phase diagrams and their applications,
- The students will gain knowledge on magnetic, dielectric and superconducting properties of materials,
- The students will understand the basics of polymers, composites and nano materials, and
- The students will have knowledge on advanced materials.

TEXT BOOKS:

1. W.D.Callister, **Materials Science and Engineering**, John Wiley & Sons, 2007.
2. V.Raghavan, **Physical Metallurgy,** Prentice Hall of India, 2006.
3. V.Rajendran, **Materials Science**, McGraw Hill Education (India) Private Ltd., 2017

REFERENCE BOOKS:

1. D.A. Porter and K. E. Easterling, **Phase Transformations in Metals and Alloys**, Taylor and Francis, 2009.
2. S.H.Avner, **Introduction to Physical Metallurgy**, 2nd edition, McGraw Hill, 1985.
3. S.O. Pillai, **Solid State Physics**, New Age International (P) Ltd., publishers, 2009.
4. T.Pradeep, **Nano: The Essentials**, Mc Graw Hill Publishing Co. Ltd., 2007.
5. Charles P. Poole Jr., Frank J. Owens, **Introduction to nano technology**, Wiley, 2003.

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191GES201T	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	L	T	P	R	C
		3	0	0	0	3

(Common to first year Automobile, Biomedical, Civil, CSE, Mechanical, R&A, AI&DS and IT)

OBJECTIVES:

1. To understand the Basic Fundamentals in Electrical Circuits.
2. To study the construction, Principle of operation and performance of DC and AC Machines
3. To understand the principles of PN Junction diode and BJT
4. To Study the protection and safety measures in Electricity

UNIT I FUNDAMENTALS OF ELECTRICITY AND CIRCUITS: 9 Hours

Evolution of Electricity and Inventions- Electrical Quantities—Charge- Electric Potential, Voltage, Current, Power Energy, DC, AC, time period, Frequency, Phase, Flux density, RMS, Average, Peak, Phasor and Vector diagram. Electric circuit elements – Sources - Ohm's Law - Kirchhoff's Laws, Faradays Law, Lenz's Law- Wiring- House wiring and Industrial Wiring systems.

UNIT-II MEASURING INSTRUMENTS: 9 Hours

Principle of Operation Moving Coil and Moving Iron Types of Voltmeters and Ammeters - Multimeters –Measurements of resistance, inductance & capacitance-Power and Energy Measurements- Energy Efficient Equipment's and sample load (Domestic load) calculations.

UNIT III ELECTRICAL MACHINES: 9 Hours

Construction - Principle of Operation - EMF Equation –Application of DC Generator, DC Motor – types and Characteristics – Applications – Transformer-AC Machines – Construction, Operation and types of Single phase and three Phase Induction Motors.

UNIT IV BASIC ELECTRONICS AND COMMUNICATION: 9 Hours

PN Junction Diode, Zener Diode – V-I Characteristics – Applications – Rectifier – Half Wave – Full Wave and Rectifiers – Transistors types – Transistor as an Amplifier — Junction Field Effect Transistor (JFET) operation and characteristics, SCR - characteristics and its applications- CRO-Principle of Cathode Ray Tube-regulated power Supply- Function Generators. Communication systems- types- Analog, Digital and Wireless.

UNIT V PROTECTION, SAFETY AND INDIAN ELECTRICITY SCENARIO: 9 Hours

Hazards of Electricity-Shock, Burns, arc- blast, Thermal Radiation, Explosives, fires, effect of electricity on the human Body. Electrical safety practices, Protection devices. Electrical power- Generation resources- transmission and Distribution. Regulatory authorities- role of MNRE, MNRE, NTPC, TEDA, TANGEDCO.

TOTAL : 45 HOURS

OUTCOMES:

1. Demonstrate knowledge on basics of electrical circuits, Construction and working principle of various electrical machines.
2. Analyze the behaviour and performance of electrical circuits and machines.
3. Apply knowledge on CRO and function generator.
4. Describe electrical hazards and safety equipment.
5. Analyze and apply various grounding and bonding techniques.
6. Select appropriate safety method for low, medium and high voltage equipment.
7. Participate in a safety team.
8. Carry out proper maintenance of electrical equipment by understanding various standards.

TEXT BOOKS:

1. S.Hasan Saeed, D.K.Sharma, Non-Conventional Energy Resources, Katson Books, 3rd Edition, 2013
2. John Cadick, Mary Capelli-Schellpfeffer, Dennis Neitzel, Al Winfield,'Electrical Safety Handbook', McGraw-Hill Education, 4thEdition, 2012.

3. D.P.Kothari and I.J. Nagarath –"Basic Electrical & Electronics Engineering", Mc.Grawhill publications, 1st Edition, 2014.
4. Leonard S Bobrow, "Foundations of Electrical Engineering", Oxford University Press, 2013
5. Vincent Del Toro, Electrical Engineering Fundamentals, Prentice Hall, 2006.

References:

1. Del Toro, "Electrical Engineering Fundamentals", Pearson Education, New Delhi, 2007 2. John Bird, "Electrical Circuit Theory and Technology", Elsevier, First Indian Edition, 2006.
2. Maxwell Adams.J, 'Electrical Safety- a guide to the causes and prevention of electric hazards', The Institution of Electric Engineers, IET 1994. 2. Ray A. Jones, Jane G. Jones, 'Electrical Safety in the Workplace', Jones & Bartlett Learning, 2000.
3. V.K.Mehta& Rohit Mehta, Principles of Electrical Engineering, S.Chand publications, 2nd Edition, 2003.
4. Lawmans, Electricity act 2003, Act No. 36 of 2003, Kamal Publishers, New Delhi.

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191GES202T	ENGINEERING MECHANICS	L	T	P	R	C
		3	2	0	0	4

(Common to first year Automobile, Biomedical, Civil, Mechanical and R&A Engineering)

OBJECTIVES:

- To apply the fundamental concepts in determining the effect of forces on a particle and rigid body.
- To determine the geometry dependant properties of solids and sections
- To apply the principles of kinetics and kinematics in dynamics
- To understand the concepts of static friction.
- To know the basics of solid mechanics.

UNIT I STATICS OF PARTICLES **12 Hours**

Introduction – Units and Dimensions – Laws of Mechanics – Lami's theorem, Parallelogram and triangular Law of forces – Vectorial representation of forces – Vector operations of forces - Coplanar Forces – Resolution and Composition of forces – Free body diagram - Forces in space – Equilibrium and equivalent system of forces in space – Principle of transmissibility.

UNIT II EQUILIBRIUM OF RIGID BODIES **12 Hours**

Free body diagram – Types of supports –reaction forces –stable equilibrium –- Moments and Couples – Vectorial representation of moments and couples – Varignon's theorem – Single equivalent force - Resultant and equilibrium - Equilibrium of Rigid bodies in two and three dimensions - Analysis of truss elements – method of joints.

UNIT III PROPERTIES OF SURFACES AND SOLIDS **12 Hours**

Centre of gravity, Centre of mass and Centroid – Moment of Inertia of simple and complex areas -Theorems of Pappus - Area moments of inertia of plane areas -Parallel axis theorem and perpendicular axis theorem – Principal moments of inertia of plane areas – Radius of gyration – Polar moment of inertia – Product of inertia - Mass moment of Inertia of simple solids.

UNIT IV DYNAMICS OF PARTICLES AND FRICTION **12 Hours**

Kinematics – Rectilinear and curvilinear motion – projectile motion Kinetics – Newton's second law – D'Alembert's Principle – Work Energy method – Principle of Impulse momentum – Laws of friction – coefficient of friction – Dry friction – wedge friction – ladder friction – rolling resistance

UNIT V STRESS, STRAIN AND DEFORMATION OF SOLIDS **12 Hours**

Stresses - Strain - - Hooke's law-Relationship among elastic constants- Factor of safety-Thermal stresses- Compound bars- Strain energy due to axial force, impact and suddenly applied load.

TOTAL: 60 HOURS

OUTCOMES:

On successful completion of this course, the student will be able to

- analyse the particle and rigid body in equilibrium
- evaluate the properties of surfaces and solids
- calculate dynamic forces exerted in rigid body
- determine the friction and the effects by the laws of friction
- understand the properties of deformable solids

TEXT BOOKS:

1. Beer, F.P and Johnston Jr. E.R., "Vector Mechanics for Engineers (In SI Units): Statics and Dynamics", 8th Edition, Tata McGraw-Hill Publishing company, New Delhi (2004).
2. Popov, E.P, "Engineering Mechanics of Solids", Prentice-Hall of India, New Delhi, (2009).
3. Kazmi, S. M. A., Solid Mechanics, TMH, Delhi, India., 2008.
4. Rajasekaran S and Sankarasubramanian G., "Engineering Mechanics Statics and Dynamics", 3rd Edition, Vikas Publishing House Pvt. Ltd., 2005.

REFERENCES:

1. Bhavikatti, S.S and Rajashekarappa, K.G., "Engineering Mechanics", New Age International (P) Limited Publishers, 2009.
2. Hibbeller, R.C and Ashok Gupta, "Engineering Mechanics: Statics and Dynamics", 11th Edition, Pearson Education 2010.
3. Irving H. Shames and Krishna Mohana Rao. G., "Engineering Mechanics – Statics and Dynamics", 4th Edition, Pearson Education 2006.

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191GES203T	BASIC CIVIL AND MECHANICAL ENGINEERING	L	T	P	R	C
		3	0	0	0	3

OBJECTIVES:

- To impart basic knowledge on Civil and Mechanical Engineering.
- To familiarize the materials used in Civil Engineering.
- To provide the exposure on the fundamental elements of civil engineering structures.
- To enable the students to distinguish the components and working principle of power plant units and IC engines.
- To provide the basic knowledge on working of Refrigeration and Air conditioning systems.

UNIT I SCOPE OF CIVIL AND MECHANICAL ENGINEERING **9 Hours**

Overview of Civil Engineering - Civil Engineering contributions to the welfare of Society – Specialized sub disciplines in Civil Engineering – Structural, Construction, Geotechnical, Environmental, Transportation and Water Resources Engineering.

Overview of Mechanical Engineering - Mechanical Engineering contributions to the welfare of Society –Specialized sub disciplines in Mechanical Engineering - Production, Automobile, Energy Engineering. Interdisciplinary concepts in Civil and Mechanical Engineering.

UNIT II SURVEYING AND CIVIL ENGINEERING MATERIALS **9 Hours**

Surveying: Objects – classification – principles – measurements of distances –Application of surveying using GPS – Principles of remote sensing and GIS.

UNIT III BUILDING COMPONENTS **9 Hours**

Components of building – Substructure and Superstructure – Foundation - Brick masonry –– beams -columns – roofing - – flooring – plastering – floor area, carpet area and floor space index - water supply - sources and quality of water - Rain water harvesting.

UNIT IV INTERNAL COMBUSTION ENGINES AND POWER PLANTS **9 Hours**

Classification of Power Plants - Internal combustion engines as automobile power plant – Working principle of Petrol and Diesel Engines – Four stroke and two stroke cycles – Comparison of four stroke and two stroke engines – Working principle of steam, Gas, Diesel, Hydro - electric and Nuclear Power plants –- working principle of Boilers, Turbines, Reciprocating Pumps (single acting and double acting) and Centrifugal Pumps

UNIT V REFRIGERATION AND AIR CONDITIONING SYSTEM **9 Hours**

Terminology of Refrigeration and Air Conditioning. Principle of vapour compression and absorption system–Layout of typical domestic refrigerator–Window and Split type room Air conditioner.

TOTAL: 45 HOURS

OUTCOMES:

On successful completion of this course, the student will be able to

- Appreciate the Civil and Mechanical Engineering components of Projects.
- Explain the usage and proper selection of construction materials and usage of modern surveying instruments.
- Identify the components used in power plant cycle.
- Demonstrate working principles of petrol and diesel engine.
- Elaborate the components of refrigeration and Air conditioning cycle.

TEXTBOOKS:

1. Shanmugam G and Palanichamy MS,“Basic Civil and Mechanical Engineering”, Tata McGraw Hill Publishing Co.,NewDelhi,1996.
2. Anji Reddy M, “Text book of Remote sensing and Geographical Systems”, BS Publications, 2015.

REFERENCES:

1. Palanikumar, K. Basic Mechanical Engineering, ARS Publications, 2010.
2. Ramamrutham S.,“Basic Civil Engineering”, Dhanpat Rai Publishing Co.(P) Ltd.2013
3. Seetharaman S.,“BasicCivil Engineering”,AnuradhaAgencies,2005.
4. ShanthaKumar SRJ.,“Basic Mechanical Engineering”, Hi-tech Publications, Mayiladuthurai, 2000.
5. Venugopal K. and Prahu Raja V., “Basic Mechanical Engineering”, Anuradha Publishers, Kumbakonam, 2000.

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191GES204T **PROGRAMMING IN C**

L	T	P	R	C
3	0	0	0	3

OBJECTIVES:

- Learn to think logically and write pseudo code or draw flow charts for problems.
- Be exposed to the syntax of C.
- To develop C Programs using basic programming constructs.
- Learn to use arrays and strings in C.
- To develop applications in C using functions , pointers and structures
- To do input/output and file handling in C

UNIT I - C PROGRAMMING BASICS **9 Hours**

Introduction- Algorithm – Flow Charts – Pseudo Code - Structure of a C program – compilation and linking processes – Character set - Constants, Variables – Data Types – Expressions using operators in C – Managing Input and Output operations – Decision Making and Branching – Looping statements.

UNIT II - ARRAYS AND STRINGS **9 Hours**

Arrays: Initialization – Declaration – Accessing the array elements – Operations on array- One dimensional array - two dimensional arrays – Strings: String operations – String Arrays - Simple programs: sorting- searching – matrix operations.

UNIT III - FUNCTIONS AND POINTERS **9 Hours**

Functions: Introduction - Function prototype - function definition - function call – Return statement - Recursion. Parameter passing: Pass by value - Pass by reference. Pointers: Pointer operators – Declaring the pointer variable - Pointer arithmetic – Null pointer- Arrays and pointers – Array of pointers.

UNIT IV- STRUCTURES AND UNIONS **9 Hours**

Structures: Introduction - Need for structure data type –definition and declaration – Structure within structure – Structures and functions – Union: Definition and Declaration – Accessing the members of union - Programs using Structures and Unions – Scope of variables - Storage classes - Preprocessor directives.

UNIT V- FILE HANDLING **9 Hours**

Introduction – Using files in C - File operation: Read data from files, writing data to files, detecting the end of file, Functions for selecting a record randomly – File pointer – Error handling - Types of file processing: Sequential access, Random access- Dynamic memory allocation.

TOTAL: 45 HOURS

OUTCOMES:

Upon completion of the course, the students will be able to

- Develop simple applications in C using basic constructs
- Design and implement applications using arrays and strings
- Develop and implement applications in C using functions and pointers.
- Develop applications in C using structures.
- Design applications using sequential and random access file processing.

TEXT BOOKS:

1. Reema Thareja, —Programming in C, Oxford University Press, Second Edition, 2016.
2. Ajay Mittal — Programming in C, A practical Approach, Ltd., Pearson Education in South Asia, 2011.
3. Balagurusamy E — Programming in ANSI C, McGraw Hill Publication, Eighth Edition, 2019.

REFERENCES:

1. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C", McGraw-Hill Education, 1996.
2. Pradip Dey, Manas Ghosh, —Fundamentals of Computing and Programming in C, First Edition, Oxford University Press, 2009.
3. Paul Deitel and Harvey Deitel, —C How to Program, Seventh edition, Pearson Publication
4. Juneja, B. L and Anita Seth, —Programming in C, CENGAGE Learning India pvt. Ltd., 2011.
5. Kernighan, B.W and Ritchie, D.M, —The C Programming language, Second Edition, Pearson Education, 2006.

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191GES205T **PROGRAMMING AND DATA STRUCTURES USING C**

L	T	P	R	C
3	0	0	0	3

PREREQUISITES: NIL

COURSE OBJECTIVES:

- Be familiar with the basics of C programming language.
- To understand the concepts of ADTs
- To Learn linear data structures – lists, stacks, and queues

- To apply Tree and Graph structures
- To understand sorting, searching and hashing algorithms

UNIT I : C PROGRAMMING BASICS AND ADVANCED FEATURES **9 Hours**

Conditional statements – Control statements – Arrays - Pointers - Variation in pointer declarations –Functions - Function Pointers –-Structures - File handling concepts – File read – write – binary and Stdio - File Manipulations

UNIT II : LINEAR DATA STRUCTURES – LIST **9 Hours**

Abstract Data Types (ADTs) – List ADT – array-based implementation – linked list implementation —singly linked lists- circularly linked lists- doubly-linked lists – Stack ADT- Queue ADT- applications of queues.

UNIT III : NON LINEAR DATA STRUCTURES – TREES **9 Hours**

Tree ADT –Unbalanced tree –Balanced tree- tree traversals - Binary Tree ADT – expression trees – applications of trees – binary search tree ADT –Threaded Binary Trees- AVL Trees – B-Tree - B+ Tree **-** Heap –Binary Heap- Applications of heap.

UNIT IV : NON LINEAR DATA STRUCTURES – GRAPHS **9 Hours**

Definition – Representation of Graph – Types of graph - Breadth-first traversal - Depth-first traversal – Topological Sort – Bi-connectivity – Cut vertex – Euler circuits – Applications of graphs-minimum spanning tree-dijkstra's algorithm-kruskal's algorithm

UNIT V : SEARCHING, SORTING AND HASHING TECHNIQUES **9 Hours**

Searching- Linear Search - Binary Search. Sorting - Bubble sort - Selection sort - Insertion sort - Shell sort. Hashing- Hash Functions – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing.

TOTAL : 45 HOURS

COURSE OUTCOMES:

Upon completion of this course, student will be able to:

1. Outline the basic concepts of C programming
2. Apply the concept of abstract data types for linear data structures
3. Develop solutions using linear and non-linear data structures
4. evaluate algorithms and data structures in terms of time complexity of basic operations.
5. Apply searching and sorting techniques to solve the complex problem
6. Describe the hash function and concepts of collision and its resolution methods

TEXT BOOKS:

1. Anita Goel and Ajay Mittal, “Computer Fundamentals and Programming in C”, Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.
2. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C”, 2nd Edition, Pearson Education,1997.

REFERENCE BOOKS:

1. Byron S Gottfried, “Programming with C”, Schaum‟s Outlines, Second Edition, Tata McGraw-Hill, 2006.
2. Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein, “Introduction to Algorithms", Second Edition, Mcgraw Hill, 2002.
3. Aho, Hopcroft and Ullman, “Data Structures and Algorithms”, Pearson Education,1983.
4. Stephen G. Kochan, “Programming in C”, 3rd edition, Pearson Education.
5. Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, “Fundamentals of Data Structures in C”, Second Edition, University Press, 2008

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191GES206T	DATA ESSENTIALS	L	T	P	R	C
		3	0	0	0	3

PREREQUISITES: NIL

COURSE OBJECTIVES:

- To understand the basic functions involved in working of spreadsheets.
- To understand and make use of various built in functions.
- To analyse the various representations of given data available in spreadsheets.
- To learn the data validation techniques.
- Implement the security features according to the categories.

UNIT I : INTRODUCTION **9 Hours**

Reading data into Excel using various formats -Basic functions in Excel, arithmetic as well as various logical functions-Formatting rows and columns-Using formulas in Excel and their copy and paste using absolute and relative referencing.

UNIT II : SPREADSHEET FUNCTIONS **9 Hours**

Functions-Built-in functions-using functions-IF and the nested IF functions- VLOOKUP and HLOOKUP- The RANDBETWEEN function

UNIT III : FILTERING, PIVOT TABLES, AND CHARTS **9 Hours**

VLOOKUP/HLOOKUP across worksheets-Data filtering in Excel-Use of Pivot tables with categorical as well as numerical data-Introduction to the charting capability of Excel- Line, Bar and Pie charts-Pivot charts-Scatter plots-Histograms

UNIT IV : MACROS **9 Hours**

Filtering -Sorting-Using Ranges-Data Validation- styles-Themes-Templates-Macro Creation-Security-Absolute Reference-Relative Reference-VBA-understanding codes.

UNIT V : GRAPHICS AND SECURITY **9 Hours**

Graphics- Cross referencing-Email Workbook-Translate Workbook- File Level Protection-Workbook security-Keyboard Shortcuts.

TOTAL PERIODS : 45 HOURS

COURSE OUTCOMES:

Upon completion of this course, student will be able to:

1. Explore Microsoft excel environment to modify worksheet and workbook.
2. Apply functions,formulas and formatting to work with cell references.
3. Create different types of tables and charts.
4. Apply filtering and sorting techniques in a workbook.
5. Use macros, templates, and custom toolbars for data validation.
6. Implement security mechanisms at various levels.

TEXT BOOKS:

1. Liengme, B: A Guide to Microsoft Excel 2013 for Scientists and Engineers: helpful various code used in the text.

REFERENCE BOOKS:

1. NIL

E-BOOKS / WEB REFERENCES:

1. https://www.excelbee.com
2. https://online.rice.edu/courses/excel-data-analysis/

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191CES201T	MATERIAL SCIENCE FOR CIVIL ENGINEERS	L	T	P	R	C
		3	0	0	0	3

OBJECTIVES :

The course will enable

- To gain knowledge about the various materials used in the buildings.
- To know the types of floors and roofs, damp proof courses
- To understand various types of timbers, paints and modern materials.

Unit I Materials For Masonry **9 Hours**

Stone as building material – Criteria for selection – Tests on stones – Deterioration and Preservation of stone work – Bricks – Classification – Manufacturing of clay bricks – Tests on bricks – Compressive Strength – Water Absorption – Efflorescence – Bricks for special use – Refractory bricks – Concrete blocks – Lightweight concrete blocks.

Unit II Materials For Concrete **9 Hours**

Lime – Preparation of lime mortar – Cement – Ingredients – Manufacturing process – Types and Grades – Properties of cement and Cement mortar – Hydration – Compressive strength – Tensile strength – Fineness– Soundness and consistency – Setting time – fine aggregates – river sand – crushed stone sand – properties – coarse Aggregates – Crushing strength – Impact strength – Flakiness Index – Elongation Index – Abrasion Resistance – Grading

Unit III Materials For Floors And Roofs **9 Hours**

Components of Floors, Flooring material - Mosaic, Marble, Granite, Tile flooring, Cladding of tiles. Roof- Requirement of good roof, Types of roof, Trussed roof - King post Truss, Queen Post Truss- roofing materials- Various materials for stairs DPC, Causes of dampness; Methods of preventing dampness; Damp proofing materials, DPC treatment in Buildings - Anti-termite treatment, site preparation, soil treatment and post construction treatment.

Unit IV Timber And Other Materials **9 Hours**

Timber – Market forms – Industrial timber– Plywood – Veneer – Thermocol – Panels of laminates – Steel – Aluminum and Other Metallic Materials – Composition – Aluminium composite panel – Market forms- Paints, Enamels and Varnishes: Introduction - Composition of Oil paints - Characteristics of an Ideal Paint - Preparation of Paints - Covering power of paints - Pigment Volume Concentration - Enamels -Distempers - Water Wash and Colour Wash - Varnish - French Polish - Wax Polish – Miscellaneous Paints.

Unit V Modern Materials **9 Hours**

Glazing –aluminum frames– Sealants for joints—polymeric materials –rubber-plastic-properties – Clay products – Ceramics – Composite materials – Types – Applications of laminar composites – Fibre textiles– Geomembranes and Geotextiles for earth reinforcement- sound insulation materials- thermal insulation materials -fire resistance materials – smart materials

TOTAL: 45 HOURS

OUTCOMES:

After successful completion of this course, the students should be able to

- Identify and suggest the suitable building material for construction of buildings
- Understand the tests on cement and aggregates
- Understand the properties of ingredients of concrete
- Understand the types of materials for floors and roofs
- Understand the appropriate usage of modern materials

TEXT BOOKS:

1. Duggal.S.K., "Building Materials", 4th Edition, New Age International, 2015.
2. Gambhir.M.L., "Concrete Technology", 3rd Edition, Tata McGraw Hill Education, 2004
3. Rajput. R.K., "Engineering Materials", S. Chand and Company Ltd., 2008.

4. Varghese.P.C, "Building Materials", PHI Learning Pvt. Ltd, New Delhi, 2015.

REFERENCES:

1. Jagadish.K.S, "Alternative Building Materials Technology", New Age International, 2007.
2. Gambhir. M.L., & Neha Jamwal., "Building Materials, products, properties and systems", Tata McGraw Hill Educations Pvt. Ltd, New Delhi, 2012.
3. IS456 - 2000: Indian Standard specification for plain and reinforced concrete, 2011
4. IS383 - 1970: Indian Standard specification for coarse and fine aggregate from natural Sources for concrete, 2011
5. IS1542-1992: Indian standard specification for sand for plaster, 2009

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		L	T	P	R	C
191EIC201T	**ELECTRIC CIRCUIT ANALYSIS**	**2**	**2**	**0**	**0**	**3**

OBJECTIVES:

1. To input fundamental concepts on electric circuits
2. To apply network theorems in DC and AC circuits.
3. To impart knowledge on sinusoidal steady state analysis of RLC circuits.
4. To introduce the phenomenon of resonance in coupled circuits.
5. To educate on obtaining the transient response of circuits.

UNIT I FUNDAMENTAL CONCEPTS 9 Hours

Circuit elements, Series and parallel combination of Circuit elements - Energy Sources - Source Transformation- Star-Delta connection - Kirchhoff's laws - Current division - Voltage division - Nodal and mesh analysis in DC and AC electric circuits.

UNIT II APPLICATION OF NETWORK THEOREMS IN DC & AC CIRCUITS 9 Hours

Application of network theorems in DC & AC circuits: Thevenins and Norton Theorems – Superposition Theorem – Maximum power transfer theorem – Reciprocity Theorem – Millman's theorem.

UNIT III SINUSOIDAL STEADY STATE ANALYSIS OF RLC CIRCUITS 9 Hours

Sinusoidal steady state analysis of RLC circuits with phasor diagram: Series and parallel AC circuits- Series and Parallel Combinations of RL, RC and RLC Circuits.

UNIT IV RESONANCE AND COUPLED CIRCUITS 9 Hours

Series and parallel resonance – Frequency response – Quality factor and Bandwidth – Coupled Circuits - Self and mutual inductance – Dot Conversion - Coefficient of coupling – Tuned circuits – Single tuned circuits.

UNIT V TRANSIENT RESPONSE ANALYSIS 9 Hours

L and C elements - Transient response of RL, RC and RLC Circuits using Laplace transform for DC input and A.C. sinusoidal input.

Total: 45 HOURS

OUTCOMES:

Students will be able to

- understand and apply fundamental concepts on electric circuits analyze electrical circuits
- apply network theorems in DC and AC circuits.
- gain knowledge on sinusoidal steady state analysis of RLC circuits and apply.
- understand the phenomenon of resonance in coupled circuits.
- get the transient response of circuits DC input and A.C. sinusoidal input.

TEXT BOOKS:

1. Abhijit Chakrabarti, “Circuits Theory - Analysis and synthesis, , 7th Edition, Dhanpath Rai & Sons, New Delhi, 2015.
2. Hayt.W.H., Kemmerly.J.E., Durbin.S.M., “Engineering Circuit Analysis”, 7th Edition, Tata McGraw Hill, New Delhi, 2010.
3. Sudhakar. A and Shyammohan S Palli, “Circuits and Network Analysis and Synthesis”, 3rd Edition, Tata McGraw Hill, New Delhi, 2015.

REFERENCES:

1. Charles K. Alexander, Mathew N.O. Sadiku, “Fundamentals of Electric Circuits”, Second Edition, McGraw Hill
2. Jegatheesan, R., “Analysis of Electric Circuits”, McGraw Hill, 2015.
3. Joseph A. Edminister, MahmoodNahri, “Electric circuits”, Schaum’s series, McGraw- Hill, New Delhi, 2010.
4. Mahadevan.K., Chitra, C., “Electric Circuits Analysis,” Prentice-Hall of India Pvt Ltd., New Delhi, 2015.
5. Richard C. Dorf and James A. Svoboda, “Introduction to Electric Circuits”, 7th Edition, John Wiley & Sons, Inc. 2015.

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191ECC201T	ELECTRIC CIRCUITS AND ELECTRONIC DEVICES	L	T	P	R	C
		3	2	0	0	4

UNIT I : BASIC CIRCUIT ANALYSIS **12 Hours**

Kirchhoff’s laws– Mesh current and node voltage analysis for D.C and A.C. circuits - Network Theorems and applications: Thevenin’s theorem, Norton’s theorem, Superposition theorem, Reciprocity Theorem and Maximum power transfer theorem – Source transformation - Star-delta conversion.

UNIT II : TRANSIENT ANALYSIS AND RESONANCE **12 Hours**

Transient response of RC, RL and RLC circuits to excitation by Step Signal, Impulse Signal, Sinusoidal signal and exponential sources. Parallel and series resonances – Bandwidth - Q factor - Selectivity – Mutual inductance – Coefficient of Coupling - Single tuned and Double tuned coupled circuits.

UNIT III : SEMICONDUCTOR DIODES **12 Hours**

PN junction diode, Current equations, Energy Band diagram, Diffusion and drift current densities, Transition and Diffusion Capacitances, Switching Characteristics - Zener diode and its characteristics – Avalanche and Zener Breakdown mechanisms.

UNIT IV : TRANSISTORS **12 Hours**

Principle and operation of PNP and NPN transistors –Early effect-Current equations – Input and Output characteristics of CE, CB, CC configurations – Hybrid-π model - h-parameter model, Ebers Moll Model – JFETs – Drain and Transfer characteristics - Current equations– MOSFET – Enhancement and depletion types - Characteristics – Comparison of BJT with JFET – Comparison of JFET with MOSFET.

UNIT V : SPECIAL SEMICONDUCTOR DEVICES **12 Hours**

Metal-Semiconductor Junction MESFET- FINFET, PINFET, CNTFET, DUAL GATE MOSFET, Tunnel diodes – Schottky barrier diode- Varactor diode – UJT, SCR, Diac and Triac – Gallium Arsenide device- LED, Laser diode, Photodiode, Photo transistor, Opto Coupler, Solar cell, CCD.

TOTAL: 60 HOURS

OUTCOMES:

At the end of the course, the student should be able to:

- analyze the A.C and D.C. electric circuits and apply the circuit theorems

- understand the concepts of transient analysis of RL,EC and RLC circuits
- explain the concepts of resonance and tuned coupled circuits
- explain the characteristics of diode, BJT and MOSFET
- describe the operation of metal-semiconductor junction devices, power control devices and opto-electronic devices.

TEXT BOOKS:

1. William H. Hayt, Jr. Jack E. Kemmerly and Steven M. Durbin, Engineering Circuit Analysis, McGraw Hill Science Engineering, Eighth Edition, 11th Reprint 2016.
2. Donald A Neaman, Semiconductor Physics and Devices‖, Fourth Edition, Tata Mc GrawHill Inc. 2012.

REFERENCES:

1. Joseph Edminister and Mahmood Nahvi, Electric Circuits‖, Schaum‘s Outline Series, Tata McGraw Hill Publishing Company, New Delhi, Fifth Edition Reprint 2016.
2. Charles K. Alexander, Mathew N.O. Sadiku, Fundamentals of Electric Circuits, Fifth Edition, McGraw Hill, 9th Reprint 2015.
3. Robert Boylestad and Louis Nashelsky, Electron Devices and Circuit Theory, Pearson Prentice Hall, 10th edition, July 2008.
4. R.S.Sedha, — A Text Book of Applied Electronics‖ S.Chand Publications, 2006.
5. Salivahanan. S, Suresh Kumar. N, Vallavaraj.A, Electronic Devices and Circuits, Third Edition, Tata McGraw- Hill, 2008.

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191EEC201T	CIRCUIT THEORY	L	T	P	R	C
		3	1	0	0	4

OBJECTIVES:

- To introduce electric circuits and its analysis
- To impart knowledge on solving circuits using network theorems
- To introduce the phenomenon of resonance in coupled circuits.
- To educate on obtaining the transient response of circuits.
- To Phasor diagrams and analysis of three phase circuits

UNIT I FUNDAMENTALS IN ELECTRICITY AND BASIC CIRCUITS ANALYSIS **12 Hours**

Evolution of Electricity and Inventions- Electrical Quantities—Charge- Electric Potential, Voltage, Current, Power Energy, DC, AC, time period, Frequency, Phase, Flux density, RMS, Average, and Peak values of AC- Ohm’s Law – Kirchhoff’s laws – DC and AC Circuits – Resistors, Inductors and Capacitors in series and parallel circuits-Mesh current and node voltage method of analysis for D.C and A.C. circuits – Phasor Diagram –Power, Power Factor and Energy.

UNIT II NETWORK TOPOLOGY, REDUCTION AND THEOREMS FOR DC AND AC CIRCUITS **12 Hours**

Network reduction: voltage and current division, source transformation – star delta conversion.
Thevenin’s and Norton’s Theorem – Superposition Theorem – Maximum power transfer theorem –Reciprocity Theorem. – Characterization of two port networks in terms of Z, Y and h parameters.

UNIT III RESONANCE AND COUPLED CIRCUITS **12 Hours**

Series and parallel resonance – their frequency response – Quality factor and Bandwidth - Self and mutual inductance – Coefficient of coupling – Tuned circuits – Single tuned circuits.

UNIT IV TRANSIENT RESPONSE ANALYSIS **12 Hours**

L and C elements- Phasor representation of Purely Resistive(R), Purely Inductive(L), Purely Capactive (C) - RL, RC, RLC circuits -Transient response of RL, RC and RLC Circuits using Laplace transform for DC input and A.C. withSinusoidal input.

UNIT V THREE PHASE CIRCUITS **12 Hours**

Three phase balanced / unbalanced voltage sources – analysis of three phase 3-wire and 4-wireCircuits with star and delta connected loads, balanced & Un balanced – Phasor diagram of voltage and current - Power and power factor measurements in three phase circuits- Harmonics and filters.

TOTAL: 60 HOURS

OUTCOMES:

- Ability to analyse electrical circuits
- Ability to apply circuit theorems
- Ability to analyse AC and DC Circuits

TEXT BOOKS:

1. David V. Kerns Jr., J. David Irwin, “Essentials of Electrical and Computer Engineering”, Pearson publications, 2004
2. William H. Hayt Jr, Jack E. Kemmerly and Steven M. Durbin, “Engineering Circuits Analysis”, Tata McGraw Hill publishers, 8th edition, New Delhi, 2013.
3. John Bird, “Electrical Circuit Theory and Technology”, Routledge (Taylor & Francis) publishers, 6th edition
4. Carlson and Gisser, “Electrical engineering concepts and applications”, Addison Wesley, 1990

REFERENCES:

1. Chakrabati A, “Circuits Theory (Analysis and synthesis), Dhanpath Rai& Sons, New Delhi, 1999.
2. Charles K. Alexander, Mathew N.O. Sadiku, “Fundamentals of Electric Circuits”, 6th Edition, McGraw Hill, 2003.
3. M Nahvi, Joseph Edminister and K Uma Rao, “Electric circuits”, (Schaum’s outline series), Tata McGraw-Hill publishers, 5th edition, New Delhi, 2010

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191CYM201T **ENVIRONMENTAL SCIENCE**

L	T	P	R	C
3	0	0	0	3

OBJECTIVES:

- To appreciate and acquire knowledge about nature, environmental education and biodiversity.
- To understand the interrelationship between living organism and environment, environment functions and its value.
- To assess the environmental pollution and its impact on the human world.
- To find and implement scientific, economic and political solutions to environmental problems.
- To gain knowledge about waste management and resource recovery for protecting the environment.

UNIT I - ENVIRONMENT AND BIODIVERSITY **9 Hours**

Definition and scope of an environment – structure of an ecosystem –biotic and abiotic components– ecological succession – food chain, food web – Introduction to biodiversity definition, types – biogeographical classification of India, India as a mega-diversity nation – values of biodiversity– endangered and endemic species of India hot-spots of biodiversity – threats to biodiversity – conservation of biodiversity

UNIT II – NATURAL RESOURCES AND ITS CONSERVATION **9 Hours**

Forest resources - Uses and over exploitation, Deforestation, causes and its effects - Water Resources – Uses and over utilization - Water conservation- Dams, benefits and their effects, Rain Water Harvesting, Watershed Management – Mineral resources - Uses and exploitation, Food resources- World food problems - Effects of modern agriculture – Energy resources - Ocean energy, Geothermal energy, Biomass energy

UNIT III - ENVIRONMENTAL DEGRADATION **9 Hours**

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Noise pollution (e) Thermal pollution – role of an individual in prevention of pollution – pollution case studies – disaster management: cyclone, flood, drought, earthquake and landslides - case studies

UNIT IV –SOCIAL ISSUES **9 Hours**

Population and Sustainability: Population explosion - Sustainable development – Equitable use of resources for sustainable lifestyles-urban problems related to energy - Role of information technology in environment and human health.

Industrial effluent treatment: Removal of organic constituents-Biological oxidation process-Removal of inorganic constituents-Metal and radioactive wastes, zero liquid discharge solutions from textile industries.

UNIT V – WASTE MANAGEMENT AND RESOURCE RECOVERY **9 Hours**

Introduction –Biodegradable, non-biodegradable waste, Municipal solid waste and its management - Special waste – E-waste and Scrap tires - Definition, causes, effects and its management - Resource recovery: a) Waste land reclamation b) Sewage treatment c) Recycling of Plastic, Glass and Paper wastes.

Total : 45 HOURS

OUTCOMES:

- Environmental education initiates an awareness, deeper understanding and sensitivity to the environment and environmental challenges.
- Acquired knowledge about the principles of nature, environment and their protection
- Created an involvement to the public to implement environmental laws effectively.
- Environmental education allows an individual to explore and think about the modern lifestyle has lead to serious environmental disasters and should develop the skills to make responsible decisions.
- Acquired skills to behave ecofriendly.

TEXT BOOKS:

1. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2006.
2. Handbook of Solid Waste Management (McGraw-Hill Handbooks), George Tchobanoglous, Frank Kreith, Publisher: McGraw-Hill Education; 2 edition July, 2002

REFERENCE BOOKS:

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media.
2. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT LTD,New Delhi, 2007.
3. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press 2005.
4. *Waste Management and Resource Recovery,* Charles R. Rhyner, Leander J.Schwartz, Robert B. Wenger, Mary G. Kohrell, CRC Press Published August 31, 1995.
5. Industrial wastewater management, treatment and disposal, Water management" Federation Alexandria Virgiia, Third Edition, 2008.

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191GES211L	ENGINEERING PRACTICES LABORATORY	L	T	P	R	C
		0	0	4	0	2

OBJECTIVES:

To provide exposure to the students with the concepts involved in product realization by carrying out manufacturing shop exercises. Hands-on practice with manufacturing shop exercises and assembly leading to realization of a new product in a group.

GROUP A (CIVIL & MECHANICAL)

CIVIL & MECHANICAL ENGINEERING PRACTICE **30 HOURS**

I CIVIL ENGINEERING PRACTICE

A. Plumbing Works:

1. Pipeline joints, its location and functions: Valves, Taps, Couplings, Unions, Reducers, Elbows in household fittings.
2. Connection of two Galvanized Iron pipes
3. Connection of PVC pipes
4. Basic pipe connections involving the fitting like Valves, Taps and Bends

B. Carpentry works:

1. Joints in Roofs, Doors, Windows and Furniture.
2. Cross Lap joint
3. Mortise and Tenant joint

II MECHANICAL ENGINEERING PRACTICE

A. Welding:

1. Arc welding of Butt joints, Tap joints and Tee joints.
2. Gas welding practice

B. Basic machining:

1. Simple Turning and Taper turning
2. Drilling practice

C. Sheet metal work:

1. Rectangular tray making
2. Funnel making

GROUP B (ELECTRICAL & ELECTRONICS)

III ELECTRICAL ENGINEERING PRACTICE **30 HOURS**

1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lamp wiring.
3. Stair case wiring
4. Measurement of electrical quantities – voltage, current, power & power factor in RLC circuit.
5. Measurement of energy using single phase energy meter.
6. Measurement of resistance to earth of electrical equipment.

IV ELECTRONICS ENGINEERING PRACTICE

1. Electronic components and equipments – Resistor, colour coding measurement of AC signal parameter (peak-peak, RMS period, frequency) using CR.
2. Logic gates AND, OR, EX-OR and NOT.
3. Generation of Clock Signal.
4. Soldering practice – Components Devices and Circuits – Using general purpose PCB.
5. Measurement of ripple factor of HWR and FWR.

OUTCOMES:

On successful completion of this course, the student will be able to

- Fabricate carpentry components and pipe connections including plumbing works.
- Use welding equipments to join the structures.
- Carry out the basic machining operations
- Make the models using sheet metal works
- Carry out basic home electrical works and Understand works of Home Appliances
- Measure the electrical quantities
- Elaborate on the Electronic components, Logic gates and soldering practice.

Total: 60 Hours

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		L	T	P	R	C
191GES212L	**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY**	**0**	**0**	**4**	**0**	**2**

(Common to Automobile, Biomedical, Mechanical and R&A Engineering)

OBJECTIVES:

To train the students in performing various tests on Electrical machines, Sensors and circuits.

LIST OF EXPERIMENTS:

1. Load test on separately excited DC generator
2. Load test on Single phase Transformer
3. Load test on Induction motor
4. Verification of Circuit Laws
5. Load test on DC shunt motor.
6. Diode based application circuits
7. Transistor based application circuits
8. Study of CRO and measurement of AC signals
9. Characteristics of LVDT
10. Calibration of Rotometer
11. RTD and Thermistor

OUTCOMES :

Ability to understand and apply circuit theorems, basic concepts in Electrical and Electronics Engineering applications.

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		L	T	P	R	C
191GES213L	**C PROGRAMMING LABORATORY**	**0**	**0**	**3**	**1**	**2**

OBJECTIVES:

- To develop programs in C using basic constructs.
- To develop applications in C using strings, pointers, functions, structures.
- To develop applications in C using file processing.

LIST OF EXPERIMENTS:

1. Programs using only I/O functions.
2. Programs to study operators and data types.
3. Programs based on control structures (IF, SWITCH CASE).
4. Programs using FOR and WHILE loops.
5. Programs using single dimensional arrays.
6. Programs using multi dimensional arrays.
7. Programs on Sorting and Searching using arrays.
8. Programs based on String manipulations.
9. Programs based on User Defined Functions.
10. Programs using Functions with Parameters.
11. Programs using Storage Classes.
12. Programs to introduce Pointers.
13. Programs using Structures and Union.
14. Programs using Array of Structures.
15. Programs based on Files.

Total: 60 Hours

MINI PROJECT:

1. Create a —Railway reservation system / Airline reservation system with the following modules
   - Booking
   - Availability checking
   - Cancellation
   - Prepare chart

OUTCOMES:

Upon completion of the course, the students will be able to:

- Develop C programs for simple applications making use of basic constructs, arrays and strings.
- Develop C programs involving functions, recursion, pointers, and structures.
- Design applications using sequential and random access file processing.

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		L	T	P	R	C
191GES214L	**PROGRAMMING AND DATA STRUCTURES USING C LABORATORY**	**0**	**0**	**4**	**0**	**2**

PREREQUISITES: NIL

COURSE OBJECTIVES:

- Be familiar with c programming
- To implement linear and non-linear data structures
- To understand the different operations of search trees
- To implement graph traversal algorithms
- To get familiarized to sorting and searching algorithms

LIST OF EXPERIMENTS

1. C Programs using Conditional and Control Statements
2. C Programs using Functions and Structure.
3. Array implementation of List ADT
4. Array implementation of Stack and Queue ADTs
5. Linked list implementation of List, Stack and Queue ADTs
6. Applications of List, Stack and Queue ADTs

7. Implementation of Binary Trees and its operations
8. Implementation of Binary Search Trees
9. Implementation of AVL Trees
10. Implementation of Breadth first Search and Depth first Search
11. Implementation of searching and sorting algorithms
12. Mini project Hashing – any two collision techniques

TOTAL : 60 HOURS

COURSE OUTCOMES:

Upon completion of this course, student will be able to:

1. Apply the concept of linear data structures for problem solving
2. Develop solutions for complex problems using non-linear data structures
3. Implement various searching and sorting algorithms
4. Implement simple data structures
5. Design hashing algorithms for efficient data storage and retrieval
6. Develop real-time applications using the linear and non-linear data structures

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		L	T	P	R	C
191GES215L	**DATA ESSENTIALS LABORATORY**	**0**	**0**	**2**	**0**	**1**

PREREQUISITES: NIL

COURSE OBJECTIVES:

- To Create and access data using Microsoft Excel
- To form Graph for visualizing real time data
- To propose database using MySQL
- To Preprocess the data using Weka
- To execute statistical analysis for given data using python

LIST OF EXPERIMENTS

1. Grade Sheet Exercise: Illustrates how to create a basic spreadsheet by entering text, numbers, and formulas.
2. Mortgage Exercise: How functions can be used to create a spreadsheet to perform calculations.
3. Sorting and ChartWizard: Learn how to sort data and Demonstrates the ease of creating charts.
4. Linking Exercise: Learn how to consolidate several worksheets into one and to link several worksheets to a master worksheet.
5. Statistical Analysis Exercise: Use a worksheet to calculate descriptive statistics (e.g., mean, standard deviation, distribution, correlation).
6. Create database and perform manipulations on database using MySQL.
7. Using Weka Tool Perform
   a. Data preprocessing by selecting or filtering attributes
   b. Data preprocessing for handling missing values
8. Perform data virtualization using Weka.
9. Write a python code to count the number of occurrences of each value in an array of non negative numbers.
10. Develop a application for accessing database using python

TOTAL : 30 HOURS

COURSE OUTCOMES:

Upon completion of this course, student will be able to:

1. Create and access data using Microsoft Excel
2. Construct Graph for visualizing real time data

3. Design database using MySQL
4. Preprocess the data using Weka
5. Perform statistical analysis for given data using python
6. Develop applications for accessing database using python.

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		L	T	P	R	C
191CES211L	**COMPUTER AIDED BUILDING DRAWING LABORATORY**	**0**	**0**	**3**	**1**	**2**

OBJECTIVES:

- To introduce the students to draft the plan, elevation and sectional views of buildings in accordance with development and control rules satisfying orientation and functional requirements as per National Building Code.

LIST OF EXPERIMENTS

1. Principles of planning, orientation and complete joinery details (Paneled and Glazed Doors and Windows)
2. Buildings with load bearing walls
3. Buildings with sloping roof
4. R.C.C. framed structures.
5. Industrial buildings – North light roof structures

TOTAL: 60 HOURS

OUTCOMES:

- The students will be able to draft the plan, elevation and sectional views of buildings, industrial structures, and framed buildings using computer software.

TEXTBOOKS:

1. Sikka V.B., A Course in Civil Engineering Drawing, 4th Edition, S.K.Kataria and Sons, 2015.
2. George Omura, Mastering in Autocad 2005 and Autocad LT 2005– BPB Publications, 2008

REFERENCES:

1. Chuck Eastman, Paul Teicholz, Rafael Sacks, Kathleen Liston, BIM Handbook:A Guide to building information modeling for Owners, Managers, Designers, Engineers, and Contractors, John Wiley and Sons. Inc.,2011.
2. Marimuthu V.M., Murugesan R. and Padmini S., Civil Engineering Drawing-I, Pratheeba Publishers, 2008.
3. Shah.M.G., Kale. C.M. and Patki.S.Y., Building Drawing with an Integrated Approach to Built Environment, Tata McGraw Hill Publishers Limited, 2007.
4. Verma.B.P., Civil Engineering Drawing and House Planning, Khanna Publishers, 2010.

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		L	T	P	R	C
191ECC211L	**CIRCUITS AND DEVICES LABORATORY**	**0**	**0**	**3**	**1**	**2**

OBJECTIVES:

- To gain hands on experience in KVL, KCL, Thevenin, Norton, Super Position, Maximum Power Transfer and Reciprocity Theorems
- To understand the concept of Resonance circuits
- To learn the characteristics of basic electronic devices such as Diode, BJT, JFET, SCR, DIAC, TRIAC, UJT, and Photo Devices
- To gain hands on experience in Electron Devices using simulation software

LIST OF EXPERIMENTS :

1. Verifications of KVL and KCL
2. Verifications of Thevenin and Norton Theorem
3. Verifications of Super Position Theorem
4. Verifications of Maximum Power Transfer Theorem
5. Verifications of Reciprocity theorem
6. Determination of Resonance Frequency of Series and Parallel RLC Circuits
7. V-I Characteristics of PN Junction Diode and Zener Diode
8. Common Emitter input-output Characteristics
9. Common Base input-output Characteristics
10. Drain and Transfer characteristics of JFET
11. V-I characteristics of Thyristors (SCR/DIAC/TRIAC)
12. V-I characteristics of UJT
13. V-I characteristics of Photo Diode and Photo Transistor
14. Simulation of V-I characteristics of Electron Devices using PSPICE/Multisim

TOTAL: 60 HOURS

OUTCOMES:

At the end of the course, the student should be able to:

- Verify KVL, KCL, Thevinin, Norton, Super Position, Maximum Power Transfer and Reciprocity Theorems
- Design Resonance circuits
- Analyze the characteristics of basic electronic devices
- Synthesis the characteristics of Electron Devices using simulation software
- Identify and apply electron devices for specific applications

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		L	T	P	R	C
191EEC211L	**ELECTRIC CIRCUITS LABORATORY**	**0**	**0**	**3**	**1**	**2**

OBJECTIVES :

To provide practical experience with simulation of electrical circuits and verifying circuit theorems.

LIST OF EXPERIMENTS

1. Experimental verification of Kirchhoff's voltage and current laws
2. Experimental verification of network theorems (Thevenin, Norton, Superposition and maximum
3. Power transfer Theorem).
4. Study of CRO and measurement of sinusoidal voltage, frequency and power factor.
5. Experimental determination of time constant of series R-C electric circuits.
6. Experimental determination of frequency response of RLC circuits.
7. Design and Simulation of series resonance circuit.
8. Design and Simulation of parallel resonant circuits.
9. Simulation of low pass and high pass passive filters.
10. Simulation of three phase balanced and unbalanced star, delta networks circuits.
11. Experimental determination of power in three phase circuits by two-watt meter method .
12. Calibration of single phase energy meter.
13. Determination of two port network parameters.

Total: 60 HOURS

OUTCOMES :

Ability to understand and apply circuit theorems and concepts in engineering applications.

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191EIC211L	ELECTRIC CIRCUITS LABORATORY	L	T	P	R	C
		0	0	3	1	2

OBJECTIVE:

- To gain practical experience on electric circuits and verification of circuit theorems.
- To simulate electric circuits and verify circuit theorems using MATLAB.

LIST OF EXPERIMENTS

1. Verification of ohm's law and Kirchhoff's laws.
2. Verification of Mesh and Nodal Analysis.
3. Verification of Superposition theorem.
4. Verification of Thevenin's theorem.
5. Verification of Norton's Theorem.
6. Verification of Maximum power transfer Theorem.
7. Verification of Reciprocity theorem.
8. Frequency response of RLC circuits.
9. Frequency Response of series and parallel Resonance circuits.
10. Transient Response of RC circuits.

All the above experiments should be carried out both experimentally and using MATLAB.

Total: 60 HOURS

OUTCOME:

Students will be able to

- apply circuit theorems in electric circuits.
- simulate electric circuits using MATLAB.

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