NRI INSTITUTE OF TECHNOLOGY

(An Autonomous Institution Permanently Affiliated to JNTUK, Kakinada)
(Accredited by NAAC with "A" Grade and ISO 9001:2015 Certified Institution)
POTHAVARAPPADU (V), (VIA) NUNNA, AGIRIPALLI (M), PIN – 521 212

DEPARTMENT OF CIVIL ENGINEERING

STRUCTURE FOR FIRST YEAR B.TECH PROGRAMME

I YEAR I SEMESTER

Sl. No	Course Code	Title of the Course	Scheme of Instruction (Periods Per Week)				Scheme of Examination (Maximum Marks)			No. of Credits
			L	T	P	Total	CIA	SEA	Total	
1	20A1100101	Professional Communication	3	0	0	3	30	70	100	3
2	20A1100201	Engineering Mathematics-1	3	1	0	4	30	70	100	4
3	20A1100202	Engg. Physics	3	0	0	3	30	70	100	3
4	20A1101401	Engg. Drawing	1	0	4	5	30	70	100	3
5	20A1102301	BASIC ELECTRICAL ENGINEERING	3	0	0	3	30	70	100	3
6	20A1100291	Engg. Physics Lab	0	0	3	3	15	35	50	1.5
7	20A1101391	Basics of Civil &Electrical Engg. Work Shop (Lab)	0	0	3	3	15	35	50	1.5
Total			13	1	10	24	180	420	600	19

I YEAR II SEMESTER

Sl. No	Course Code	Title of the Course	Scheme of Instruction (Periods Per Week)				Scheme of Examination (Maximum Marks)			No. of Credits
			L	T	P	Total	CIA	SEA	Total	
1	20A1200201	Engineering Mathematics-II	3	0	0	3	30	70	100	3
2	20A1200204	Engg. Chemistry	3	0	0	3	30	70	100	3
3	20A1201401	Theory of Mechanics	3	0	0	3	30	70	100	3
4	20A1205301	Programming and Problem Solving with C	3	0	0	3	30	70	100	3
5	20A1201402	Building Material & Concrete technology	3	0	0	3	30	70	100	3
6	20A1200293	Engg. Chemistry Lab	0	0	3	3	15	35	50	1.5
7	20A1205391	Programming and Problem Solving with C Lab	0	0	3	3	15	35	50	1.5
8	20A1201491	Building Planning and Computer Aided Building Drawing	0	0	3	3	15	35	50	1.5
9	20A1200191	Communicative English lAB	0	0	3	3	15	35	50	1.5
10	20A1200801	Environmental Sciences	2	0	0	2	30	70*	100	0
Total			17	0	12	29	240	560	800	21

* Internal Evaluation

L - LECTURE   T – TUTORIAL   P - PRACTICAL
CIA – Continuous Internal Assessment   SEA – Semester End Assessment

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20A1100101: PROFESSIONAL COMMUNICATION
(Common to CE,EEE,ME,ECE,CSE,IT,AIML and DS)

Lecture – Tutorial:	3-1 Hours	Internal Marks:	30
Credits	3	External Marks:	70

Prerequisites: None

Course Objectives

1. To strengthen the lexical ability of the students in different contexts.
2. To expose the students to various sub-skills and strategies of reading and writing – summarizing and paraphrasing.
3. To help the students develop effective writing skills through paragraph writing.
4. To train the students in fundamentals of grammar required to equip them with fluent English.
5. To enable the students to think critically by exposing them to different socio-cultural contexts through various literary texts.

Course Outcomes

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

CO1	Build the grammatical structures accurately in their real-time situations in either spoken or written form.
CO2	Extend their ability to use vocabulary from various texts along with GRE and technical vocabulary in written and spoken communication
CO3	Comprehend, analyze and evaluate texts critically. Demonstrate effective writing skills in specific forms of written communication (paragraphs, summaries, email and letters.)
CO4	Apply the strategies of reading various texts and graphs, and describe in prose.
CO5	Relate human values and professional ethics in their academic, professional and social lives.
CO6	Summarize the main events of the literary texts, from different socio-cultural contexts, and interpret them critically.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1										1		2
CO2										1		2
CO3										2		2
CO4										1		2
CO5							1	1				2
CO6												2

UNIT I

1. **Text: A Drawer full of happiness** from "**Infotech English**", Maruthi Publications
2. **Reading:** Skimming text to get the main idea. Scanning to look for specific pieces of information.
3. **Reading for Writing:** Paragraph Writing (specific topics) using suitable Cohesive Devices; Linkers, Sign Posts and Transition Signals; Mechanics of Writing - Punctuation, Capital Letters.
4. **Vocabulary:** Technical vocabulary from across technical branches (20) GRE Vocabulary (20) (Antonyms and Synonyms, Word applications) Verbal Reasoning and Sequencing of Words.
5. **Grammar:** Content Words and Function Words; Word Forms: Verbs, Nouns, Adjectives and Adverbs; Nouns: Countables and Uncountables; Singular and Plural, Basic Sentence Structures; Simple Question Form - WH- Questions; Word Order in Sentences. Collocations (30 Phrases)

UNIT II

1. **Text: Nehru's letter to his daughter Indira on her birthday** from "**Infotech English**", Maruthi Publications
2. **Reading**: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.
3. **Reading for Writing**: Summarizing - identifying main idea/s and rephrasing what is read; avoiding redundancies and repetitions.
4. **Vocabulary**: Technical vocabulary from across technical branches (20 words). GRE Vocabulary

Analogies (20 words) (Antonyms and Synonyms, Word applications)
5. **Grammar**: Use of Articles and Zero Article; Prepositions; Connectives (25 words)

UNIT III

1.   Text: Stephen Hawking-Positivity
   'Benchmark' from "**Infotech English**", Maruthi Publications
2. **Reading**: Reading a text in detail by making basic inferences - recognizing and interpreting specific context clues; strategies to use text clues for comprehension. Critical Reading.
3. **Reading for Writing**: Summarizing - Identifying main ideas and Rephrasing what is read; avoiding Redundancies and Repetitions. Letter Writing-types, Format and Principles of Letter Writing. E-mail Etiquette, Writing CVs.
4. **Vocabulary**: Technical vocabulary from across technical branches (20 words). GRE Vocabulary (20 words) (Antonyms and Synonyms, Word applications) Association, Sequencing of Words
5. **Grammar**: Verbs, Phrasal Verbs - Tenses; Subject-Verb Agreement;

UNIT IV

1. **Text: Liking a Tree, Unbowed: Wangari Maathai-biography** from "**Infotech English**", Maruthi Publications
2.   **Reading**: Studying the use of graphic elements in texts to convey information, reveal trends / patterns / relationships, communicative process or display complicated data.
3. **Reading for Writing**: Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables. Writing SOP, writing for media.
4. **Vocabulary**: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) (Antonyms and Synonyms, Word applications) Cloze Encounters.
5. **Grammar**: Quantifying Expressions - Adjectives and Adverbs; Comparing and Contrasting; Use of Antonyms; Direct and Indirect Speech, Reporting Verbs for Academic Purposes. Idiomatic Expressions (25 Idioms)

UNIT V

1. **TEXT: Stay Hungry-Stay foolish** from "**Infotech English**", Maruthi Publications
2. **Reading**: Reading for Comprehension. RAP Strategy Intensive Reading and Extensive Reading Techniques.
3. **Reading for Writing**: Report writing (Significance, Format and Style of Writing Technical Reports)
4. **Vocabulary**: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) (Antonyms and Synonyms, Word applications) Coherence, Matching Emotions.
5. **Grammar**: Change of Voice; Editing Short Texts – Identifying and Correcting Common Errors in grammar and usage (Articles, Prepositions, Tenses, Subject-Verb Agreement)

Text Book: "Infotech English", Maruthi Publications.

REFERENCE BOOKS:
1. **English Grammar in Use**, Raymond Murphy, Cambridge University Press.
2. **Oxford Practice Grammar,** John Eastwood, Oxford University Press.
3. **The Most Common Mistakes in English Usage** – Thomas Elliott Berry
4. **Essential Communication Skills** – Shalini Agarwal, Ane Books Pvt Ltd.
5. **Dictionary of Synonyms and Antonyms**, Oxford & IBH, III Ed
6. **A Practical English Grammar**, Agnes V. Martinet and Audrey Jean Thomson, Oxford University Press.
7. **English Vocabulary in Use,** Michael McCarthy and Felicity O'Dell, Cambridge University Press

E-RESOURCES
1. https://www.grammarbank.com/
2. http://guidetogrammar.org/grammar/index.htm
3. https://writeandimprove.com/
4. https://englishforeveryone.org/
5. http://www.englishvocabularyexercises.com/
6. https://englishplusmagazine.com/

20A1100201 **ENGINEERING MATHEMATICS-I**
(Common to CE,EEE,ME,ECE,CSE,IT,AIML and DS)

Lecture – Tutorial:	3-1	Internal Marks:	30
Credits:	4	External Marks:	70

Prerequisites: Fundamentals of matrices, Fundamentals of Trigonometry and Calculus.

Course Objectives:

- To instruct the concept of Matrices in solving linear algebraic equations
- To elucidate the different numerical methods to solve nonlinear algebraic equations
- To disseminate the use of different numerical techniques for carrying out numerical integration.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

Course Outcomes:

CO1	Student will be able to develop the **use** of matrix algebra techniques that is needed by engineers for practical applications (L6) solve system of linear algebraic equations using Gauss elimination, Gauss Seidel and **write** Eigen values and eigenvectors of a matrix (L3)
CO2	Student will be able to **write** diagonal form and different factorizations of a matrix (L3), to find inverse of a matrix and integral powers of a matrix by Cayley-Hamilton Theorem **identify** the nature of a Quadratic form such as positive definite, positive semi definite etc., and use this information to facilitate the calculation of matrix characteristics (L2)
CO3	Student will be able to **evaluate** the approximate roots of polynomial and transcendental equations by different algorithms (L5)
CO4	Student will be able to **apply** Newton's forward & backward interpolation and Lagrange's formulae for unequal intervals (L3)
CO5	Student will be able to **apply** numerical integral techniques to different Engineering problems (L3)
CO6	Student will be able to **apply** different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	2	2								
CO2	3	3	2	2								
CO3	3	3	2	2								
CO4	3	3	2	2								
CO5	3	3	2	2								
CO6	3	3	2	2								

UNIT – I: Solving systems of linear equations, Eigen values and Eigen vectors: (10hrs)

Rank of a matrix by echelon form and normal form – Solving system of homogeneous and non- homogeneous linear equations – Gauss

Elimination method – Eigen values and Eigen vectors and properties.
Unit – II: Cayley–Hamilton theorem and Quadratic forms: (10hrs)
Cayley-Hamilton theorem (without proof) – Applications – Finding the inverse and power of a matrix by Cayley-Hamilton theorem – Reduction to Diagonal form – Quadratic forms and nature of the quadratic forms – Reduction of quadratic form to canonical forms by orthogonal transformation.
UNIT – III: Iterative methods: (8 hrs)
Introduction– Bisection method – Method of false position– Iteration method Newton-Raphson method (One variable). Gauss-Jacobi and Gauss-Seidel methods for solving system of equations numerically.
UNIT – IV: Interpolation: (10 hrs)
Introduction– Errors in polynomial interpolation – Finite differences– Forward differences– Backward differences –Central differences – Relations between operators – Newton's forward and backward formulae for interpolation – Interpolation with unequal intervals – Lagrange's interpolation formula.
UNIT –V: Numerical integration and Solution of ordinary differential equations with initialconditions (10 hrs)
Trapezoidal rule– Simpson's $1/3^{rd}$ and $3/8^{th}$ rule– Solution of initial value problems by Taylor's series– Picard's method of successive approximations– Euler's method –Modified Euler's method – Runge-Kutta method (second and fourth order).
TEXT BOOKS:
1. **B. S. Grewal,** Higher Engineering Mathematics, 44th Edition, Khanna Publishers.   2. **B. V. Ramana,** Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education.   3. **David Poole,** Linear Algebra- A modern introduction, 4th Edition, Cengage.
REFERENCE BOOKS:
1. **Steven C. Chapra,** Applied Numerical Methods with MATLAB for Engineering and Science,Tata Mc. Graw Hill Education.   2. **M. K. Jain, S.R.K. Iyengar and R.K. Jain,** Numerical Methods for Scientific and Engineering Computation, New Age International Publications.   3. **Lawrence Turyn,** Advanced Engineering Mathematics, CRC Press.
E-RESOURCES:1. www.nptel **videos.com/mathematics/(Math Lectures from MIT,Stanford,IIT'S**
2. nptl.ac.in/courses/1221104017

20A1100202 : ENGINEERING PHYSICS
(Common to CE and ME)

Lecture – Tutorial:	3-0	Internal Marks:	30
Credits:	3	External Marks:	70

Prerequisites: Knowledge on fundamental concepts of waves, optics, sound and magnetism

Course Objectives:

❖ The course aims at making students to understand the basic concepts of Principles of Physics in a broader sense with a view to lay foundation for the various engineering courses.

❖ To develop analytical capability and solve various engineering problems.

Course Outcomes:

CO1	Apply the interaction of light with matter through interference, diffraction, polarization and identify these phenomena in different natural optical processes and optical instruments.
CO2	Apply the comprehended knowledge about laser and fibre optic communication systems in various engineering applications.
CO3	Interpret the knowledge of dielectric and magnetic materials with characteristic utility in appliances.
CO4	Apply the principles of acoustics to explain the nature and characterization of acoustic design and to provide a safe and healthy environment.
CO5	Apply the knowledge of non-destructive testing using ultrasonics in various engineering applications.
CO6	Study the Structure-property relationship exhibited by solid crystal materials for their utility.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3				3					3		
CO2	3	3		2	2					3		
CO3	3	3	3		3							
CO4	3				2							
CO5	3											
CO6	3				2							

Unit-I: Wave Optics
(12hrs)

Interference: Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) - Colors in thin films- Newton's Rings- Determination of wavelength and refractive index.

Diffraction: Introduction - Fresnel and Fraunhofer diffraction - Fraunhofer diffraction due to single slit, double slit - N-slits (Qualitative) – Diffraction Grating - Dispersive power and resolving power of Grating (Qualitative).

Polarization: Introduction-Types of polarization - Double refraction - Nicol's Prism -Half wave and Quarter wave plates.

Unit-II: Lasers and Fiber optics
(8hrs)

Lasers: Introduction – Characteristics of laser – Spontaneous and Stimulated emissions of radiation – Einstein's coefficients – Population inversion – Lasing action - Pumping Schemes – Ruby laser – He-Ne laser - Applications of lasers.

Fiber optics: Introduction –Principle of optical fiber- Acceptance Angle - Numerical

Aperture -

Classification of optical fibers based on refractive index profile and modes – Propagation of electromagnetic wave through optical fibers - Applications.

Unit-III: Magnetic and Dielectric Materials
(10hrs)

Magnetic Materials: Introduction - Origin of permanent magnetic moment - Classification of

magnetic materials: Dia, para, Ferro, antiferro & Ferri magnetic materials - Domain concept for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials.

Dielectric Materials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility and Dielectric constant - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field- Clausius- Mossotti equation.

Unit-IV: Acoustics and Ultrasonics
(10hrs)

Acoustics: Introduction – requirements of acoustically good auditorium– Reverberation – Reverberation time– Sabine's formula - Absorption coefficient and its determination – Factors affecting acoustics of buildings and their remedial measures.

Ultrasonics: Introduction - Properties - Production by magnetostriction and piezoelectric methods – Detection - Non Destructive Testing – pulse echo system through transmission and reflection modes - Applications.

Unit-V: Crystallography and X-ray diffraction
(8hrs)

Crystallography: Space lattice, Basis, Unit Cell and lattice parameters – Bravais Lattice – crystal systems (3D) – coordination number - packing fraction of SC, BCC & FCC - Miller indices – separation between successive (hkl) planes.

X- ray diffraction: Bragg's law - X-ray Diffractometer – crystal structure determination by Laue's and powder methods.

TEXT BOOKS:

1. **M. N. Avadhanulu, P.G.Kshirsagar & TVS Arun Murthy**" A Text book of Engineering Physics"- S.Chand Publications, 11th Edition 2019.
2. Engineering Physics by **P.K.Palanisamy** SciTech publications

REFERENCE BOOKS:

1. Engineering Physics by **M.R.Srinivasan**, New Age international publishers (2009).
2. Engineering Physics - **Sanjay D. Jain, D. Sahasrabudhe and Girish**, University Press
3. **B.K. Pandey and S. Chaturvedi**, Engineering Physics, Cengage Learning

E-RESOURCES: www.doitpoms.ac.uk**,**
http://www.itp.uni-hannover.de/~zawischa/ITP/diffraction.html**,**
http://www.coherent.com/products/?834/Lasers**,**

20A1101401: ENGINEERING DRAWING
(Common to Civil and Mechanical Engineering)

Lecture – Practical:	2 - 2 Hours	**Internal Marks:**	30
Credits:	3	**External Marks:**	70

Prerequisites:
1. Knowledge of basic Mathematics
2. **Drawing skills**

Course Objectives:
1. To introduce the students the usage of drawing instruments and to draw polygons, Engg. Curves and scales.
2. To introduce the students to use orthographic projections, projection of points & simple lines.
3. To make the students draw the projections of the lines inclined to both the planes.
4. To make the students draw the projections of the plane inclined to both the planes.
5. To make the students draw the projections of the various types of solids in different positions inclined to one of the planes.
6. To represent the object in 3D view through isometric views and to convert the isometric view to orthographic view and vice versa.

Course Outcomes:

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

CO1	Understand the simple geometric constructions like polygons, engineering curves and scales.
CO2	Understand the orthographic projections of points and lines
CO3	Understand the orthographic projections of straight lines- inclined to one plane and inclined to both the planes.
CO4	Understand the orthographic projections of planes and Planes inclined to both the planes.
CO5	Understand and draw the projections of the various types of solids in different positions inclined to one of the planes
CO6	Understand the transformation of orthographic views into isometric views and vice versa.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	-	-	-	3	-	1
CO2	3	2	-	-	-	-	-	-	-	3	-	1
CO3	3	2	-	-	-	-	-	-	-	3	-	1
CO4	3	2	-	-	2	-	-	-	-	3	-	1
CO5	3	2	-	-	2	-	-	-	-	3	-	1
CO6	3	2	-	-	2	-	-	-	-	3	-	1

UNIT I

Polygons: Constructing regular polygons by general methods, inscribing and describing polygons on circles.

Curves: Parabola, Ellipse and Hyperbola by general and special methods, cycloids,

involutes, tangents & normals for the curves.
Scales: Plain scales, diagonal scales and vernier scales

UNIT II

Orthographic Projections: Reference plane, importance of reference lines, projections of points in various quadrants, projections of lines, line parallel to both the planes, line parallel to one plane and inclined to other plane.

Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclination.

UNIT III

Projections of planes: regular planes perpendicular/parallel to one reference plane and inclined to the other reference plane; inclined to both the reference planes.

UNIT IV

Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to both the planes.

UNIT V

Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

Computer Aided Design, Drawing practice using Auto CAD, Creating 2D&3D drawings of objects using Auto CAD

Note: In the End Examination there will be no question from CAD.

TEXT BOOKS:

1. Engineering Drawing by N.D. Butt, Chariot Publications
2. Engineering Drawing by Agarwal & Agarwal, Tata McGraw Hill Publishers

REFERENCE BOOKS:

1. Engineering Drawing by K.L.Narayana & P. Kannaiah, Scitech Publishers
2. Engineering Graphics for Degree by K.C. John, PHI Publishers
3. Engineering Graphics by PI Varghese, McGrawHill Publishers
4. Engineering Drawing + AutoCad – K Venugopal, V. Prabhu Raja, New Age

20A1102301: BASIC ELECTRICAL & ELECTRONICS ENGINEERING
(Civil ENGINEERING)

Lecture – Tutorial:	4-1 Hours	Internal Marks:	30
Credits:	3	External Marks:	70

Prerequisites: Students are expected to have knowledge on the following topics: Algebra , simple integral equations & simple differential equations (**Mathematics**)

Course Objectives:

6. To learn the basic principles of electrical law's and analysis of networks..
7. To understand the principle of operation and construction details of DC and AC Machines.
8. To understand the principle of operation and construction details of transformer.
9. To study the operation of PN junction diode, half wave, full wave rectifiers and Transistors.

Course Outcomes:

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

CO1	Analyze the various electrical networks.
CO2	Understand the principle of operation of DC machines
CO3	Understand the principle of operation of AC machines
CO4	Understand the principle of operation of Transformers
CO5	Able to analyze the operation of PN junction Diode & OP-AMPS
CO6	Analyze the operation of Transistor configurations

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	1									
CO2	3	2										
CO3	2	1										
CO4	3	3										
CO5	3	2										
CO6	3	2	1									

NIT I

Electrical Circuits

Basic definitions – types of network elements – Ohm's Law – Kirchhoff's Laws – inductive networks – capacitive networks – series – parallel circuits – star-delta and delta-star transformations.-Numerical Problems.

UNIT II

DC Machines

Principle of operation of DC generator – EMF equation – types of DC machines – torque equation characteristics of DC motors – applications – three point starter – speed control methods of DC motor – Swinburne's Test-Brake test on DC shunt motor-Numerical problems

UNIT III

AC Machines:

Transformers

Principle of operation and construction of single phase transformers – EMF equation – Losses – OC & SC tests – efficiency and regulation-Numerical Problems.

AC Rotating Machines

Principle of operation and construction of alternators – types of alternators Regulation of alternator by synchronous impedance method – principle of operation of synchronous motor – principle of operation of 3-Phase induction motor – slip-torque characteristics – efficiency – applications- Numerical Problems.

UNIT IV

Rectifiers & Linear ICs

PN junction diodes – diode applications (half wave and bridge rectifiers). Characteristics of operation amplifiers (OP-AMP) – application of OP-AMPs (inverting, non-inverting, integrator and differentiator)- Numerical Problems

UNIT V

Transistors

PNP and NPN junction transistor, transistor as an amplifier– frequency response of CE amplifier – Basic concepts of feedback amplifier-Numerical problems.

REFERENCE BOOKS:

1.Basic Electrical Engineering by M.S.Naidu and S.Kamakshiah,TMH Publications.
2.Fundamentals of Electrical Engineering by Rajendra Prasad, PHI Publications, 2nd edition.
3.Basic Electrical Engineering by Nagsarkar, Sukhija, Oxford Publications, 2nd edition.
4.Industrial Electronics by G.K. Mittal, PHI

20A1100291: ENGINEERING PHYSICS LAB
(Common to CE and ME)

Labs / Instructions Hours/Week	3		Internal Marks:	30
Credits:	2		External Marks:	70

Prerequisites: Knowledge on vernier callipers, Screw guage, common balance

Course Objectives:
- ❖ The Objective of this course is to make the students gain practical knowledge to co-relate with the theoretical studies.
- ❖ To achieve perfectness in experimental skills and the study of practical applications will bring more confidence and ability to develop and fabricate engineering and technical equipments.
- ❖ Training field oriented Engineering graduates to handle instruments and their design methods to improve the accuracy of measurements.

Course Outcomes:

CO1	Understand principle, concept, working of an instrument and can compare results with theoretical calculations.
CO2	Analyze the physical principle involved in the various instruments; also relate the principle to new application.
CO3	Understand design of an instrument with targeted accuracy for physical measurements.
CO4	Develop skills to impart practical knowledge in real time solution.
CO5	The various experiments in the areas of optics, mechanics and thermal physics will nurture the students in all branches of Engineering..
CO6	Think innovatively and also improve the creative skills that are essential for engineering.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3											
CO2	3	3		3					3			
CO3	3	3	1	3					3			
CO4	3	3		3								
CO5	3											
CO6	3	3	2	3								

List of Experiments

1. Study of variation of magnetic field along the axis of a current carrying circular coil by Stewart & Gee's method.
2. Determination of numerical aperture and acceptance angle of an optical fiber.
3. Determination of thickness of thin object by wedge method.
4. Determination of radius of curvature of given plano convex lens by Newton's rings.
5. Determination of wavelengths of different spectral lines in mercury spectrum using diffraction grating in normal incidence configuration.
6. Determination of dispersive power of the prism.
7. Sonometer: Verification of laws of string.
8. Study of I/V Characteristics of Semiconductor diode.
9. I/V characteristics of Zener diode.
10. Melde's experiment-Longitudinal and Transverse mode.

11. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
12. Estimation of Planck's constant using photoelectric effect.
13. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall Effect
14. Determination of wavelength of Laser light using diffraction grating.
15. Rigidity modulus of material of a wire-dynamic method (Torsional pendulum).

Note: Any 8 experiments out of 15 should be done in the laboratory and 2 experiments in virtual lab.

TEXT BOOKS:

S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- S Chand Publishers, 2017.

REFERENCE BOOKS:

Engineering Physics / Applied Physics Lab Manual – **Spectrum Publications**

E-RESOURCES: www.vlab.co.in

20A1101391-BASICS OF CIVIL & ELECTRICAL ENGG. WORKSHOP
(Civil Engineering)

Practical	3 Hours	Internal Marks:	30
Credits:	1.5	External Marks:	70

Prerequisites:

Course Objectives:
- ➢ To outline the process of identification of various building components and their estimation
- ➢ To provide knowledge on operation of the various survey instruments used for linear and angular measurements.
- ➢ To explain the concept of measurement of discharge and velocity in a pipe and density of water
- ➢ To demonstrate automatic weather station.

Course Outcomes:

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

CO1	Identify various components of a building and give lump-sum estimate.
CO2	Determine distances and irregular areas using conventional survey instruments like chain ,tape, cross-staff and compass
CO3	Identify different soils & Know various traffic signs & signals
CO4	Determine centre of gravity and moment of inertia of channel and I-sections.
CO5	Set out a signal room building as per given plan & Install simple sanitary filling and find discharge/velocity in a water pipe line as density of water
CO6	Know to the process of making cement mortar / concrete for nominal mix

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	1	-	-	-	-	-	1	-	-	-	-
CO2	2	2	-	-	-	-	-	2	-	-	-	-
CO3	2	1	-	-	-	-	-	1	-	-	-	-
CO4	2	2	-	-	-	-	-	2	-	-	-	-
CO5	2	2	-	-	-	-	-	2	-	-	-	-
CO6	2	1	-	-	-	-	-	1	-	-	-	-

List of Experiments
PART-A (CIVIL)

1. Demonstration on usage of chain
2. Ranging – offsets – chain-age
3. To find the area of an irregular polygon using chain by using horizontal measurements
4. Determination of bearings and included angles with prismatic compass.
5. Demonstration on various Building materials used in construction
6. Estimation of quantity of bricks, concrete, wood, paint for the given single room building
7. Masonry work hands – on practice work deferent types of bonds in brick masonry
8. Identification of quality of brick through physical tests
9. Identification of soil based on their physical properties
10. Setting out of building: The student is required to set out a building

(Single room only) as per the given building plan using tape and cross staff.
11. Demonstration on Installation of simple sanitary fittings and fixtures like Tap, T-joint, Elbow, bend, threading etc.
12. Finding the discharge velocity in a water pipe line also find density of water
13. Computation of Centre of gravity and moment of inertial of (i) I-section and (ii) Channel section.
14. Welding (arc welding and gas welding)
15. Carpentry (Demonstration)
16. Identify deferent types of roads in the campus and write the physical characteristics of layers
17. Demonstration on making of cement mortar/concrete for the given nominal mix
18. Study of given Topo-sheet

PART-B (ELECTRICAL)

1. Introduction
2. Three lamps control by a single switch in series connection
3. Three lamps control by a single switch in parallel connection
4. Staircase Wiring
5. Fluorescent lamp fitting

TEXT BOOKS:

REFERENCE BOOKS:
Laboratory Manual for Basic Civil Engineering workshops

E-RESOURCES:

20A120001: **ENGINEERING MATHEMATICS-II**
(Common to All Branches)

Lecture – Tutorial:	3-1	Internal Marks:	30
Credits:	4	External Marks:	70

Prerequisites: Fundamentals of matrices, Fundamentals of Trigonometry and Calculus.

Course Objectives:

- To familiarize a variety of well-known sequences and series, with a developing intuition about the behaviour of new ones.
- To enlighten the learners in the concept of differential equations and multivariable calculus.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

Course Outcomes:

CO1	Student will be able to **find** the General/Particular solutions of first order and first degree ordinary differential equations by **apply** different methods **(L3),** know the applications of Newton's law of cooling, natural growth and decay problems and **find** orthogonal trajectories of the given family of curves. **(L3)**
CO2	Student will be able to **identify** the essential characteristics of linear differential equations with constant coefficients. **(L2)solve** the linear differential equations with constant coefficients by appropriate method **(L3)**
CO3	Student will be able to find convergence (or) divergence of a series **(L3)**
CO4	Student will be able to utilize mean value theorems to real life problems**(L3)**
CO5	Student will be able to find partial derivatives numerically and symbolically and use them to **analyze** and interpret the way a function varies. **(L4)acquire** the Knowledge maxima and minima of functions of several variable **(L1)Utilize** Jacobian of a coordinate transformation to deal with the problems in change of variables **(L3)**
CO6	Student will be able to **find** length of the arc, volume of solid of revolution and surface area of solid of revolution**(L3)**

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	2	2								
CO2	3	3	2	2								
CO3	3	3	2	2								
CO4	3	3	2	2								
CO5	3	3	2	2								
CO6	3	3	2	2								

UNIT – I: Differential equations of first order and first degree: (10hrs)

Linear differential equations– Bernoulli's equations –Exact equations and equations reducible to exact form. Applications: Newton's Law of cooling– Law of natural growth and decay– Orthogonal trajectories.

UNIT-II: Linear Differential equations of higher order: (10hrs)

Homogeneous and Non-homogeneous differential equations of higher order with constant coefficients – with non-homogeneous term of the type $e^{\alpha x}$, sin ax, cos ax, polynomials in x^n, $e^{\alpha x}V(x)$ and $x^n V(x)$ – Method of Variation of

parameters, Cauchy and Legendre's linear equations.

UNIT – III: Sequences, Series and Mean value theorems: (10hrs)

Sequences and Series: Convergences and divergence – Ratio test – Comparison tests – Integral test – Cauchy's root test – Alternate series– Leibnitz's rule.

Mean Value Theorems (without proofs): Rolle's Theorem – Lagrange's mean value theorem – Cauchy's mean value theorem – Taylor's and Maclaurin's theorems with remainders, Problems and applications on the above theorem.

UNIT – IV: Partial differentiation: (10hrs)

Introduction – Homogeneous function – Euler's theorem– Total derivative– Chain rule– Jacobian – Functional dependence –Taylor's and MacLaurin's series expansion of functions of two variables.Applications: Maxima and Minima of functions of two variables without constraints and Lagrange's multiplied method.

UNIT – V: Multiple integrals: (8hrs) (8 hrs)

Double and Triple integrals – Change of order of integration in double integrals – Change of variables to polar, cylindrical and spherical coordinates. Applications: Finding Areas and Volumes

TEXT BOOKS:

1. **B. S. Grewal,** Higher Engineering Mathematics, 44th Edition, Khanna Publishers.
2. **B. V. Ramana,**Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education.

REFERENCE BOOKS:

1. **Erwin Kreyszig,** Advanced Engineering Mathematics, 10th Edition, Wiley-India.
2. **Joel Hass, Christopher Heil and Maurice D. Weir,** Thomas calculus, 14thEdition, Pearson.
3. **Lawrence Turyn,** Advanced Engineering Mathematics, CRC Press, 2013.
4. **Srimantha Pal, S C Bhunia,** Engineering Mathematics, Oxford University Press.

E-RESOURCES:

1. www.nptel **videos.com/mathematics/(Math Lectures from MIT,Stanford,IIT'S**
2. nptl.ac.in/courses/1221104017

20A1200204 Engineering Chemistry)
(Common to CE and ME)

Lecture – Tutorial:	3-0	Internal Marks:	30
Credits:	3	External Marks:	70

Prerequisites: Fundamentals of Polymers and Electro Chemical scells.

Course Objectives:.

Engineering Chemistry is an applied manifestation of Chemistry and its thorough knowledge in fundamental aspects, essential for Civil and Mechanical to understand chemical structure and other aspects of materials. The study of applied concepts of Chemistry endeavoured in this course namely; Polymer technology, electrochemistry, corrosion, Chemistry of materials, fuels and water treatment helps the student in comprehensing their engineering applications with right aptitude and ability in predicting the results under given conditions.

Course Outcomes:

CO1	**Analyze** the different types of composite plastic materials and **interpret** the mechanism of conduction in conducting polymers.
CO2	Predict potential complications from combining various chemicals and metals in engineering setting
CO3	Discuss fundamental aspects of electrochemistry and materials science relevant to corrosion phenomena
CO4	**Apply Nano chemistry, Refractories, Lubricants, cement in engineering processes**
CO5	*Discuss the various* petroleum products and alternate fuels
CO6	Examine the water quality and select appropriate purification technique for intended problem

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	1								
CO2	3	3	2	1								
CO3	3	2	2	1								
CO4	3	3	2	2								
CO5	3	2	2	1								
CO6	3	3	2	1								

UNIT I
POLYMER TECHNOLOGY
Polymerisation:- Introduction, methods of polymerization (emulsion and suspension), mechanical properties.
Plastics: Thermoplastic-thermosetting Compounding, fabrication (compression, injection, transfer and extrusion), preparation, properties and applications (PVC, polycarbonates and Bakelite), mention some examples of plastic materials used in electronic gadgets.
Elastomers:- Introduction, preparation, properties and applications (Buna S, thiokol and polyurethanes). **Composite materials:** Fiber reinforced plastics, conducting polymers, biodegradable polymers,

UNIT II
ELECTROCHEMICAL CELLS AND CORROSION: Single electrode potential, electrochemical series and uses of series, standard hydrogen electrode, calomel electrode, batteries (Dry cell, liquid Li ion battery), fuel cells (H2-O2).
Corrosion:-Definition, theories of corrosion (chemical and electrochemical), galvanic corrosion, differential aeration corrosion, galvanic series, factors influencing rate of corrosion, corrosion control methods-Protective coatings (Galvanizing, tinning electroplating and electroless plating [nickel]),

	UNIT III ***CHEMISTRY OF MATERIALS*** **Nano materials:-** Introduction, sol-gel method, characterization by transmission electron microscopy [TEM]) , carbon nanotubes (types, preparation and applications) **Refractories: -** Definition, classification, properties (refractoriness, refractoriness under load, porosity and thermal spalling), failure of refractories. **Lubricants: -** Definition, mechanism of lubricants, properties (definition and importance). **Cement: -** Constituents, manufacturing, parameters to characterize the clinker formation: lime saturation factor (LSF), silica ratio (SR) and alumina ratio (AR), chemistry of setting and hardening, deterioration of cement.
	UNIT IV ***FUELS10 hrs*** Introduction, calorific value, higher calorific value, lower calorific values, problems using Dulong's formula, proximate and ultimate analysis of coal sample and their significance, petroleum (refining-cracking), synthetic petrol (Fischer Tropsch), petrol knocking, diesel knocking, octane and cetane ratings, anti-knocking agents, Introduction to alternative fuels (Bio-diesel, natural gas, liquefied petroleum gas, compressed natural gas), Flue gas analysis by Orsat apparatus.
	UNIT V ***WATER TECHNOLOGY8 hrs*** Hardness of water, determination of hardness by complexometric method, boiler troubles (priming and foaming, scale formation, boiler corrosion, caustic embrittlement), internal treatments, softening of hard water (zeolite process and ion exchange process), potable water and its specifications, steps involved in purification of water, chlorination, break point chlorination-desalination (reverse osmosis and electro dialysis).
	TEXT BOOKS:
	1. P.C. Jain and M. Jain "**Engineering Chemistry**", 15/e, Dhanpat Rai & Sons, Delhi, (Latest edition). 2. Shikha Agarwal, "**Engineering Chemistry**", Cambridge University Press, New Delhi, (2019). 3. S.S. Dara, "**A Textbook of Engineering Chemistry**", S.Chand & Co, (2010). 4. Shashi Chawla, "Engineering Chemistry", Dhanpat Rai Publicating Co. (Latest edition).
	REFERENCE BOOKS:
	1. K. Sesha Maheshwaramma and Mridula Chugh, "**Engineering Chemistry**", Pearson India Edn. 2. (a) O.G. Palana, "**Engineering Chemistry**", Tata McGraw Hill Education Private Limited, (2009). (b) CNR Rao and JM Honig (Eds) "**Preparation and characterization of materials**" Academic press, New York (latest edition) 3. B. S. Murthy, P. Shankar and others, "**Textbook of Nanoscience and Nanotechnology**", University press (latest edition)
	E-RESOURCES:
	1. https://en.wikipedia.org >wiki> Water treatment 2. https://en.wikipedia.org >wiki> Conductive polymers 3. www.sae.org/fuel cells/fuelcells-types.htm 4. https://en.wikipedia.org >wiki> Nanomaterials 5. https://en.wikipedia.org >wiki> Electrochemical cell 6. https:// www.britancia.com>technology>cement-building-material

20A1201401: THEORY OF MECHANICS
(Civil Engineering)

Lecture – Practical:	3 - Hours	Internal Marks:	30
Credits:	3	External Marks:	70

Prerequisites:
1. Engineering Physics
2. Engineering Mathematics

Course Objectives:
1. To introduce the concepts of force and friction, direction and its application to the students.
2. To make the students expose to the application of free body diagrams. Solution to problems using graphical methods and law of triangle of forces.
3. To introduce the concepts of centre of gravity, concepts of moment of inertia and polar moment of inertia including transfer methods and their applications to the students.
4. The students are to be exposed to motion in straight line and in curvilinear paths, its velocity and acceleration computation and methods of representing plane motion.
5. The students are to be exposed to rigid body motion kinematics and kinetics

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

CO1	Compute the resultant of forces and moments using free body diagrams.
CO2	Analyze free body diagrams & can solve problems using graphical methods and law of triangle of forces.
CO3	Identify the Centroid and Centre of Gravity of the simple, composite figures and able to apply the concepts of friction.
CO4	Determine the area and mass moment of inertia of the composite figures and bodies.
CO5	Understand the fundamental concepts of kinematics and kinetics of rigid body.
CO6	Able to apply the work energy and Impulse momentum principle to analyze the simple, practical problems.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-
CO6	3	2	-	-	-	-	-	-	-	-	-	-

UNIT I

Introduction to Engg. Mechanics – Basic Concepts. Systems of Forces: Coplanar Concurrent Forces – Components in Space – Resultant – Moment of Force and its Application – Couples and Resultant of Force Systems. Introduction, limiting friction and impending motion, coulomb's laws of dry friction, coefficient of friction, cone of friction

UNIT II

Equilibrium of Systems of Forces : Free Body Diagrams, Equations of Equilibrium of Coplanar Systems, Spatial Systems for concurrent forces. LamisTheorm, Graphical method for the equilibrium of coplanar forces, Converse of the law of Triangle of forces, converse of the law of polygon of forces condition of equilibrium.

UNIT III

Centroid :Centroids of simple figures (from basic principles) – Centroids of Composite Figures Centre of Gravity :Centre of gravity of simple body (from basis principles), centre of gravity of composite bodies, pappus theorem.
FRICTION Types of friction – Limiting friction – Laws of Friction – static and Dynamic Frictions – Angle of Friction –Cone of limiting friction– Friction of wedge, block and Ladder.

UNIT IV

Area moments of Inertia :Definition – Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Products of Inertia, Transfer Formula for Product of Inertia.
Mass Moment of Inertia :Moment of Inertia of Masses, Transfer Formula for Mass Moments of Inertia, mass moment of inertia of composite bodies.

UNIT V

Kinematics: Rectilinear and Curvelinear motions – Velocity and Acceleration – Motion of Rigid Body – Types and their Analysis in Planar Motion.   Introduction – Rectilinear motion – Motion with uniform and variable acceleration–Curvilinear motion–Components ofmotion– Circular motion – Projectiles- Instantaneous centre
Kinetics: Kinetics of a particle – D'Alembert's principle – Motion in a curved path – work, energy and power. Principle of conservation of energy – Kinetics of a rigid body in translation, rotation – work done – Principle of work-energy – Impulse-momentum.

TEXT BOOKS:
1. Engineering Mechanics - S.Timoshenko & D.H.Young., 4th Edition - , Mc Graw Hill publications.

REFERENCE BOOKS:
1. Engineering Mechanics by S S Bhavikatti, New age International
2. Engineering Mechanics by R K Bansal, Laxmi Publications

20A1205301: Programming and Problem Solving with C
(Civil Engineering)

Lecture – Tutorial-Practical::	3-0-0	Internal Marks:	30
Credits:	3	External Marks:	70

Prerequisites: Basic knowledge on computers, Mathematics

Course Objectives: The objectives of Programming for Problem Solving Using C are
- To learn about the computer systems, computing environments, developing of a computer program and Structure of a C Program
- To gain knowledge of the operators, selection, control statements and repetition in C
- To learn about the design concepts of arrays, strings, enumerated structure and union types and their usage.
- To assimilate about pointers, dynamic memory allocation and know the significance of Preprocessor.
- To assimilate about File I/O and significance of functions

Course Outcomes:

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

CO1	Understand the programming terminology and implement various c-tokens & input-output statements to solve simple problems
CO2	Able to compare and differentiate various looping & branching constructs and apply the best looping structure for a given problem
CO3	Identify the necessity of modularity in programming and design various function types
CO4	Understand pointers and implement the programs to directly access memory locations
CO5	Interpret and implement the need of arrays and structure/union to store homogeneous and heterogeneous groups of data
CO6	Contrast the need of using files in programming and implement file operations

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	--	2	--	3	--	--	--	--	--	--	2
CO2	--	2	3	--	2	--	--	--	--	--	--	--
CO3	--	2	3	--	--	--	--	--	--	--	--	2
CO4	3	--	2	2	2	--	--	--	--	--	--	--
CO5	--	--	3	--	--	--	--	--	--	--	--	3
CO6	--	--	3	--	--	--	--	--	--	--	--	--

UNIT I : Objective: Notion of Computer Languages, algorithm, computational procedure, editing and executing programs and C Declarations

BASICS AND INTRODUCTION TO C: Basics of Computer, Introduction to C, Machine, Assembly and High level Language, Assembler, Compiler and Interpreter, Structure of a C program, Programming Rules, Executing the C Program, Advantages of C, Header Files, Flow Chart, Algorithm.

THE C DECLARATIONS: The C-Character set, Delimiters, Types of Tokens, The C keywords, Identifiers, Constants, Variables, C Data types, initialization, type modifiers, type conversions, constant and volatile variables. Properties of Operators, Operator Priority ,comma and conditional operators, arithmetic, relational, assignment operators and expressions, logical , bitwise operators. Input and output in c: Formatted and Unformatted functions

UNIT II: Objective: Understanding branching, iteration, data representation using arrays and strings

DECISION STATEMENTS: The if statement, if-else, nested if else, if-else-if ladder, break, continue, goto, Switch statement, nested switch case, Switch case and nested ifs.
LOOP CONTROL: for loop, nested for loop, while, do-while, do-while statement with while loop.
ARRAYS: Array initialization, array terminology, characteristics of an array, 1-D array and its operations, 2-D arrays and operations, Multi -dimensional arrays.
STRINGS: Declaration and initialization of string, string standard functions, string conversion functions, memory functions, application of strings.

UNIT III: Objective: Modular programming and recursive solution formulation and storage classes

FUNCTIONS: Basics, function definition, return statement, types of functions, call by value ,call by reference, function as an argument, Functions with operators, Function and Decision Statements, Functions and loop Statements, Functions with arrays and Pointers, Recursion-Types of Recursion, Rules for Recursive Function, Recursion versus Iterations, Advantages and Disadvantages of Recursion, Efficiency of Recursion, Library Functions.
STORAGE CLASS: Variable Lifetime, Automatic Variables, External Variables, Static Variables, Register Variables.

UNIT IV: Objective: Understanding pointers, dynamic memory allocation and Preprocessor Directives.

POINTERS: Features of pointers, pointers and address, pointer declaration, void pointers, arithmetic operations with pointers, pointers and arrays, array of pointers, pointers to pointers, pointers and strings. Dynamic memory allocation
PREPROCESSOR DIRECTIVES: The #define Directive, Defining and Undefining a Macros, The #include Directive

UNIT V: Objective: Understanding derived data types of C and basic of file operations.

STRUCTURE AND UNION: Features of Structures, Declaration and initialization of Structures, Structure within Structure, Arrays of Structure, Pointer to Structure, Structure and functions, typedef, Bit fields, Enumerated Data Type, Unions and Unions Vs Structures.
FILES: Streams and File Types, Steps for File Operations, FILE I/O, Structures Read and Write, Other file function, Command line Arguments.

TEXT BOOKS:

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

REFERENCE BOOKS:

[1]Kernighan and Ritchie , —"The C programming language" , The (Ansi C Version), PHI, second edition.
 [2]Yashwant Kanetkar , —"Let us C" , BPB Publications, 2nd Edition 2001.
[3]Paul J. Dietel and Dr. Harvey M. Deitel, —"C: How to Program", Prentice Hall, 7 th edition (March 4,2012).
 [4]Herbert Schildt, —"C:The Complete reference", McGraw Hill, 4th Edition, 2002.
 [5]K.R.Venugopal, Sundeep R Prasad, —"Mastering C", McGraw Hill, 2nd Edition, 2015

E-RESOURCES:

1.http://cslibrary.stanford.edu/101/EssentialC.pdf
2. http://nptel.ac.in/courses/106104128/
3.http://www.vssut.ac.in/lecture_notes

20A1201402: Building materials & concrete technology
(Civil Engineering)

Lecture – Practical:	3 - 1 Hours	Internal Marks:	30
Credits:	3	External Marks:	70

Prerequisites:

Course Objectives:

1. To introduce various building construction materials
2. To describe various properties of ingredients of concrete
3. To explain various properties and tests of fresh Concrete
4. To explain various properties and tests of fresh andHardened Concrete

Course Outcomes:

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

CO1	Know various engineering properties of building construction materials and suggest their suitability
CO2	Identify the functional role of Aggregates and apply this knowledge to concrete mix design
CO3	Identify the functional role of cement and apply this knowledge to concrete mix design
CO4	Acquire and apply fundamental knowledge in the fresh properties of
CO5	Acquire and apply fundamental knowledge in the hardened properties of concrete
CO6	Acquire the fundamental knowledge in testing of hardened concrete

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	-	-	-	-	-	1	-	-	-	-
CO2	2	2	-	-	-	-	-	1	-	-	-	-
CO3	2	1	-	-	-	-	-	1	-	-	-	-
CO4	2	2	-	-	-	-	-	1	-	-	-	-
CO5	2	2	-	-	-	-	-	2	-	-	-	-
CO6	2	2	-	-	-	-	-	2	-	-	-	-

UNIT I

Stones: Classification of Stones – Properties of stones in structural requirements
Bricks: Composition of good brick earth, various methods of manufacturing of bricks
Tiles: Characteristics of good tile – Manufacturing methods, Types of tiles
Wood: Structure – Properties – Seasoning of timber – Classification of various types of woods used in buildings – Defects in timber
Paints: White washing and distempering, Constituents of paint – Types of paints – Painting of new and old wood – Varnish

UNIT II

Aggregates: Classification of aggregate, Bond, Strength and other mechanical properties of aggregate, Physical properties of aggregate, bulking of sand, Deleterious substance in aggregate, Soundness of aggregate, Alkali-Aggregate reaction – Thermal properties, Sieve analysis – Fineness modulus – Grading curves – Grading of fine and coarse aggregates as per relevant IS code, Maximum aggregate size
Portland Cement: Chemical composition, Hydration, Structure of hydrated cement – Setting of cement, Fineness of cement, Tests for physical properties – Different grades of cements-Supplementary cementitious materials: Fly ash, GGBS, Silica fume, Rice husk ash, Calcinated ash (Basic properties and their

contribution to concrete strength). Admixtures: Mineral and Chemical admixtures

UNIT III

Fresh Concrete-Manufacture of concrete – Mixing and vibration of concrete, Workability – Segregation and bleeding – Factors affecting workability, Measurement of workability by different tests, Effect of time and temperature on workability – Quality of mixing water, Ready mix concrete, Shotcrete

UNIT IV

Hardened Concrete-Water / Cement ratio – Abram's law, Gel space ratio, Nature of strength of concrete – Maturity concept, Strength in tension and compression – Properties of Hardened Concrete (Elasticity, Creep, Shrinkage, Poisson's ratio, Water absorption, Permeability, etc.), Relating between compression and tensile strength, Curing

UNIT V

Testing of Hardened Concrete-Factors affecting properties of Hardened concrete, Compression tests, Tension tests, Flexure tests, Non-destructive testing methods – Codal provisions for NDT – Rebound hammer and UPV method

TEXT BOOKS:

1. "Concrete Technology" by M. S. Shetty - S. Chand & Co., 2004
2. "Engineering Materials" by Rangwala S C, (36th edition), Anand Charotar Publishing House
   "Concrete Technology" by Shantha Kumar – Oxford Publications

REFERENCE BOOKS:

1. "Building Materials" by S. K. Duggal, New Age International Publications
2. "Building Materials" by P. C. Verghese, PHI learning (P) Ltd., 2009
3. "Properties of Concrete" by A. M. Neville – Pearson – 4th edition

E-RESOURCES:

- http://nptel.ac.in/courses/105102012/
- https://onlinecourses.nptel.ac.in/noc16_ce10/preview
- http://nptel.ac.in/courses/105104030/http://freevideolectures.com/Course/3357/Concrete-Technology
- http://textofvideo.nptel.iitm.ac.in/105102012/lec1.pdf

20A1200801: ENVIRONMENTAL Sciences
(Common to CE,EEE,ME and ECE

Lecture – Tutorial:	2-0	Internal Marks:	30+70
Credits:	--	External Marks:	

Prerequisites:

Course Objectives:

The objectives of the course are to impart:
- ❖ Overall understanding of the natural resources.
- ❖ Basic understanding of the ecosystem and its diversity.
- ❖ Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities.
- ❖ An understanding of the environmental impact of developmental activities.
- ❖ Awareness on the social issues, environmental legislation and global treaties.

Course Outcomes:

CO1	➢ Illustrate the importance of sustainability in the progress of a nation. (L2)
CO2	➢ Infer the existence of ecosystems in maintaining ecological balance. (L2)
CO3	➢ Recall the importance of biodiversity and its conservation. (L1)
CO4	➢ Summarize the role of natural resources for the sustenance of life on earth and recognize the need to conserve them. (L2)
CO5	➢ Identify the environmental pollutants and the abatement devices to be used. (L3)
CO6	➢ Interpret environmental related acts and social issues. (L2)

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	2	-	-	2	3	2	-	-	2	2
CO2	3	2	2	-	-	2	3	2	-	-	2	2
CO3	3	2	2	-	-	2	3	2	-	-	2	2
CO4	3	2	2	-	-	2	3	2	-	-	2	2
CO5	3	2	2	-	-	2	3	2	-	-	2	2
CO6	3	2	2	-	-	2	3	2	-	-	2	2

UNIT I   (6hrs)
Sustainability: Stockholm and Rio Summit–Global Environmental Challenges: Global warming and climate change, acid rains, ozone layer depletion, population growth and explosion, effects. Role of information technology in environment and human health.

Ecosystems: Concept of an ecosystem. - Structure and function of an ecosystem; Producers, consumers and decomposers. - Energy flow in the ecosystem - Food chains, food webs and ecological pyramids- Ecological succession.

UNIT II   (4hrs)
Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity- classification - Value of biodiversity: consumptive use, productive use, social value. India as a mega diversity nation - Hot-sports of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts. Endangered and endemic species of India – Conservation of biodiversity.

UNIT III	(7hrs)

Natural Resources: Natural resources and associated problems.

Forest resources: Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people.

Water resources: Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems.

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

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

Role of an individual in conservation of natural resources; Equitable use of resources for sustainable lifestyles.

UNIT IV	(5hrs)

Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Studies. Impact of Fire Crackers on Men and his well being.

Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.

UNIT V	(6hrs)

Social Issues and the Environment: Urban problems related to energy, rain water harvesting. Environmental ethics: Issues and possible solutions. Environmental Protection Act -Air (Prevention and Control of Pollution) Act. –Water (Prevention and control of Pollution) Act - Wildlife Protection Act -Forest Conservation Act. Environmental Management: Impact Assessment and its significance various stages of EIA, preparation of EMP and EIS. Ecotourism, Green Campus – Green business and Green politics.

TEXT BOOKS:

1) Perspectives in Environment Studies, Anubha Kaushik, C P Kaushik, New Age International Publishers, 2014
2) Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers, Vijayawada
3) Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.
4) Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai

REFERENCE BOOKS:

1) Text Book of Environmental Studies, Deeshita Dave & P. Udaya Bhaskar, Cengage Learning.
2) A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi
3) Environmental Studies, Benny Joseph, Tata McGraw Hill Co, New Delhi

E-RESOURCES: 1. http://nptel.ac.in/courses.php.
2. http://jntuk-coeerd.in/

20A1200191: Communicative English LAB
(Common to All Branches (CE, EEE, MECH, ECE, CSE, IT, AIML, DS)

Labs / Instructions Hours/Week	3 Hours	Internal Marks:	30
Credits	1.5	External Marks:	70

PREREQUISITES: None

COURSE OBJECTIVES

1. To learn the sound systems of English and understand word stress of English.
2. To train the students in the art of conversation and discussion
3. To equip the students with good communication skills.
4. To emphasize the need of English in the technical world.
5. To improve their presentation and participation skills
6. To prepare them for interviews and future job environments.

COURSE OUTCOMES

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

CO 1	Demonstrate better understanding of the nuances of spoken English to put into use in various situation and events.
CO 2	Apply the rules of phonetics–pronunciation, accent and intonation– in their everyday communication
CO 3	Relate their understanding of the importance of spoken skills and the need for life-long learning in day-to-day communication.
CO 4	Construct strategies like critical and analytical skills to participate effectively in group discussions and debates.
CO 5	Demonstrate their ideas accurately and effectively in presentations.
CO 6	Build responses to the questions by listening to short audio texts and identify the context and specific pieces of information.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

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

UNIT I
• Making Inquiries on the phone, Thanking and Responding to Thanks, Responding to Requests and Asking for Directions   • Vowels, Consonants, Pronunciation, Phonetic Transcription, Common Errors in Pronunciation
UNIT II
• Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating, Apologising, Advising, Suggesting, Agreeing and Disagreeing   • Word stress – Di-Syllabic Words, Poly-Syllabic Words, Weak and Strong Forms, Contrastive Stress (Homographs)
UNIT III
• Debating   • Stress in Compound Words, Rhythm, Intonation, Accent Neutralization.
UNIT IV
• Group Discussions   • Listening to Short Audio Texts, and Identifying the context and specific pieces of information to answer a series of questions in speaking.
UNIT V
• Presentation Skills and Interview Skills   • Newspapers reading; Understanding and identifying key terms and structures useful for writing reports.
Lab Manual: "Infotech English", Maruthi Publications.
Software: k-van solutions Multimedia language lab
REFERENCE BOOKS:
1. **Exercises in Spoken English Part 1,2,3,4,** OUP and CIEFL.   2. **English Pronunciation in use** - Mark Hancock, Cambridge University Press.   3. **English Phonetics and Phonology**-Peter Roach, Cambridge University Press.   4. **English Pronunciation in use**- Mark Hewings, Cambridge University Press.   5. **English Pronunciation Dictionary**- Daniel Jones, Cambridge University Press.   6. **English Phonetics for Indian Students**- P. Bala Subramanian, Mac Millan Publications
E-RESOURCES
1. https://learnenglish.britishcouncil.org/   2. https://rachelsenglish.com/   3. https://www.bbc.co.uk/learningenglish/   4. https://www.engvid.com/   5. https://bbclearningenglish.com

20A1200203 : Engineering Chemistry Lab
(Common to CE and ME)

Labs / Instructions Hours/Week	3	Internal Marks:	30
Credits:	1.5	External Marks:	70

Prerequisites: Knowledge on Volumetric analysis.

Course Objectives:
- ❖ To provide knowledge of chemistry practical's.
- ❖ It enables the students to analyze the different parameters of water sample like hardness and alkalinity and different volumetric titrations.
- ❖ It makes the students to obtain basic knowledge of instrumentation based on different Engineering applications.

Course Outcomes:

CO1	❖ Students of Engineering should understand and apply polymers and plastic technologies along with their utilization to solve the problems of the society.
CO2	❖ Knowledge of cells and sensors utilized in many instruments is necessary to engineering students in solving and applying to batteries and fuel cells.
CO3	❖ Knowledge of electrochemical cells is essential in understanding corrosion along with the methods of controlling to budding engineers.
CO4	❖ Students should have the knowledge of water and its hardness, boiler troubles and problems associated with the environment and its sustainability.
CO5	❖ Knowledge of fuels and energy, their advantages & disadvantages should be known by the students to solve and understand engineering problems.
CO6	❖ Knowledge, design and analysis of materials should be understood by the Engineering students in solving the complex problems of the society.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	1	1	1								
CO2	3	3	1	-								
CO3	3	2	2	-								
CO4	3	1	-	1								
CO5	3	2	2	1								
CO6	3	1	1	1								

List of Experiments

1. Introduction to Chemistry laboratory – Molarity, Normality, Primary, secondary standard solutions, Volumetric titrations, Quantitative analysis, Qualitative analysis, etc.
2. Determination of HCl using standard Na_2CO_3 solution.
3. Determination of alkalinity of a sample containing Na_2CO_3 and NaOH.
4. Determination of $KMnO_4$ using standard Oxalic acid solution.
5. Determination of total hardness of water using standard EDTA solution.
6. Determination of Iron using standard $K_2Cr_2O_7$ solution
7. Estimation of vitamin C
8. Determination of Iron by a Colorimetric method using thiocyanates as reagent.
9. Conductometric titration between strong acid and strong base.
10. Potentiometric titration between strong acid and strong base.

11. Preparation of Bakelite.
12. Determination of   pH of water sample

EQUIPMENT REQUIRED:

PH meters, Potentiometers, Conductometers, colorimeters.

APPARATUS

Burettes, Pipettes, Conical flask, Beakers, Volumetric flask.

REFERENCE BOOKS:

1 . A Textbook of Quantitative Analysis, Arthur J. Vogel.

2. Dr.JyotsnaCherukuri (2012) *Laboratory Manual of engineering chemistry-II,*
VGSTechno Series

3. Chemistry Practical Manual, Lorven Publications

4. K. Mukkanti (2009) *Practical Engineering Chemistry,* B.S. Publication

20A1205391: Programming and Problem Solving WITH C Lab
(Civil Engineesring

Lecture – Tutorial-Practical::	0-0-4	Internal Marks:	30
Credits:	2	External Marks:	70

Prerequisites:

Course Objectives:
1. To make the student learn a programming language.
2. To learn problem solving techniques.
3. To teach the student to write programs in C and to solve the problems

Course Outcomes:

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

CO1	Understand basic Structure of the C-PROGRAMMING, declaration and usage of variables
CO2	Exercise conditional and iterative statements to inscribe C programs
CO3	Exercise user defined functions to solve real time problems
CO4	Inscribe C programs using Pointers to access arrays, strings and functions
CO5	Inscribe C programs using pointers and allocate memory using dynamic memory management functions
CO6	Exercise user defined data types including structures and unions to solve problems
CO7	Exercise files concept to show input and output of files in C

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	1		3									
CO2			2									
CO3			3									
CO4			2									
CO5			3									
CO6		2	3									
CO7		1	3									

Exercise 1:
1. Write a C program to print a block F using hash (#), where the F has a height of six characters and width of five and four characters.
 2. Write a C program to compute the perimeter and area of a rectangle with a height of 7 inches and width of 5 inches.
3. Write a C program to display multiple variables.

Exercise 2:
1. Write a C program to calculate the distance between the two points.
 2. Write a C program that accepts 4 integers p, q, r, s from the user where r and s are positive and p is even. If q is greater than r and s is greater than p and if the sum of r and s is greater than the sum of p and q print "Correct values", otherwise print "Wrong values".

Exercise 3:
1. Write a C program to convert a string to a long integer.
 2. Write a program in C which is a Menu-Driven Program to compute the area of the various geometrical shape.
 3. Write a C program to calculate the factorial of a given number

Exercise 4:
1. Write a program in C to display the n terms of even natural number and their sum.
2. Write a program in C to display the n terms of harmonic series and their sum. 1 + 1/2 + 1/3 + 1/4 + 1/5 ... 1/n terms.
 3. Write a C program to check whether a given number is an Armstrong number or not.

Exercise 5:
1. Write a program in C to print all unique elements in an array.
2. Write a program in C to separate odd and even integers in separate arrays.
 3. Write a program in C to sort elements of array in ascending order.

Exercise 6:
 1. Write a program in C for multiplication of two square Matrices.
2. Write a program in C to find transpose of a given matrix.

Exercise 7:
1. Write a program in C to search an element in a row wise and column wise sorted matrix.
2. Write a program in C to print individual characters of string in reverse order.

Exercise 8:
1. Write a program in C to compare two strings without using string library functions.
2. Write a program in C to copy one string to another string.

Exercise 9:
1. Write a C Program to Store Information Using Structures with Dynamically Memory Allocation
2. Write a program in C to demonstrate how to handle the pointers in the program.
 Exercise 10:
 1. Write a program in C to demonstrate the use of & (address of) and *(value at address) operator.
 2. Write a program in C to add two numbers using pointers.

 Exercise 11:
1. Write a program in C to add numbers using call by reference.
2. Write a program in C to find the largest element using Dynamic Memory Allocation.

Exercise 12:
1. Write a program in C to swap elements using call by reference.

2. Write a program in C to count the number of vowels and consonants in a string using a pointer.

Exercise 13:
1. Write a program in C to show how a function returning pointer.
2. Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc( ) function.

Exercise 14:
1. Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc( ) function. Understand the difference between the above two programs
2. Write a program in C to convert decimal number to binary number using the function.

Exercise 15:
1. Write a program in C to check whether a number is a prime number or not using the function.
2. Write a program in C to get the largest element of an array using the function.

Exercise 16:
1. Write a program in C to append multiple lines at the end of a text file.
2. Write a program in C to copy a file in another name.
3. Write a program in C to remove a file from the disk.

TEXT BOOKS:

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

REFERENCE BOOKS:
[1]Kernighan and Ritchie , ―"The C programming language" , The (Ansi C Version), PHI, second edition.
[2]Yashwant Kanetkar , ―"Let us C" , BPB Publications, 2nd Edition 2001.
[3]Paul J. Dietel and Dr. Harvey M. Deitel, ―"C: How to Program", Prentice Hall, 7 th edition (March 4,2012).
[4]Herbert Schildt, ―"C:The Complete reference", McGraw Hill, 4th Edition, 2002.
[5]K.R.Venugopal, Sundeep R Prasad, ―"Mastering C", McGraw Hill, 2nd Edition, 2015

E-RESOURCES:
1.http://cslibrary.stanford.edu/101/EssentialC.pdf
2. http://nptel.ac.in/courses/106104128/
3.http://www.vssut.ac.in/lecture_notes

20A1201491-BUILDING PLANNING AND COMPUTER AIDED ENGINEERING DRAWING

Lecture – Lab:	1-3 Hours	Internal Marks:	30
Credits:	2	External Marks:	70

Prerequisites:

Course Objectives:

To help the student to attain competency in preparation of engineering drawings as per principles of planning using a suitable CAD software through various teaching learning experiences.

Course Outcomes:

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

CO1	Perform basic commands of any suitable CAD software to draw 2D
CO2	Interpret the conventions, signs and symbols from a given drawing.
CO3	Prepare line plans of residential and public buildings using principles of planning.
CO4	Prepare submission and working drawing from the given requirement for Load Bearing and Framed structures

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

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

List of Experiments

WEEK 1, 2 and 3

Introduction to CAD software: Basic commands of CAD to draw, modify 2D drawings

Building Byelaws: Introduction – Terminology – Objectives of building byelaws – Principles under laying building bye laws – Types of Buildings.

Regulations: Introduction – Development Control Rules of buildings – General Building

Requirements as per NBC – Open space, Lighting and ventilation requirements – Floor area ratio & Floor space index.

Conventions, signs and symbols: Conventions as per IS 962-1989, signs and symbols for earthwork, brickwork, stonework, concrete, woodwork and glass used in civil engineering. Construction, Graphical symbols for door and window, Abbreviations, symbols for sanitary and electrical installations.

Types of lines and scales: Types of lines- visible lines, centre line, hidden line, section line, dimension line, extension line, pointers, arrow head or dots. Appropriate size of lettering and numerals for Titles, sub titles, notes and dimensions.

Types of scale- Monumental, Intimate, criteria for Proper Selection of scale for various types of drawing. Sizes of various standard papers/sheets.

Exercise 0

Prepare a given line drawing in minimum three layers using CAD software.

Exercise 1

Reading and interpreting readymade Architectural building drawing (To be procured from Architect, Planning Consultants, Planning Engineer)

WEEK 4, 5 and 6

Principles of building planning: Introduction to buildings, Classification of

Buildings, Building Components, Orientation of building, Principles of architecture composition

Principles of planning of Residential and Public building, Orientation of building and Principles of architecture composition: Aspect, Prospect Orientation, Grouping, Privacy, Elegance, Flexibility. Roominess, Circulation, Furniture requirements, Sanitation, Ventilation, Illumination and Economy.

Space requirements and bye-laws: Space requirement and norms for minimum dimension of different units in the residential and public buildings as per IS 962-1989. Rules and bye-laws of sanctioning authorities for construction work. Plot area, built up area, super built-up area, plinth area, carpet area, floor area and FAR (Floor Area Ratio) / FSI.

Exercise 2

Line plans for residential building of minimum three rooms including w/c, bath and staircase as per principles of planning.

Exercise 3

Line plans for public building-school building, primary health centre, restaurant, bank, post office, hostel, Function Hail and Library.

WEEK 7, 8, 9 and 10

Drawing of Load Bearing Structure: Developed plan, elevation, section, site plan, schedule of openings construction notes with specifications, area statement. Planning and design of staircase Rise and Tread for residential and public building (2 BHK Load bearing structure). Component parts of the given load bearing structure

Exercise 4

Draw developed plan, elevation, section, site plan from the given line plan for a load bearing residential building (2BHK) with stair case.

Exercise 5

Prepare submission drawing (including foundation plan) of the given load bearing residential building with stair case.

WEEK 11, 12, 13 and 14

Drawing of Framed Structure: Developed plan, elevation, section, site plan, schedule of openings construction notes with specifications, area statement. Planning and design of staircase Rise and Tread for residential and public building (G+1, 2 BHK framed structure). Component parts of the given framed structure

Exercise 6

Draw developed plan, elevation, section, site plan from the given line plan for framed structure residential building including stair case (2BHK, G+1).

Exercise 7

Prepare submission drawing (including foundation plan) of the given framed structure residential building with stair case

Note: It is mandatory that student performs all 8 Exercises (from 0 to 7).