RAJALAKSHMI ENGINEERING COLLEGE
(AN AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY)
Common to all Branches of B.E. and B.Tech
CURRICULUM
SEMESTER I

S. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	HS17151	Communicative English	HS	4	4	0	0	4
2.	MA17151	Engineering Mathematics - I	BS	5	3	2	0	4
3.	PH17151	Engineering Physics	BS	3	3	0	0	3
4.	CY17151	Engineering Chemistry	BS	3	3	0	0	3
5.	GE17151	Problem Solving and Python Programming	ES	3	3	0	0	3
6.	GE17152	Engineering Graphics	ES	6	2	0	4	4
PRACTICALS								
7.	GE17161	Problem Solving And Python Programming Laboratory	ES	3	0	0	3	2
8.	GE17162	Physics and Chemistry Laboratory	BS	3	0	0	3	2
			TOTAL	30	18	2	10	25

HS17151   **COMMUNICATIVE ENGLISH**   **L T P C**

Common to all branches of B.E. / B.Tech. programmes   **4 0 0 4**

OBJECTIVES:

- To develop the basic reading and writing skills of first year engineering and technology students.
- To help learners develop their listening skills, which will enable them listen to lectures and comprehend them by asking questions; seeking clarifications.
- To help learners develop their speaking skills and speak fluently in real contexts.
- To help learners develop vocabulary of a general kind by developing their reading skills

UNIT I   SHARING INFORMATION RELATED TO ONESELF/FAMILY& FRIENDS 12

Reading- short comprehension passages, practice in skimming-scanning and predicting.   Writing- completing sentences- developing hints. Listening- short texts- short formal and informal conversations. Speaking- introducing oneself - exchanging personal information- Language development- Wh Questions- asking and answering yes or no questions. Subject-Verb agreement – regular and irregular verbs. Vocabulary development- prefixes- suffixes- articles.

UNIT II   GENERAL READING AND FREE WRITING   12

Reading - comprehension-pre-reading-post reading- comprehension questions (multiple choice questions and /or short questions/ open-ended questions)-inductive reading- short narratives and descriptions from newspapers including dialogues and conversations (also used as short Listening texts)- register. Writing – paragraph writing- topic sentence- main ideas- free writing, short narrative descriptions using some suggested vocabulary and structures. Listening- telephonic conversations. Speaking – sharing information of a personal kind—greeting – taking leave. Language development – prepositions, conjunctions. Vocabulary development - guessing meanings of words in context.

UNIT III   GRAMMAR AND LANGUAGE DEVELOPMENT   12

 Reading- short texts and longer passages (close reading). Writing- understanding text structure - use of reference words and discourse markers-coherence-jumbled sentences. Listening – listening to longer texts

and filling up the table- product description- narratives from different sources. Speaking- asking about routine actions and expressing opinions. Language development- degrees of comparison- pronouns- direct vs indirect questions. Vocabulary development – single word substitutes- adverbs.

UNIT IV   READING AND LANGUAGE DEVELOPMENT   12

Reading- comprehension-reading longer texts- reading different types of texts- magazines. Writing- letter writing, informal or personal letters-emails-conventions of personal email. Listening- listening to dialogues or conversations and completing exercises based on them. Speaking- speaking about oneself-speaking about one's friend. Language development- Tenses- simple present-simple past- present continuous and past continuous. Vocabulary development- synonyms-antonyms- phrasal verbs

UNIT V   EXTENDED WRITING   12

Reading- longer texts- close reading. Writing- brainstorming -writing short essays – developing an outline- identifying main and subordinate ideas- dialogue writing. Listening – listening to talks-conversations. Speaking – participating in conversations- short group conversations. Language development-modal verbs- present/ past perfect tense. Vocabulary development-functional uses of tenses.

TOTAL: 60 PERIODS

OUTCOMES:

At the end of the course, learners will be able to:

- Read articles of a general kind in magazines and newspapers.
- Participate effectively in informal conversations; introduce themselves and their friends and express opinions.
- Comprehend conversations and short talks delivered in English
- Express ideas about oneself freely
- Write short essays of a general kind and personal letters and emails in English.

TEXT BOOKS:

1. Board of Editors. Using English A Course book for Undergraduate Engineers and Technologists. Orient BlackSwan Limited, Hyderabad: 2015.
2. Richards, C. Jack. Interchange Students' Book-2 New Delhi: CUP, 2015.

REFERENCES:

1. Bailey, Stephen. Academic Writing: A practical guide for students. New York: Rutledge,2011.
2. Means,L. Thomas and Elaine Langlois.   English & Communication For Colleges. Cengage Learning ,USA: 2007
3. Redston, Chris &Gillies Cunningham Face2Face (Pre-intermediate Student's Book& Workbook) Cambridge University Press, New Delhi: 2005
4. Comfort, Jeremy, et al. Speaking Effectively: Developing Speaking Skills for Business English. Cambridge University Press, Cambridge: Reprint 2011
5. Dutt P. Kiranmai and RajeevanGeeta. Basic Communication Skills, Foundation Books: 2013

MA17151   **ENGINEERING MATHEMATICS – I**   **L T P C**

                              Common to all branches of B.E. / B.Tech. programmes   **3 2 0 4**

OBJECTIVES :

- To learn the basics and concepts of traditional calculus.

- To provide the basic tools of calculus mainly for the purpose of modelling the engineering problems mathematically and obtaining solutions.

- To understand the concepts of single variable and multivariable calculus that plays an important role in the field of science, engineering & technology.

UNIT I   MATRICES   15

Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigenvalues and Eigenvectors – 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   15

Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules - Maxima and Minima of functions of one variable.

UNIT III   FUNCTIONS OF SEVERAL VARIABLES   15

Partial differentiation – Homogeneous functions and Euler's theorem – Total derivative – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables – Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers.

UNIT IV   INTEGRAL CALCULUS   **15**

Definite and Indefinite integrals - Substitution rule - Techniques of Integration - Integration by parts – Bernoulli's formula, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals.

UNIT V   MULTIPLE INTEGRALS   **15**

Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of solids – Change of variables in double and triple integrals.

TOTAL : 75 PERIODS

OUTCOMES :

On completion of the course students will be able to:

- Apply the concept of Eigenvalues and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices for solving problems

- Use the techniques of differentiation to differentiate functions and to apply the concept of differentiation to solve maxima and minima problems.

- To apply the concept of Partial differentiation for functions two or more variables and use different techniques for solving problems.

- Solve problems involving integration using different methods such as substitution, partial fractions, by parts .

- Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.

TEXT BOOKS :

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 43rd Edition, 2014.
2. James Stewart, "Calculus: Early Transcendentals", Cengage Learning, 7th Edition, New Delhi, 2015.

REFERENCES :

1. Anton, H, Bivens, I and Davis, S, "Calculus", Wiley, 10th Edition, 2016.
2. Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 3rd Edition, 2007.
3. Narayanan, S. and Manicavachagom Pillai, T. K., "Calculus" Volume I and II, S. Viswanathan Publishers Pvt. Ltd., Chennai, 2007.
4. Srimantha Pal and Bhunia, S.C, "Engineering Mathematics" Oxford University Press, 2015.
5. Weir, M.D and Joel Hass, "Thomas Calculus", 12th Edition, Pearson India, 2016.
6. T. Veerarajan, Engineering Mathematics I & II, McGraw Hill Education, 3rd Edition, 2012.

PH 17151   **ENGINEERING PHYSICS**   **L T P C**

Common to all branches of B.E. / B.Tech. programmes   **3 0 0 3**

OBJECTIVE:

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

UNIT I   PROPERTIES OF MATTER   9

Elasticity – Stress-strain diagram and its uses - factors affecting elastic modulus and tensile strength – torsional stress and deformations – twisting couple - torsion pendulum: theory and experiment - bending of beams –area moment of inertia - bending moment – cantilever - applications – uniform and non-uniform bending- I-shaped girders - stress due to bending in beams.

UNIT II   WAVES AND OPTICS   9

Oscillatory motion – forced and damped oscillations: differential equation and its solution – plane progressive waves – wave equation. Lasers: population of energy levels, Einstein's A and B coefficients derivation – resonant cavity, optical amplification (qualitative) –CO_2 laser - Semiconductor lasers: homojunction and heterojunction – Fiber optics: principle, numerical aperture and acceptance angle - types of optical fibers (material, refractive index, mode) – losses associated with optical fibers - fiber optic sensors: pressure and displacement.

UNIT III   THERMAL PHYSICS   9

Transfer of heat energy – thermal expansion of solids and liquids – expansion joints - bimetallic strips - thermal conduction, convection and radiation –rectilinear heat flow – thermal conductivity - Forbe's and Lee's disc method: theory and experiment - conduction through compound media (series and parallel) – thermal insulation – applications: heat exchangers, refrigerators, ovens and solar water heaters.

UNIT IV   QUANTUM PHYSICS   9

Black body radiation – Planck's theory (derivation) – Compton effect: theory and experimental verification – wave particle duality – electron diffraction – concept of wave function and its physical significance – Schrödinger's wave equation – time independent and time dependent equations – particle in a one-dimensional rigid box – tunnelling (qualitative) – electron microscope - scanningtunnelling microscope.

UNIT V   CRYSTAL PHYSICS   9

Single crystalline, polycrystalline and amorphous materials – single crystals: unit cell, crystal systems, Bravais lattices, directions and planes in a crystal, Miller indices – inter-planar distances -reciprocal lattice - coordination number and packing factor for SC, BCC, FCC, and HCP –Polymorphism and allotropy: diamond and graphite structures - crystal imperfections: point defects, line defects – Burger vectors, stacking faults – role of imperfections in plastic deformation - growth of single crystals: solution and melt growth techniques.

TOTAL: 45 PERIODS

OUTCOMES:

On completion of the course, students will be able to
- Apply the knowledge of basic properties of matter and its applications in Engineering and Technology.
- Use the concepts of waves and optical devices and their applications in fiber optics.
- Use the concepts of thermal properties of materials and their applications in heat exchangers.
- Use the advanced physics concepts of quantum theory and its applications in electron microscope and material sciences.
- Apply the basic knowledge of crystallography in materials preparation and device fabrication.

TEXT BOOKS:

1. Bhattacharya, D.K. & Poonam, T. "Engineering Physics". Oxford University Press, 2015.
2. Gaur, R.K. & Gupta, S.L. "Engineering Physics". Dhanpat Rai Publishers, 2012.
3. Pandey, B.K. & Chaturvedi, S. "Engineering Physics". Cengage Learning India, 2012.

REFERENCES:

1. Halliday, D., Resnick, R. & Walker, J. "Principles of Physics". Wiley, 2015.
2. Serway, R.A. & Jewett, J.W. "Physics for Scientists and Engineers". Cengage Learning, 2010.
3. Tipler, P.A. &Mosca, G. "Physics for Scientists and Engineers with Modern Physics'. W.H.Freeman, 2007.
4. Arthur Besier and S. RaiChoudhury,Concepts of Modern Physics (SIE), 7th edition, McGraw-Hill Education, 1994.

5. R. Murugeshan and Kiruthiga Sivaprasath, Modern Physics, S.Chand, 2015.

CY17151   **ENGINEERING CHEMISTRY**   **L T P C**

Common to all branches of B.E. / B.Tech. programmes   **3 0 0 3**

OBJECTIVES:

- To acquire knowledge on characteristics of boiler feed water and water treatment techniques.
- To develop an understanding on surface chemistry and its applications
- To develop an understanding of the basic concepts of phase rule and its applications towards alloying
- To acquire knowledge on different types of fuels and its characteristics.
- To obtain knowledge on batteries and fuel cell.

UNIT I   WATER AND ITS TREATMENT   9

Hardness of water – types – expression of hardness – units– boiler troubles (scale and sludge) – treatment of boiler feed water – Internal treatment (phosphate, colloidal, sodium aluminate and calgon conditioning) - External treatment – ion exchange process, zeolite process – potable water treatment – break point chlorination - desalination of brackish water - Reverse Osmosis – UASB process (Up flow Anaerobic Sludge Blanket).

UNIT II   SURFACE CHEMISTRY AND CATALYSIS   9
Adsorption - types of adsorption – adsorption of gases on solids – adsorption of solute from solutions – adsorption isotherms – Freundlich's adsorption isotherm – Langmuir's adsorption isotherm – contact theory – Preparation and applications of activated carbon (up flow and down flow process) -applications of adsorption on pollution abatement.
Catalysis – types of catalysis – criteria – autocatalysis – catalytic poisoning and catalytic promoters - acid base catalysis – applications (catalytic convertor) – enzyme catalysis– Michaelis – Menten equation.

UNIT III   PHASE RULE, ALLOYS AND   COMPOSITES   9

Phase rule - introduction, definition of terms with examples, one component system -water system - reduced phase rule - thermal analysis and cooling curves - two component systems - lead-silver system - Pattinson process.
Alloys - definition- properties of alloys- significance of alloying- functions and effect of alloying elements- nichrome and stainless steel (18/8) – heat treatment of steel.
Composites- polymer matrix composites -metal matrix composites-ceramic matrix composites.

UNIT IV   FUELS AND COMBUSTION   9
Fuels - classification of fuels - coal - analysis of coal (proximate and ultimate) - carbonization - manufacture of metallurgical coke (Otto Hoffmann method) - petroleum - manufacture of

synthetic petrol (Bergius process) - knocking - octane number - diesel oil - cetane number - natural gas - compressed natural gas (CNG) - liquefied petroleum gas (LPG) - power alcohol and biodiesel.

Combustion of fuels - introduction - calorific value - higher and lower calorific values- theoretical calculation of calorific value - ignition temperature - spontaneous ignition temperature - explosive range.

UNIT V   ENERGY SOURCES AND STORAGE DEVICES   9

Batteries - components – Characteristics – voltage , current , capacity, electrical storage density, energy density, discharge rate – types of batteries – primary battery (dry cell)- secondary battery (lead acid battery, Ni- Cd battery,lithium-ion-battery) .Fuel cells – H_2-O_2 fuel cell, methanol oxygen fuel cell, Proton exchange membrane fuel cell – SOFC and Biofuel cells.

TOTAL: 45 PERIODS

OUTCOMES:

On completion of the course students will be able to

- Get familiarized on water treatment techniques.
- Apply adsorption phenomena on various fields.
- Analyse alloying composition based on phase rule concept.
- Apply the role of fuels in day today applications.
- Design batteries and fuel cells.

TEXT BOOKS:

1. P. C. Jain and Monika Jain, "Engineering Chemistry" 17thedition, DhanpatRai Publishing Company (P) LTD, New Delhi, 2015
2. S. Vairam, P. Kalyani and Suba Ramesh, "Engineering Chemistry", Wiley India PVT, LTD, New Delhi, 2013

REFERENCES:

1. Friedrich Emich, "Engineering Chemistry", Scientific International PVT, LTD, New Delhi, 2014.
2. PrasantaRath, "Engineering Chemistry", Cengage Learning India PVT, LTD, Delhi, 2015.
3. ShikhaAgarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, 2015.
4. S. S. Dara and S. S. Umare, "A Textbook of Engineering Chemistry", 12thedition, S. Chand & Company LTD, New Delhi, 2015.

GE17151 PROBLEM SOLVING AND PYTHON PROGRAMMING

L	T	P	C
3	0	0	3

OBJECTIVES:

1. To develop an understanding of algorithmic problem solving.
2. To read and write simple Python programs.
3. To develop Python programs with conditionals and loops.
4. To define Python functions and call them.
5. To use Python data structures –- lists, tuples, dictionaries.
6. To do input/output with files in Python.

UNIT I   ALGORITHMIC PROBLEM SOLVING   9

Introduction to Computers, Characteristics, Basic Organization of a Computer-Algorithm, building blocks of algorithms (instructions/statements, state, control flow, functions)-notation (pseudo code, flow chart, programming language)-algorithmic problem solving-simple strategies for developing algorithms (iteration, recursion).

UNIT II   DATA, EXPRESSIONS, STATEMENTS   9

Python interpreter and interactive mode- values and types: int, float, booleans, strings and lists-variables-expressions and statements- tuple assignment- precedence of operators-comments-modules and functions, function definition and use, flow of execution, parameters and arguments-Illustrative programs: exchange the values of two variables, circulate the values of n variables, test for leap year.

UNIT III   CONTROL FLOW, FUNCTIONS   9

Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else)-Iteration: state, while, for, break, continue, pass-Fruitful functions: return values, parameters, scope: local and global, composition, recursion- Strings: string slices, immutability, string functions and methods, string module-Lists as arrays-Illustrative programs: square root, gcd, exponentiation, sum the array of numbers, linear search, binary search.

UNIT IV   COMPOUND DATA: LISTS, TUPLES, DICTIONARIES   9

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters-Tuples: tuple assignment, tuple as return value-Dictionaries: operations and methods-advanced list processing - list comprehension-Illustrative programs on sorting.

UNIT V   FILES, MODULES, PACKAGES   9

Files and exception: text files, reading and writing files, format operator, command line arguments, errors and exceptions, handling exceptions, modules, packages-Illustrative programs: word count, copy file-Case studies-Assignment.

TOTAL :   45   PERIODS

COURSE OUTCOMES:

Upon completion of the course, students will be able to

- Develop algorithmic solutions to simple computational problems
- Read, write, execute by hand simple Python programs.
- Structure simple Python programs for solving problems.
- Decompose a Python program into functions.
- Represent compound data using Python lists, tuples, dictionaries.
- Read and write data from/to files in Python Programs.

TEXT BOOKS:

1   Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist'', 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016. (http://greenteapress.com/wp/think-python/).

REFERENCE BOOKS:

1   Anita Goel,Ajay Mittal , "Computer Fundamentals and programming in C", Pearson India Publisher, First edition, 2013.

2   John V Guttag, "Introduction to Computation and Programming Using Python'', Revised and expanded Edition, MIT Press , 2013.

3   Robert Sedgewick, Kevin Wayne, Robert Dondero, "Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.

4   Timothy A. Budd, "Exploring Python", Mc-Graw Hill Education (India) Private Ltd., 2015.

5   Kenneth A. Lambert, "Fundamentals of Python: First Programs", CENGAGE Learning, 2012.

6   Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem-Solving Focus, Wiley India Edition, 2013.

7   The Python Tutorial, https://docs.python.org/2.7/tutorial/

GE17152   **ENGINEERING GRAPHICS**

(Common to all B.E and B.Tech Programmes)

L T P C

2 0 4 4

OBJECTIVE:

- To develop in students, graphic skills for communication of concepts, ideas and design of Engineering products.

- To expose them to existing national standards related to technical drawings.

CONCEPTS AND CONVENTIONS (Not for Examination)   1

Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

UNIT I   PLANE CURVES AND FREEHAND SKETCHING   7+12

Basic Geometrical constructions, Curves used in engineering practices: Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves – Construction of helical curve.

Visualization concepts and Free Hand sketching: Visualization principles –Representation of Three Dimensional objects – Layout of views- Freehand sketching of multiple views from pictorial views of objects

UNIT II   PROJECTION OF POINTS, LINES AND PLANE SURFACE   6+12

Orthographic projection- principles-Principal planes-First angle projection-projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method and traces Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

UNIT III   PROJECTION OF SOLIDS   5+12

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one of the principal planes by rotating object method.

UNIT IV   PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES   5+12

Sectioning of above solids 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 lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones. Development of lateral surfaces of solids with cut-outs and holes

UNIT V   ISOMETRIC AND PERSPECTIVE PROJECTIONS   6+12

Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions - Perspective projection of simple solids-Prisms, pyramids and   cylinders by visual ray method .

TOTAL: 90 PERIODS

OUTCOMES:

On Completion of the course, the student will be able to

- Perform freehand sketching of basic geometrical constructions and multiple views of objects.
- Do the conic curves and special curves.
- Do orthographic projection of lines and plane surfaces.
- Draw projections and solids and development of surfaces.
- Prepare isometric and perspective sections of simple solids.

TEXT BOOK:

1. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 50th Edition, 2010.
2. Natrajan K.V., "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2009.

REFERENCES:

1. Basant Agarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
2. Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Stores, Bangalore, 2007.
3. Luzzader, Warren.J. and Duff,John M., "Fundamentals of Engineering Drawing with

an introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.
4. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 2008.
5. Shah M.B., and Rana B.C., "Engineering Drawing", Pearson, 2nd Edition, 2009.

Publication of Bureau of Indian Standards:

1. IS 10711 – 2001: Technical products Documentation – Size and lay out of drawing sheets.
2. IS 9609 (Parts 0 & 1) – 2001: Technical products Documentation – Lettering.
3. IS 10714 (Part 20) – 2001 & SP 46 – 2003: Lines for technical drawings.
4. IS 11669 – 1986 & SP 46 – 2003: Dimensioning of Technical Drawings.
5. IS 15021 (Parts 1 to 4) – 2001: Technical drawings – Projection Methods.

Special points applicable to end semester examinations on Engineering Graphics:

1. There will be five questions, each of either or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size. The examination will be conducted in appropriate sessions on the same day

GE17161	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY	L	T	P	C
		0	0	3	2

OBJECTIVES
- Be familiar with the use of Office software.
- Be exposed to presentation and visualization tools.
- Be exposed to problem solving techniques and flow charts.
- To write, test, and debug simple Python programs.
- To 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.

LIST OF PROGRAMS

1. Search, generate, manipulate data using Open Office

2. Presentation and Visualization – graphs, charts, 2D, 3D

3. Problem formulation, Problem Solving and Flowcharts

4. Compute the GCD of two numbers.

5. Find the square root of a number (Newton's method)
6. Exponentiation (power of a number)
7. Linear search and Binary search
8. First n prime numbers
9. Find the maximum of a list of numbers
10. Sorting
11. Removing all the duplicate elements in a list
12. Multiply matrices
13. Programs that take command line arguments (word count)
14. Find the most frequent words in a text read from a file

TOTAL :45 PERIODS

OUTCOMES

Upon completion of the course, students will be able to

- Apply good programming design methods for program development.
- Write, test, and debug simple Python programs.
- Implement Python programs with conditionals and loops.
- Develop Python programs step-wise by defining functions and calling them.
- Use Python lists, tuples, dictionaries for representing compound data.
- Read and write data from/to files in Python.

GE17162	PHYSICS AND CHEMISTRY LABORATORY	L	T	P	C
	(Common to all branches of B.E. / B.Tech Programmes)	0	0	3	2

OBJECTIVE:

- To introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics, properties of matter and liquids.

LIST OF EXPERIMENTS: PHYSICS LABORATORY (Any 5 Experiments)

1. Determination of rigidity modulus – Torsion pendulum
2. Determination of Young's modulus by non-uniform bending method
3. (a) Determination of wavelength, and particle size using Laser
   (b) Determination of acceptance angle in an optical fiber.
4. Determination of thermal conductivity of a bad conductor – Lee's Disc method.
5. Determination of velocity of sound and compressibility of liquid – Ultrasonic interferometer
6. Determination of wavelength of mercury spectrum – spectrometer grating
7. Determination of thickness of a thin wire – Air wedge method

TOTAL: 21 PERIODS

OUTCOMES:

On completion of the course students will be able to

- Apply the principle of elasticity viz Young's modulus & regidity modulus of Engineering materials.
- Apply the principle elasticity in determining compressibility of liquids using ultrasonic waves
- Apply the principle of optics in fiber optical communication.
- Apply thermal properties of various insulating materials in Engineering applications.
- Use the basic instruments like vernier caliber, micrometer and microscope for various basic measurements.

CHEMISTRY LABORATORY : (Any seven experiments to be conducted)

OBJECTIVE:

- To acquire practical skills in the determination of water quality parameters.
- To gain the knowledge about spectrophotometer and flamephotometer.
- To acquire knowledge on the determination of corrosion rate.

LIST OF EXPERIMENTS: CHEMISTRY LABORATORY (Any 7 Experiments)

1. Estimation of HCl using Na_2CO_3 as primary standard and Determination of alkalinity in water sample.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of DO content of water sample by Winkler's method.
4. Determination of chloride content of water sample by argentometric method.
5. Determination of strength of given hydrochloric acid using pH meter.
6. Estimation of iron content of the given solution using potentiometer.
7. Conductometric titration of strong acid vs strong base.
8. Determination of strength of acids in a mixture of acids using conductivity meter.
9. Estimation of copper content of the given solution by Iodometrxy.
10. Estimation of iron content of the water sample using spectrophotometer (1, 10-Phenanthroline / thiocyanate method).
11. Estimation of sodium and potassium present in water using flame photometer.
12. Corrosion experiment-weight loss method.

TOTAL: 24 PERIODS

OUTCOMES:

On completion of the course students will be able to

- Apply the quantitative chemical analysis of water quality related parameters.
- Analyse characteristics of water.
- Measure the corrosion rate in metals.

- Apply instrumentation skills in analysing metallic elements in water.
- Analyse quantitatively the strength of acids and bases in water

TEXT BOOKS:

1   Vogel's Textbook of Quantitative Chemical Analysis (8TH edition, 2014)