Academic Regulations Programme Structure & Detailed Syllabus

Bachelor of Technology
(B. Tech)
(Four Year Regular Programme)
(Applicable for Batches admitted from 2017-18)

Department of Civil Engineering

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
Bachupally, Kukatpally, Hyderabad, Telangana, India
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Academic Regulations
GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY, HYDERABAD
DEPARTMENT OF CIVIL ENGINEERING (B. Tech)
GR17 REGULATIONS

Gokaraju Rangaraju Institute of Engineering andTechnology 2017 Regulations (GR17 Regulations) are given hereunder. These regulations govern the programmes offered by the Department of Civil Engineering with effect from the students admitted to the programmes in 2017-18 academic year.

1. **Programme Offered:** The programme offered by the Department is B.Tech in Civil Engineering, a four-year regular programme.

2. **Medium of Instruction:** The medium of instruction (including examinations and reports) is English.

3. **Admissions:** Admission to the B.Tech in Civil Engineering Programme shall be made subject to the eligibility, qualifications and specialization prescribed by the State Government/University from time to time. Admissions shall be made either on the basis of the merit rank obtained by the student in the common entrance examination conducted by the Government/Universityor on the basis of any other order of merit approved by the Government/University, subject to reservations as prescribed by the Government/University from time to time.

4. **Programme Pattern:**
   a) Each Academic year of study is divided into two semesters.
   b) Minimum number of instruction days in each semester is 90.
   c) **Student is introduced to "Choice Based Credit System (CBCS)"**
   d) **Grade points, based on percentage of marks awarded for each course will form the basis for calculation of SGPA (Semester Grade Point Average) and CGPA (Cumulative Grade Point Average).**
   e) The total credits for the Programme is 192. Typically each semester has 24 credits.
   f) **A student has a choice of registering for credits from the courses offered in the programme ensuring the total credits in a semester are between 20 and 28.**
   g) **All the registered credits will be considered for the calculation of final CGPA.**
   h) Each semester has - 'Continuous Internal Evaluation (CIE)' and 'Semester End Examination (SEE)'. Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) as indicated by UGC and course structure as suggested by AICTE are followed.

i) **Subject Course Classification** All subjects/ courses offered for the under graduate programme in E&T (B.Tech. degree programmes) are broadly classified as follows.

S. No.	Broad Course Classification	Course Group/ Category	Course Description
1	Foundation Courses (FnC)	BS – Basic Sciences	Includes mathematics, physics and chemistry subjects
2		ES - Engineering Sciences	Includes fundamental Engineering subjects
3		HS – Humanities and Social sciences	Includes subjects related to humanities, social sciences and management
4	Core Courses (CoC)	PC – Professional Core	Includes core subjects related to the parent discipline/ department/ branch of Engineering.
5	Elective Courses (EℓC)	PE – Professional Electives	Includes elective subjects related to the parent discipline/ department/ branch of Engineering.
6		OE – Open Electives	Elective subjects which include interdisciplinary subjects or subjects in an area outside the parent discipline/ department/ branch of Engineering.
7	Core Courses	Project Work	B.Tech. project or UG project or UG major project
8		Industrial training/ Mini- project	Industrial training/ Internship/ UG Mini-project/ Mini-project
9		Seminar	Seminar/ Colloquium based on core contents related to parent discipline/ department/ branch of Engineering.
10	Minor courses	-	1 or 2 Credit courses (subset of HS)
11	Mandatory Courses (MC)	-	Mandatory courses Credits/Marks are not counted for grading/pass percentage

5. **Award of B.TechDegree:** A student will be declared eligible for the award ofB. Tech Degree if he/she fulfills the following academic requirements:
   a) He/She pursues the course of study and completes it successfully in not less than four academic years and not more than eight academic years.
   b) A student has to register for all the 192 credits and secure all credits.

c) A student, who fails to fulfill all the academic requirements for the award of the degree within eight academic years from the date of admission, shall forfeit his/her seat in B.Tech course.

d) The Degree of B.Tech in Civil Engineering shall be conferred by Jawaharlal Nehru Technological University Hyderabad (JNTUH), Hyderabad, on the students who are admitted to the programme and fulfill all the requirements for the award of the degree.

6. Attendance Requirements

a) A student shall be eligible to appear for the semester-end examinations if he/she puts in a minimum of 75% of attendance in aggregate in all the courses concerned in the semester.

b) Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in a semester may be granted. A committee headed by Dean (Academic Affairs) shall be the deciding authority for granting the condonation.

c) Students who have been granted condonation shall pay a fee as decided by the Academic Council.

d) Shortage of Attendance more than 10%(attendance less than 65% in aggregate) shall in no case be condoned.

e) Students whose shortage of attendance is not condoned in any semester are detained and are not eligible to take their end examinations of that semester. They may seek re-registration for that semester when offered next with the academic regulations of the batch into which he/she gets re-registered.

7. Paper Setting, Evaluation of Answer Scripts, Marks and Assessment

a) Paper setting and evaluation of the answer scripts shall be done as per the procedures laid down by the Academic Council from time to time.

b) **Distribution and Weightage of marks**

S.No	Components	Internal	External	Total
1	Theory	30	70	100
2	Practical	25	50	75
3	Engineering Graphics	30	70	100
4	Industry OrientedMini Project	25	50	75
5	Comprehensive Viva	-	100	100
6	Seminar	50	-	50
7	Major Project	50	150	200

c) **Continuous Internal Evaluation and Semester End Examinations:** The assessment of the student's performance in each course will be based on Continuous Internal Evaluation (CIE) and Semester-End Examination (SEE). The marks for each of the component of assessment are fixed as shown in the following Table.

Assessment Procedure:

S.No	Component of Assessment	Marks Allotted	Type of Assessment	Scheme of Examinations
1	Theory	30	Internal Exams & Continuous Evaluation	1) Two mid semester examinations shall be conducted for 20 marks each for a duration of 2 hours. Average of the two mid exams shall be considered **i) Subjective - 15 marks** **ii) Objective - 5 marks** **2) Tutorials - 5 marks** **3) Continuous Assessment – 5 marks**
		70	Semester-end examination	The semester-end examination is for a duration of 3 hours
2	Practical	25	Internal Exams & Continuous Evaluation	**i) Internal Exam-10 marks** **ii) Record - 5 marks** **iii) Continuous Assessment - 10 marks**
		50	Semester-end examination	The semester-end examination is for a duration of 3 hours

d) **Industry Oriented Mini Project:** The Mini Project is to be taken up with relevance to Industry and is evaluated for 75 marks. Out of 75 marks, 25 marks are for internal evaluation and 50 marks are for external evaluation. The supervisor continuously assesses the students for 15 marks (Continuous Assessment – 10 marks, Report – 5 marks). At the end of the semester, Mini Project shall be displayed in theroad show at the department level for the benefit of all students and staff and the same is to be evaluated by Mini Project Review Committeefor 10 marks. The mini project report shall be presented before Project ReviewCommittee in the presence of External Examiner and the same is evaluated for 50 marks.Mini Project Review Committee consists of HOD, Mini Project Coordinator and Supervisor.

e) **Comprehensive Viva:** The comprehensive viva shall be conductedby a Committee consisting of HOD and two senior faculty members of the department. The student shall be assessed for his/her understanding of various courses studied during the programme of

study. The Viva-voce shall be evaluated for 100 marks.

f) Seminar: For the seminar,the student shall collect information on a specialized topic andprepare atechnical report and present the same to a Committee consisting of HODand twoseniorfaculty and the seminarcoordinator of the department. The student shall be assessed for his/her understanding of the topic, its application and its relation with various coursesstudied during the programme of studyfor**50 marks.**

g) Major Project: Theproject work is evaluated for 200 marks.Out of 200,50 marksshall be for internal evaluation and 150 marksfor the external evaluation. The supervisor assesses the student for 25 marks (Continuous Assessment – 15 marks, Report – 10 marks). At the end of the semester, projects shall be displayed in the road show at the department level for the benefit of all students and staff and the same is to be evaluated by the Project Review Committee for 25 marks. The external evaluation for Project Work is a Viva-Voce Examination which is conducted by the Project Review Committee in the presence of external examiner and is evaluated for 150 marks, Project Review Committee consists of HOD, Project Coordinator and Supervisor.

h) Engineering Graphics:

- Two internal examinations, each is of 10 marks .The average of the two internal tests shall be considered for the award of marks.
- Submission of day to day work - 15 marks.
- Continuous Assessment - 5 marks.

8. **Recounting of Marks in the End Examination Answer Books:** A student can request for re-counting of his/her answer book on payment of a prescribed fee.

9. **Re-evaluation of the End Examination Answer Books:** A student can request for re-evaluation of his/her answer book on payment of a prescribed fee.

10. **Supplementary Examinations:** A student who has failed to secure the required credits can appear for a supplementary examination, as per the schedule announced by the College.

11. **Malpractices in Examinations:** Disciplinary action shall be taken in case of malpractices during Mid/ End-examinations as per the rules framed by the Academic Council.

12. Academic Requirements and Promotion Rules:

a) A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or laboratories if he / she secures not less than 35% of marks in the Semester-end Examination and a minimum of 40% of the sum total of the Internal Evaluation and Semester-end examination taken together.

b) A student shall be promoted to the next semester only when he/she satisfies the requirements of all the previous semesters.

. No.	Promotion	Conditions to be fulfilled
	First year first semester to first year second semester	**Regular course of study of first year first semester.**
	First year second semester to second year first semester	**Regular course of study of first year second semester. (ii) Must have secured at least 24 credits out of 48 credits i.e., 50% credits up to first year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.**
	Second year first semester to second year second semester	**Regular course of study of second year first semester.**
	Second year second semester to third year first semester	**Regular course of study of second year second semester. (ii) Must have secured at least 58 credits out of 96 credits i.e., 60% credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.**
	Third year first semester to third year second semester	**Regular course of study of third year first semester.**
	Third year second semester to fourth year first semester	**(i) Regular course of study of third year second semester.** **(ii) Must have secured at least 86 credits out of 144 credits i.e., 60% credits up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.**
	Fourth year first semester to fourth year second semester	**Regular course of study of fourth year first semester.**

13. **Grade Points:** A 10- point grading system with corresponding letter grades and percentage of marks, as given below, is followed

Letter Grade	Grade Point	Percentage of marks
O (Outstanding)	10	Marks>=90
A+ (Excellent)	9	Marks>=80 and Marks < 90
A (Very Good)	8	Marks>=70 and Marks < 80
B+ (Good)	7	Marks>=60and Marks < 70
B (Average)	6	Marks>=50 and Marks < 60
C (Pass)	5	Marks>=40and Marks < 50
F (Fail)	0	Marks < 40
Ab (Absent)	0	

Earning of Credit:

A student shall be considered to have completed a course successfully and earned the credits if he/she secures an acceptable letter grade in the range O-P. Letter grade 'F' in any Course implies failure of the student in that course and no credits earned.

Computation of SGPA and CGPA:

The UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

i) S_k the SGPA of kth semester(1 to 8)is the ratio of sum of the product of the number of credits and grade points to the total creditsof all courses registered by a student, i.e.,

$$SGPA(S_k) = \sum_{i=1}^{n} (C_i * G_i) / \sum_{i=1}^{n} C_i$$

Where C_i is the number of credits of the ith course and G_i is the grade point scored by the student in the ith course and n is the number of courses registered in that semester.

ii) The CGPA is calculated in the same manner taking into account all the courses m, registered by student over all the semesters of a programme, i.e., upto and inclusive of S_k, where $k \geq 2$.

$$CGPA = \sum_{i=1}^{m} (* G_i) / \sum_{i=1}^{m} C_i$$

iii) The SGPA and CGPA shall be rounded off to 2 decimal points.

14. **Award of Class:** After a student satisfies all the requirements prescribed for the completion of the Degree and becomes eligible for the award of B. Tech Degree by JNTUH, he/she shall be placed in one of the following four classesbased on CGPA secured from the 192 credits.

	Class Awarded	CGPA Secured
14.1	First Class With Distinction	CGPA $\geq$ 8.00 with no F or below grade/ detention anytime during the programme
14.2	First Class	CGPA $\geq$ 8.00 with rest of the clauses of 13.1 not satisfied
14.3	First Class	CGPA $\geq$ 6.50and CGPA < 8.00
14.4	Second Class	CGPA $\geq$ 5.50 and CGPA < 6.50
14s.5	Pass Class	CGPA $\geq$ 5.00 and CGPA < 5.50

15. **Withholding of Results:** If the student has not paid dues to the Institute/ University, or if any case of indiscipline is pending against the student, the result of the student (for that Semester) may be withheld and the student will not be allowed to go into the next semester. The award or issue of the Degree may also be withheld in such cases.

16. **Transfer of students from the Constituent Colleges of JNTUH or from other Colleges/ Universities:** Transfer of students from the Constituent Colleges of JNTUH or from other Colleges/ Universities shall be considered only on case-to-case basis by the Academic Council of the Institute.

17. **Transitory Regulations:** Students who have discontinued or have been detained for want of attendance, or who have failed after having undergone the Degree Programme, may be considered eligible for readmission/re-registration to the same or equivalent subjects as and when they are offered.

18. **General Rules**

   a) The academic regulations should be read as a whole for the purpose of any interpretation.
   b) In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Academic Council is final.
   c) In case of any error in the above rules and regulations, the decision of the Academic Council is final.
   d) The college may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the college.

Academic Regulations for B.Tech (Lateral Entry) under GR17 (Applicable for Batches Admitted from 2018-19)

1. **All regulations as applicable for B.Tech Four year degree programme (Regular) will hold good for B.Tech (Lateral Entry Scheme) except for the following rules**
   a) Pursued programme of study for not less than three academic years and not more than six academic years.
   b) A student should register for all 144 credits and secure all credits. The marks obtained in all 144 credits shall be considered for the calculation of the final CGPA.
   c) Students who fail to fulfill all the academic requirements for the award of the degree within six academic years from the year of their admission shall forfeit their seat in B.Tech programme.

2. **Academic Requirements and Promotion Rules:**

   a) A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or laboratories if he / she secure not less than 35% of marks in the Semester-end Examination and a minimum of 40% of the sum total of the Internal Evaluation and Semester-end examination taken together.
   b) A student shall be promoted to the next semester only when he/she satisfies the requirements of all the previous semesters.

S. No.	Promotion	Conditions to be fulfilled
	Second year first semester to second year second semester.	**Regular course of study of second year first semester.**
	Second year second semester to third year first semester.	**(i) Regular course of study of second year second semester.** **(ii) Must have secured at least 29 credits out of 48 credits i.e., 60% credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.**
	Third year first semester to third year second semester.	**Regular course of study of third year first semester.**
	Third year second semester to fourth year first semester.	**(i) Regular course of study of third year second semester.** **(ii) Must have secured at least 58 credits out of 96 credits i.e., 60% credits up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.**
	Fourth year first semester to fourth year second semester.	**Regular course of study of fourth year first semester.**

3. Award of Class: After a student satisfies all the requirements prescribed for the completion of the Degree and becomes eligible for the award of B. Tech Degree by JNTUH, he/she shall be placed in one of the following four classes based on CGPA secured from the 144 credits.

	Class Awarded	**CGPA Secured**
3.1	**First Class With Distinction**	**CGPA $\geq$ 8.00 with no F or below grade/ detention anytime during the programme**
3.2	**First Class**	**CGPA $\geq$ 8.00 with rest of the clauses of 3.1 not satisfied**
3.3	**First Class**	**CGPA $\geq$ 6.50 and CGPA < 8.00**
3.4	**Second Class**	**CGPA $\geq$ 5.50 and CGPA < 6.50**
3.5	**Pass Class**	**CGPA $\geq$ 5.00 and CGPA < 5.50**

I B.Tech   I semester

Group	Subject code	Name of subject	Credits			Total credits	Total Hours	Internal Marks	External Marks	Total Marks
			L	T	P					
BS	GR17A1001	Linear Algebra and Single Variable Calculus	2	1		3	4	30	70	100
BS	GR17A1002	Advanced Calculus	2	1		3	4	30	70	100
BS	GR17A1008	Engineering Chemistry	2	1		3	4	30	70	100
ES	GR17A1023	Engineering Graphics	1		2	3	5	30	70	100
HS	GR17A1018	Basic Electrical Engineering	2	1		3	4	30	70	100
ES	GR17A1012	Engineering Mechanics (Statics)	2	1		3	4	30	70	100
ES	GR17A1024	Business Communication and Soft Skills			2	2	4	25	50	75
ES	GR17A1026	IT Workshop			2	2	4	25	50	75
BS	GR17A1030	Engineering Chemistry lab			2	2	4	25	50	75
		TOTAL	**11**	**5**	**8**	**24**	**37**	**255**	**570**	**825**

IB.Tech   II semester

Group	Subject code	Name of subject	Credits			Total credits	Total Hours	Internal Marks	External Marks	Total Marks
			L	T	P					
BS	GR17A1003	Transform Calculus and Fourier Series	2	1		3	4	30	70	100
BS	GR17A1004	Numerical Methods	2	1		3	4	30	70	100
BS	GR17A1007	Physics for Engineers	2	1		3	4	30	70	100
ES	GR17A1005	English	2	1		3	4	30	70	100
ES	GR17A1011	Computer Programming & Data structures	2	1		3	4	30	70	100
ES	GR17A1020	Engineering Mechanics (Dynamics)	2	1		3	4	30	70	100
HS	GR17A1025	Engineering Workshop			2	2	4	25	50	75
ES	GR17A1029	Engineering Physics lab			2	2	4	25	50	75
BS	GR17A1028	Computer Programming & Data Structures lab			2	2	4	25	50	75
		TOTAL	**11**	**5**	**8**	**24**	**36**	**255**	**570**	**825**

CIVIL   II. B.Tech   **I-SEMESTER**

Group	Subject code	Name of subject	Credits			Total credits	Hours			Total Hours	Total Marks
			L	T	P		L	T	P		
PC	GR17A2003	Building Materials and Construction Planning	2	1		3	2	2		4	100
PC	GR17A2004	Electrical Technology	2	1		3	2	2		4	100
PC	GR17A2005	Strength of Materials-I	3	1		4	3	2		5	100
PC	GR17A2006	Surveying	3	1		4	3	2		5	100
PC	GR17A2007	Fluid Mechanics	3	1		4	3	2		5	100
PC	GR17A2008	Fluid Mechanics Lab			2	2			4	4	75
PC	GR17A2009	Surveying Lab – I			2	2			4	4	75
PC	GR17A2010	Computer Aided Drafting of Building Lab			2	2			4	4	75
		Total credits/Hours/Marks	**13**	**5**	**6**	**24**	**13**	**10**	**12**	**35**	**725**
MC	GR17A2002	Value Education and Ethics			2	2			2	2	100
MC	GR17A2106	Gender sensitization Lab			2	2			2	2	75

CIVIL   II. B.Tech   **II-SEMESTER**

Group	Subject code	Name of subject	Credits			Total credits	Hours			Total Hours	Total Marks
			L	T	P		L	T	P		
PC	GR17A2011	Probability and Statistics	2	1		3	2	2		4	100
PC	GR17A2012	Strength of Materials-II	3	1		4	3	2		5	100
PC	GR17A2013	Hydraulics and Hydraulic Machinery	2	1		3	2	2		4	100
PC	GR17A2014	Engineering Geology	3	1		4	3	2		5	100
PC	GR17A2015	Structural Analysis	3	1		4	3	2		5	100
PC	GR17A2016	Strength of Materials Lab			2	2			4	4	75
PC	GR17A2017	Hydraulics and Hydraulic Machinery Lab			2	2			4	4	75
PC	GR17A2018	Surveying Lab – II			2	2			4	4	75
		Total credits/Hours/Marks	**13**	**5**	**6**	**24**	**13**	**10**	**12**	**35**	**725**
MC	GR17A2001	Environmental Science			2	2			2	2	100

I YEAR I SEMESTER

LINEAR ALGEBRA AND SINGLE VARIABLE CALCULUS

Course Code: GR17A1001   **L:2 T:1 P:0 C:3**

Prerequisites: Vector algebra, Matrix algebra and Pre-calculus

Unit-I

Linear Algebra and Matrix eigen value problem: Rank of a matrix, Normal form, Consistency of a system of linear equations-Rank-Nullitytheorem, Pseudo inverse of a matrix-Condition number of a matrix-Norm of matrix,Approximate solution of an over determined system of linear equations using the pseudoinverse-Moore penrose method, -Solution of a system of homogeneous linear equations.
Vector norms, Linear dependence and independence of vectors, Gram-Schmidt Orthogonalization of vectors, Matrix norms, Cayley Hamilton theorem determination of Eigen values and Eigen vectors of a square matrix-Properties of Eigen values and Eigen vectors of real and complex matrices
Unit-II

Matrix factorization and Quadratic Forms: Diagonalization of a matrix- Orthogonal diagonalization of symmetric matrices-Computation of matrix powers- -Singular value decomposition - QR factorization Quadratic forms-Definiteness of a quadratic form-Rank, index and signature of a quadratic form- Reduction of a quadratic form into a canonical form by an orthogonal transformation
Unit-III

Differential Calculus of functions of a single variable: Mean value theorems (Rolles', Lagrange's, Cauchy's, Taylor's and Maclaurin's theorems Geometrical Interpretation without proof) $-L-$ Hospital rule , Hessian matrix . Approximation of functions by Taylor's and Maclaurin's theorems-Series expansion of functions, Power series representation total derivative; Tangent plane and normal line
Unit-IV

Linear differential equations of the first order and their applications: Formation of ODE-Methods to solve first order LDE (exact, reducible to exact, linear and Bernoulli equations)Applications-Growth and decay models-Newton's law of cooling- Applications to electrical circuits (LR and RC circuits)-Geometrical applications-Orthogonal trajectories solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

Unit-V

Linear differential equations of the higher order and applications: Equations with constant coefficients-Particular integrals for functions of the type - - Exponential shift - Method of variation of parameters. CauchyEuler equation; Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties
Applications-Deflection of beams, Simple harmonic motion (simple pendulum, spring-mass systems) and RLC circuits

Text Books

1. Advanced Engineering Mathematics: R.K.Jain and S.R.K.Iyengar- Narosa Publishing House
2. Advanced Engineering Mathematics: Erwin Kreyszig, Wiley.

3. Higher Engineering Mathematics: B.S.Grewal-Khanna Publications.

References Books

1. Introduction to Linear Algebra-Gilbert Strang

2. Schaum's outline series on Linear Algebra

3. GRIET reference manual

ADVANCED CALCULUS

Course Code: GR17A1002   **L:2 T:1 P:0 C:3**

Prerequisites: Analytical 2-D and 3-D geometry, differential and integral calculus

Unit-I

Differential Calculus of functions of several variables and Function Optimization: Partial differentiation – Visualization of partial derivatives - Hessian matrix-Total differentiation-Jacobian and its utility

Optimization of functions of several variables without constraints- Constrained optimization of functions of several variables with one or more equality constraints-The Lagrange's multiplier method

Unit-II

Curve tracing principles and Applications of integration: Basic principles of tracing Cartesian, polar and parametric curves -Applications of the definite integral to evaluate arc lengths, surface areas of revolution and volumes of revolution

Unit-III

Multiple integrals and applications: Evaluation of Double integrals in Cartesian and polar coordinates-Changing the order of integration- Change of variables - Evaluation of triple integrals in Cartesian, cylindrical and spherical polar coordinates

Application of multiple integrals to evaluate plane areas and volumes of solids
Unit-IV

Vector Calculus: Vector differentiation in Cartesian coordinates-Gradient, Divergence and Curl and their physical interpretation-Directional derivatives-Angle between surfaces, Vector Identities, Irrotational fields and scalar potentials
Vector integration-Evaluation of line integrals-Work done by conservative fields-Surface integrals
Unit-V

Vector Field theorems: Green's theorem in the plane-Divergence theorem of Gauss- Stoke's theorem (Without Proofs)

Text Books

1. Advanced Engineering Mathematics: R.K.Jain and S.R.K.IyengarNarosa Publishing House
2. Schaum's outline series on Vector Analysis

3. Higher Engineering Mathematics: B.S.Grewal-Khanna Publications

Reference Books

1. Advanced Engineering Mathematics: Erwin Kreyszig-Wiley

2. Calculus and Analytical Geometry-Thomas & Finney-Narosa

3. GRIET Reference manual.

ENGINEERING CHEMISTRY

Course Code: GR17A1008   **L:2 T:1 P:0 C:3**

Prerequisites: Fundamentals in Engineering Chemistry Theory Course

Unit-I

Water Technology: Sources of natural water, impurities, hardness: causes, types, expression, units, estimation of hardness of water using complexometric titration method, problems on hardness, Boiler feed water, boiler troubles (scale, sludge, carry over, Caustic Embrittlement, Boiler Corrosion). Internal treatment methods (carbonate, phosphate, Calgon), Softening of water – Lime Soda, Ion- Exchange and zeolite processes. Potable water- its characteristics and steps involved in Municipal Water Treatment, Chlorination-Break Point Chlorination, sterilization by ozonation. Desalination of Brackish water - Reverse Osmosis, Electrodialysis. Waste water-types of effluents, domestic and industrial effluents, sewage treatment-primary, secondary and tertiary .

Unit-II

Electrochemistry & Corrosion: Concept of Conductance -specific, equivalent, molar conductance and their inter relationships applications of conductance-conductometric titrations-(Strong acid Vs Strong Base and Weak Acid Vs Strong Base). EMF of a cell, Single Electrode Potential, Standard Electrode potential, potentiometric titrations(dichrometry), Electro chemical series and its applications, Electrochemical Cells-types, Galvanic cell: cell representation, Cell reactions, Cell EMF, Electrolytic cells, Concentration cell. Batteries-types, dry cell, Lithium Cells (liquid and solid cathode), Secondary cells: Pb-PbO2 cell, Fuel cells: H2-O2 fuel cells and their applications.
Corrosion: Causes and effects of corrosion-types of corrosion- chemical (Dry) corrosion-types and their mechanism, Electrochemical (Wet) corrosion and its mechanism, factors affecting the rate of corrosion – nature of metal and nature of environment. Corrosion Control Methods-Cathodic Protection: Sacrificial Anodic, Impressed Current Cathodic protection. Metallic Coatings –Anodic and Cathodic coatings, Methods of application of metallic coatings- Hot Dipping method (Galvanization and tinning), Electroplating (Cu coating), Electroless plating (Ni plating), Organic Coatings: Paints – its constituents and their functions.

Unit-III

Engineering Materials I: Cement-types-port land cement –composition, Setting & Hardening of Portland cement.
Ceramics-types-ceramic products - whitewares, Stone wares, preparation, properties and applications of ceramics.
Refractories-classification, properties (refractoriness, RUL, porosity, thermal spalling) and their application.
Lubricants: Classification with examples, mechanisms of lubrication (thick film, thin film, extreme pressure), solid lubricants, properties of lubricants- viscosity, flash point, fire point, cloud point, pour point (Definition and significance).

Unit-IV

Engineering Materials II: Electronic materials: Semiconductors, intrinsic & extrinsic semiconductors, Preparation of Pure Ge and Si by Zone Refining, Czochralski Crystal Pulling, Doping Techniques-Epitaxy, Diffusion & ion implantation.

Polymer Materials: Monomer, polymer, types of polymerization-addition and condensation, Plastics-Thermoplastic resins, Thermo set resins. Compounding & fabrication of plastics (compression & Injection moulding), Preparation, Properties, Engineering applications of High Density Poly Ethylene (HDPE), differences between HDPE & LDPE, Poly Vinyl Chloride (PVC), Bakelite & Nylon 6,6. Organic Light Emitting Diodes (an Overview). Biodegradable polymers-their advantages and their applications. Elastomers – preparation, properties and applications of Butyl rubber, Styrene-Butadiene Rubber. Conducting polymers, classification with examples-mechanism of conduction in trans poly acetylene and their applications.

Unit-V

Energy sources: Fossil Fuels: Fossil Fuels: Coal –types, analysis of coal- proximate and ultimate analysis and their significance, Calorific value of fuel – HCV, LCV, Determination of Calorific Value using BOMB calorimeter, analysis of flue gas using Orsat apparatus, Theoretical calculation of Calorific Value by Dulong's formula, Numerical Problems. Petroleum-its composition-synthetic petrol – Bergius and Fischer Tropsch's processes, cracking -definition, its types and significance, knocking and its mechanism in Internal Combustion engines, Octane Rating of Gasoline, Composition, and applications of natural gas, LPG, CNG. Bio-fuels: preparation of Bio-diesel by trans esterification method, advantages of Bio-fuel.

Text Books

1.A text book of Engineering Chemistry by PC Jain and Monica Jain, DhanpatRai publishing company.

Reference Books

1. A text book of Engineering Chemistry by SS Dara and SS Umre, S Chand publications.
2. A text book of EngineeringCchemistry by Dr Y Bharathikumari and DrChJyothsna, VGS publications.
3. A text book of Engineering Chemistry by R.P.Mani, K.N.Mishra, B.Rama Devi, V.R.Reddy, cengage learning publicati

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
ENGINEERING GRAPHICS

Course Code: GR17A1023   **L:1 T:0 P:2 C:3**

Prerequisites: Knowledge in dimensions and units, Usage of geometrical instruments and analytical ability.

Unit-I

INTRODUCTION TO ENGINEERING DRAWING: Principles of Engineering Graphics and their Significance Drawing Instruments and their Use Conventions in Drawing Lettering BIS Conventions. Curves used in Engineering Practice & their Constructions: a) Conic Sections, b) Cycloid, Epicycloid and Hypocycloid, c) Involutes.

SCALES: Different types of scales. Plain Scale, Diagonal Scale &Vernier Scale

UNIT-II
ORTHOGRAPHIC PROJECTIONS:

Preinciples of Orthographic Projections Conventions Firstand Third Angle Projections. Projections of Points and Lines inclined to both planes, True lengths, traces.

Unit -III

PROJECTIONS OF PLANES: Planes parallel, perpendicular and inclined to one of the reference planes. Plane inclined to both the reference planes.

PROJECTIONS OF SOLIDS: Projections of Regular Solids inclined to both planes.

Unit-IV

SECTIONS OF SOLIDS: Types of section planes, Section by a plane perpendicular to V.P., Section by a plane perpendicular to H.P.

DEVELOPMENT OF SURFACES: Development of Surfaces of Right Regular Solids
Prisms, Cylinder, Pyramid, Cone and their parts.

Unit-V

ISOMETRIC PROJECTIONS: Principles of Isometric Projection Isometric Scale Isometric Views Conventions Isometric Views of Lines, Plane Figures, Simple and Compound Solids Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts.

TRANSFORMATION OF PROJECTIONS: Conversion of Isometric Views to Orthographic Views Conventions.

Text Books

1.Engineering Drawing, N.D. Bhat / Charotar

Reference Books

1. Engineering Drawing and Graphics, Venugopal / New age.

2. Engineering Drawing- Johle/Tata Macgraw Hill.

3. Engineering Drawing, Narayana and Kannaiah / Scietech publishers. Engineering Drawing, Narayana and Kannaiah / Scietech publishers.
4. Engineering Drawing Basanth Agrawal/ C M Agrawal; 2e McGraw Hill Education

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
BASIC ELECTRICAL ENGINEERING

 Course Code: GR17A1018   **L:1 T:0 P:2 C:3**

Unit-I

Basic Laws: Ohm's law , Kirchhoff's voltage and current laws , Nodes-Branches and Loops ,Series elements and Voltage Division , Parallel elements and Current Division , Star-Delta transformation, Independent sources and Dependent sources , Source transformation.

Unit-II

AC Fundamentals-I: Review of Complex Algebra , Sinusoids , Phasors , Phasor Relations ofCircuit elements , Impedance and Admittance , Impedance Combinations , Series and Parallel combination of Inductors and Capacitors, Mesh analysis and Nodal Analysis.

Unit-III

AC Fundamentals-II: RMS and Average values, Form factor, Steady State Analysis of Series,Parallel and Series Parallel combinations of R, L,C with Sinusoidal excitation, Instantaneous power, Average power, Real power, Reactive power and Apparent power, concept of Power factor, Frequency.

Unit-IV
Resonance and Network Theorems: Resonance in Electric circuits: Analysis of Series andParallel Resonance, Theorems: Superposition theorem, Thevinin's theorem, Norton's Theorem, Maximum Power Transfer Theorem, Reciprocity theorem.

Unit-V

Fundamentals Of Electrical Machines: Construction, Principle, Operation and Applications of–(i) DC Motor,(ii) Single phase Transformer (iii) Single phase Induction motor

Text Books
1.Fundamentals of Electric Circuits by Charles K.Alexander, Matthew N.O.Sadiku, Tata McGraw Hill Company.
Reference Books
1. Circuit Theory (Analysis and Synthesis) by A.Chakrabarti – DhanpatRai& Co
2. Basic Electrical Engineering by Nagasarkar, Oxford Publishers
3. Network Theory by Prof.B.N.Yoganarasimham.
4. Engineering Circuit Analysis by William H.Hayt.Jr, Jack E.Kemmerly and Steven
5. M.Durbin by Tata McGraw Hill Company.

6. Electrical Engineering Fundamentals by Vincent Deltoro 6.Circuit Theory by Sudhakar and ShyamMohan

GOKARAJU RANGARAJ
INSTITUTE OF ENGINEERING AND TECHNOLOGY
ENGINEERING MECHANICS-STATICS

Course Code: GR17A1012   **L:2 T:1 P:0 C:3**

Prerequisites: A good working knowledge of calculus, vector algebra, General Physics isrequired.

Unit-I

Forces, Moments, Equilibrium: Introduction to Engineering Mechanics, Basic Concepts. System of forces: Coplanar forces, concurrent forces, Resultant, Moment of forces and its application, Varignon's principle, Couples and resultant of force system.
Equilibrium of systems of forces: Free body diagrams, equations of

equilibrium of coplanar systems, Lami's theorem, Graphical method for the equilibrium of coplanar forces, Converse of the law of triangle of forces, converse of the law of polygon of forces, conditions of equilibrium.

Unit-II

Friction: Introduction, Types of friction, Laws of Solid friction, definitions- coefficient of friction,Angle of friction, Angle of repose. Equilibrium of a body on horizontal rough plane-under horizontal & inclined force. Equilibrium of a body on a rough inclined plane- with force acting parallel to the plane and inclined to the plane.

Unit-III

Properties of surfaces and Solids: Determination of Areas and volumes, First moment of are and the centroid of sections- Rectangle, circle & triangle from method of integration, Composite sections: T-section, I-section, Angle Sections, Hollow Section by using standard formula.

Unit-IV

Moment of inertia: Second and product moments of plane area. Parallel Axis theorem, Perpendicular axis theorem, Moment of inertia of sections- rectangle, triangle, circle from method of integration, Composite Sections: T-Section, I section, Angle section, Hollow Section by using standard formula. Polar moment of inertia, moment of inertia about inclined axis, principal moments of inertia of plane areas, Principal axes of inertia.

Mass Moment of Inertia: Derivation of mass moment of inertia for rectangular section, circular section, prism, cylinder and sphere from first principles. Relation to area moments of inertia.

Unit-V

Analysis of Trusses: Introduction, Classification of trusses, Assumptions made in the analysis of perfect truss, Methods of analysis of Trusses- Method of Joints and Method of Sections.

Principle of Virtual Work: Equilibrium of ideal systems, efficiency of simple machines, stable and unstable equilibriums.

Text Books

1. Engineering Mechanics by A. Nelson, Tata-McGrawhill
2. Engineering Mechanics-Timoshenko & Young, Tata-McGrawhill

3. Engineering Mechanics- A.K Tayal, Uma Publications.

Reference Books

1. Engineering Mechanics by Shames L.H, prentice Hall.
2. Engineering Mechanics by Pakirappa, Durga publications.

3. Engineering Mechanics- R.S Khurmi, S Chand Publications

4. Engineering Mechanics- R.C. Hibbler, twelfth edition, Prentice hall.

5. Engineering Mechanics- Basudeb Bhattacharyya, Oxford University press

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
BUSINESS COMMUNICATION AND SOFT SKILLS

Course Code: GR17A1024   **L:0 T:0 P:2 C:2**

Prerequisites: Familiarity with basic language and communication skills.

Unit-I
Just A Minute (JAM); Ice Breaking Activity: Self-Introduction ; Introducing others; elocution

Unit-II
Phonetics
Introduction to speech sounds; identification of sound symbols; vowel and consonants; Word stress and Rhythm; Word Accent; Difference in British and American Pronunciation; Indian English

Unit-III
Role play
Introduction to role play;; Telephonic Etiquette; situation handling; making requests; seeking permissions; greetings; showing gratitude; situation handling; non-verbal communication

Unit-IV
Debate and Brain-Storming
Introduction and features of Debate; Types of Debate; Understanding critical thinking; building sustainable arguments; assessing credibility of the argument; overcoming obstacles; Introduction to Brain-Storming; brain-storming technique

Unit-V
Describing a Person, Situation, Process and Object

Unit-VI
Letter Writing
Manual and Emailing; types and formats; letter writing expressions; content and body of the letter. Email etiquettes

Unit-VII
Report Writing
Formats and types of reports; structure of reports

Unit-VIII
Mind Mapping and Six Thinking Hats
Assimilation of thoughts; expansion of ideas on central idea; suggesting parameters to carry forward the thinking process without deviation

Reference Books

1.   Business Communication; HorySankarMukerjee; Oxford University Press

2.   Business Communication; Meenakshi Raman, Prakash Singh; Oxford University Press

3.   English and Soft skills; SP DHanavel; Orient Blackswan

4.   Soft Skills for Everyone; Jeff Butterfield; Cengage Learning

5.   Communication Skills; Viva Career Skills Library

6.   Personality Development and Soft Skills; Barun K Mitra; Oxford University Press

7.   Six Thinking Hats, Penguin Books, Edward De Bono

8.   English for Engineer's; AedaAbidi, Ritu Chaudhry; Cengage Learning

9.   Communication Skills ; Sanjay Kumar , Pushpalatha; Oxford University Press

10.   Business English : The Writing Skills you need for today's work place: Geffner, Andrea: Fifth edition, Barron's Educational Series, Newyork.

Course Code: GR17A1026   **L:0 T:0 P:2 C:2**

Prerequisites:

•   Fundamentals of Computer and its parts.
•   Identification of peripherals of computer.

PC Hardware introduces the students to a personal computer and its basic peripherals, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered. The students should work on working PC to install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.
Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced. Productivity tools module would enable the students in crafting professional word documents, spread sheets and slide presentations.

Task-1

Installation of OS Every student should install Ubuntu and RedHat Linux on the computer. Lab instructors should verify the installation and follow it up with viva.

Task-2

Hands on experience on OpenOffice: Every student should install open office on the computer. Students would be exposed to create word documents with images, tables, formula and with additional word processing features, Power point presentation, Excel and access. Lab instructors should verify the installation and follow it up with viva.

Task-3

Internet Based Applications: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google.

Task-4

Networking-Network Infrastructure: Understand the concepts of Internet, intranet, and extranet, local area networks (LANs), Wide area networks (WANs), Wireless networking, network topologies and access methods

Task-5

Network Hardware: Understand switches, routers, media types. static routing, dynamic routing(routing protocols), default routes; routing table and how it selects best route(s); routing table memory, network address translation (NAT).Introduction to Cisco Packet Tracer, design LAN using routers and switches.

Task-6

Network Protocols: Understand the Open Systems Interconnection (OSI) model, IPv4, IPv6,tunnelling, dual IP stack, subnet mask, gateway, ports, packets, reserved address ranges for local use (including local loopback IP) Understanding Cisco Router and Switches.

Task-7

Network Services: Understand names resolution, networking services, TCP/IP-Tools (such asping), tracert, pathping, Telnet, IPconfig, netstat, reserved address ranges for local use (including local loopback IP), protocols.

Task-8

Database -Core Database Concepts: Understand how data is stored in tables, UnderstandingDML and DDL statements.

Task-9

Creating and Insertion of Data: Understanding Data types, tables and how to insert data in to the tables.

Task-10

HTML Basic HTML Tags: Understand what are the tags used for creation of website.

Task-11

Designing a Static web page: Understand how to create static web page using forms and tables.

References Books

1.Introduction to Information Technology, ITL Education Solutions Limited, Pearson Education.

2. Introduction to Computers, Peter Norton, 6/e McGraw Hill
3. Upgrading and Repairing, PC's 18th e, Scott Muller QUE, Pearson Education
4. Comdex Information Technology Course tool kit Vikas Gupta, WILEY Dreamtech

5. IT Essentials PC Hardware and Software Companion Guide, Third Edition by David Anfinson and Ken Quamme- CISCO Press, Pearson Education

6. PC Hardware and A+Handbook – Kate J. Chase PHI(Microsoft)
7. ORACLE DATA BASE LOG PL/SQL Programming SCOTT URMAN, Tata Mc- Graw Hill

8. Introduction to Database Systems, C.J.Date Pearson Education.
9. Networking Fundamentals, Wiley, by Microsoft Official Academic Course, 1st Edition .

Suggested Tutorials on Lab:

Tutorial/Lab 1: Installation of Ubuntu and RedHat Linux on the computer. Lab instructors shouldverify the installation and follow it up with viva

Tutorial/Lab 2: Students would be exposed to create word documents with images, tables, formulaand with additional word processing features, Power point presentation, Excel and access. Lab instructors should verify the installation and follow it up with viva.

Lab 3: Understand the concepts of networking topics.
Tutorial/Lab 4: DDL and DML statements
Tutorial/Lab5: Designing of static web page and verify it.

ENGINEERING CHEMISTRY LAB

Course Code: GR17A1030   **L:0 T:0 P:2 C:2**

Prerequisites: Fundamentals in Engineering Chemistry Laboratory

List of Experiments

   Task1: Estimation of Total Hardness in sample water by complexometry

   Task2: Estimation of percentage available chlorine in Bleaching Powder.

   Task3: Estimation of Fe2+by permanganometry.

   Task4: Determination of strength of an acid by potentiometric titration method

   Task5: Determination of strength of an acid by using conductometry.

   Task6: Determination of Strength of an acid in Pb-Acid battery by titrimetric method

   Task7: Determination of percentage of Iron in Cement sample by colorimetry..

   Task8: Estimation of Calcium in port land cement.

   Task9: Determination of Viscosity of the given unknown liquid by Oswald's viscometer.

   Task10: Determination of surface tention of the given unknown liquid by stalagmometer.

   Task11: Preparation of Thiokol rubber.

   Task12: Determination of percentage Moisture content in a coal sample.

   Task 13. Estimation of ferrous iron by potentiometric titration using dichromate.

   Task 14. Preparation of aspirin drug.

Reference Books

1. Laboratory Manual on Engineering Chemistry, by DrSudha Rani, DhanpatRai Publishing house.
2. A Text book on Experiments and Calculations in Engineering Chemistry, by SS Dara,

3. S Chand publications.

4. Laboratory Manual of Organic Chemistry, by Raj K Bansal, Wiley Eastern Limited, New age international limited.

5. Engineering Chemistry practical manual prepared by faculty of engineering chemistry, GRIET(A) - (for college circulation only.)

II SEMESTER

TRANSFORM CALCULUS AND FOURIER SERIES

Course Code: GR17A1003   **L:2 T:1 P:0 C:3**

Prerequisites: Differential and integral calculus, multiple integrals and linear differential equations

Unit-I

Improper Integrals and Beta, Gamma Functions: Beta and Gamma functions – Their properties– Evaluation of improper integrals in terms of Beta and Gamma functions.
Improper integrals of the first Kind- Improper integrals of the second kind Convergence of Improper Integrals

Unit-II

Laplace Transform: Introduction Basic theory of Lalace Transforms-Definition and existence of the Laplace Transform-Elementary functions- Properties of the Laplace transform- Convolution integral - Convolution theorem-Heaviside's unit step-function-Dirac delta function.

The inverse Laplace transform-Properties-Method of partial fractions- Heaviside's inversion formula-Inversion by convolution theorem.
Application of the Laplace transform to solve initial value problems and boundary value problems in ODE.
Solution of a system of linear differential equations-Solution of problems in electrical circuits by Laplace transforms method.
Laplace Transform Method for the solution of some Partial Differential Equations

Unit-III

Z-Transform and Fourier series: Introduction- Basic Theory of Z transform - Definition-Z transform of elementary sequences-Properties- The inverse Z Transform, Z transform to solve difference equations -Application of Z transform to find the sum of series
Definition of orthogonal functions-The concept of Weight function-Fourier series of 2L periodic functions- Fourier expansion of 2π periodic functions-Half range Fourier series expansions.

Fourier Series Expansions of Even and Odd functions

Unit-IV

Fourier Transform: Exponential Fourier series-Introduction – Definition-Fourier integrals – Fourier sine and cosine integral. The continuous one dimensional Fouriertransform-Properties-Convolution-Parseval's identity- Fourier Sine and Cosine transforms.

Unit-V

Partial differential equations: Introduction- formulation of First and Second order Partial Differential Equations -Solution of Lagrange's linear equations-Method of separation of variables to solve IBVP like 1-D heat, 1-D wave and BVP like 2-D Laplace's equations.

Application of Fourier transform to the solution of partial differential equations

Text Books

1. Advanced Engineering Mathematics: R. K. Jain and S. R. K. IyengarNarosa Publishing House.

2. Advanced Engineering Mathematics: Erwin Kreyszig-Wiley
3. Schaum's outline series on Laplace transforms

Reference Books

1. Higher Engineering Mathematics: B. S. Grewal-Khanna Publications
2. Higher Engineering Mathematics: C. Das Chawla-Asian Publishers
3. GRIET reference manual

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
NUMERICAL METHODS

Course Code: GR17A1004   **L:2 T:1 P:0 C:3**

Prerequisites: Elementary calculus, Partial differentiation, Geometry and ordinary differential equations.

Unit-I

Root finding techniques and Numerical solution of linear algebraic systems: Bisection method-RegulaFalsi- Fixed point iteration method-Newton Raphson method, Ramanujan's Method, Secant Method, Muller's Method, Lin-Bairstow's methos.

LU decomposition method- -Jacobi and Gauss Seidel iteration methods-Matrix Eigenvalue Problem Householder's Method, Eigen values of a Symmetric Tridiagonal Matrix.

Unit-II

Interpolation and Cubic Splines: Finite differences - Forward, backward and central differences, Relationship between operators- Interpolation with uniform data-Newton's forward and backward difference interpolation formulas- Gauss forward, Gauss backward and Stirling's central interpolation , Bessel's, Everett's formulae- Lagrange, Hermite's and Newton's divided difference interpolation formulas for non-uniform data- Cubic spline interpolation, Inverse Interpolation, Double Interpolation.

Unit-III

Curve fitting and B-spline approximation: Fitting a straight line, and second degree parabola, exponential and power curves to data, method of Least Squares for Continuous functions-Orthogonal Polynomials, Chebyshev Polynomials.
Approximation of functions by Cubic B-Splines, Applications of B-splines
Unit-IV

Numerical differentiation and numerical integration: Numerical differentiation using the Newton's forward, backward and central difference formulas- Maximum and Minimum Values of a Tabulated Functions
Numerical integration by Trapezoidal rule, Simpson's 1/3rd and 3/8th rules, Boole's and Weddle's Rules, Romberg Integration, Newton- Cotes Integration Formulae.
Unit-V

Numerical solution of initial and boundary value problems in ODE: Initial Value Problems: Picard's method of successive approximation, Solution by Taylor series method, Euler method, Runge-Kutta methods of second and fourth orders. Predictor-corrector methods, Combinations of first and second order P-C methods. Boundary Value Problems in ODE: Finite difference methods for solving second order linear ODE.

Text Books

1. Advanced Engineering Mathematics: R.K.Jain and S.R.K.Iyengar- Narosa Publishing House.

2. Advanced Engineering Mathematics: Erwin Kreyszig- Wiley.
3. Introductory methods of Numerical Analysis (5th edition)-S.S.Sastry- PHI.

Reference Books

1. Applied Numerical Methods using MATLAB- Yang, Cao, Chung & Morris – Wiley Interscience

2. Numerical methods in Engineering with MATLAB-JaanKiusalaas -Cambridge University Press.

3. GRIET Reference book.

Course Code: GR17A1006   **L:2 T:1 P:0 C:3**

Prerequisites: Fundamentals in Physics and Mathematics.

UNIT-I

1. **Crystal Structures:** Lattice points, Space lattice, Basis, Bravias lattice, unit cell and lattice parameters, Seven Crystal Systems with 14 Bravias lattices , Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, Miller Indices, Inter planer spacing of Cubic crystal system.
2. **Defects in Crystals:** Classification of defects, Point Defects: Vacancies, Substitution, Interstitial, Concentration of Vacancies, Frenkel and Schottky Defects, Edge and Screw Dislocations (Qualitative treatment), Burger's Vector, Overview of Surface and Volume defects.

UNIT –II
1. **Acoustics & Acoustic Quieting**: Basic Requirement of Acoustically Good Hall, Reverberation and Time of Reverberation, Sabine's Formula for Reverberation Time(Qualitative Treatment), Measurement of Absorption Coefficient of a Material, Factors Affecting the Architectural Acoustics and their Remedies. Acoustic Quieting: Aspects of Acoustic Quieting, Methods of Quieting, Mufflers, Sound-proofing.
2. **Ultrasonics:** Introduction, Production of ultrasonic waves: Piezo electric & Magnetostriction methods, Properties of ultrasonic waves, Applications of ultrasonics: Introduction to NDT, Ultrasonic testing systems: pulse echo, trough transmission, Resonance systems and Ultrasonic testing methods: Contact and Immersion methods.

UNIT – III
1. **Dielectric Properties:** Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector, Types of polarization: Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities (Electronic & Ionic) -Internal Fields in Solids, Clausius -Mossotti Equation, Piezo-electricity, Pyro-electricity and Ferro- electricity.
2. **Magnetic Properties:** Magnetic Permeability, Magnetic Field Intensity, Magnetic Field Induction, Intensity of Magnetization, Magnetic Susceptibility, Magnetic Flux, Origin of Magnetic Moment, Bohr Magnetron, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Hysteresis Curve on the basis of Domain Theory of Ferro Magnetism, Soft and Hard Magnetic Materials, Anti-Ferro, Ferrites and their Applications.

UNIT – IV
1. **Lasers:** Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Meta-stable State, Population Inversion, Pumping mechanisms, Optical Feedback, Resonator, Characteristics of Laser, Einstein's Coefficients and Relation between them, Ruby Laser, Helium-Neon Laser, Semiconductor Diode Laser, Applications of Lasers..
2. **Fiber Optics:** Structure and Principle of Optical Fiber, Acceptance Angle, Numerical Aperture, Types of Optical Fibers (SMSI, MMSI, MMGI), Skew rays and Meridional rays, Attenuation in Optical Fibers: Scattering losses, absorption losses and bending losses, Application of Optical Fibers, Optical fiber Communication Link with block diagram.

UNIT –V

1. **Nanotechnology:** Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Bottom-up Fabrication: Sol-gel Process, Electrodeposition, Top-down Fabrication: Ball milling, Chemical Vapor Deposition, Physical, Chemical and Optical properties of Nano materials, Characterization (SEM, EDAX), Applications.

Text Books

1. Engineering Physics: P.K.Palanisamy, Scitech Publishers.
2. Engineering Physics: S.O.Pillai, New age International.
3. Applied Physics: T.BhimaSankaram,GPrasad,BS Publications.

Reference Books

1. Solid State Physics, Charles Kittel, Wiley & Sons (Asia) Pte Ltd.
2. Fundamentals of physics, Halliday,Resnick,Walker.
3. Optical Electronics, A.J Ghatak and K.Thyagarajan, Cambridge University Press.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND
TECHNOLOGY
ENGLISH

Course Code: GR17A1005   **L:2 T:1 P:0 C:3**

Prerequisites: Familiarity with basic language and communication skills.

 Unit I

Sir C.V. Raman- Enjoying Every Day English & **Mother Teresa**- Inspiring Speeches and Lives

Unit II
i) Grammar : Types of Articles and their usages; Tense and Aspect; Subject verb Agreement;
Prepositions; Redunduncies and clichés; Correction of Sentences;

ii) Vocabulary Development : Synonyms and Antonyms; One-word substitutes; prefixes and suffixes;
words often confused; idioms and phrases; Standard Abbreviations in English

iii) Speaking & Writing skills : Information transfer; Public Speaking; Paragraph
Writing; Punctuation; Essay Writing;

Unit-III
Connoisseur - Enjoying Every day English & **Sam Pitroda**- Inspiring Speeches and Lives

Unit IV
Bubbling Well Road- Enjoying Every day English & **Amarthya Kumar Sen**- Inspiring Speeches and
Lives

Unit V
Cuddalore Experience- Enjoying Every day English &**Martin Luther King Jr.** (I have a dream) -
Inspiring Speeches and Lives

Text Books

1. Enjoying Every day English by A. Rama Krishna Rao- Sangam Books
2. Inspiring Speeches and Lives by Dr.B.YadavaRaju, Dr.C.Muralikrishna, Maruthi Publications.

Reference Books

1. Murphy's English Grammar with CD, Murphy, Cambridge University Press.
2. Effective Technical Communication, M. Ashraf Rizvi, Tata McGraw Hill.
3. Technical Communication, Meenakshi Raman, Sangeeta Sharma, Oxford higher Education.
4. English for Engineers Made Easy, AedaAbidi, Ritu Chaudhry, CengageLearning.
5. Communicate or Collapse, PushpLatha, Sanjay Kumar, PHI Learning Pvt.Ltd.
6. Communication Skills, Sanjay Kumar, PushpLatha, Oxford Higher Education.
7. A Hand Book for Engineers, Dr. P. Eliah, BS Publication

COMPUTER PROGRAMMING AND DATA STRUCTURES

Course Code: GR17A1011   **L:2 T:1 P:0 C:3**

Prerequisites: Knowledge of mathematics required

Unit-I

Introduction to Computers: Computer Hardware and Software, System Software, ProgramDevelopment Steps, Algorithms, Flowcharts.

Introduction to C: Structure of C-Program, Keywords, Identifiers, Data Types, Constants,Variables, Operators, Expressions, Precedence and Order of Evaluation, Type Conversions and Type Casting .

Managing I/O: Input-Output Statements,Formatted I/O.

Unit-II

Decision Making Statements: if, if-else, if-else-if, nested if, switch
Iterative Statements: while, do- while, for
Unconditional Statements: break, continue, go to.
Arrays: Introduction, One-dimensional Arrays, Declaring and Initializing Arrays, MultidimensionalArrays.
Strings: Introduction to Strings, String Handling Functions, Array of Strings.

Unit-III

Functions: Introduction, Function Definition, Function Declaration, Function Calls, Return Valuesand Their Types, Categories of Functions, Nested Functions, Recursion, Storage Classes, Passing Arrays to Functions.

Pointers: Pointers and Addresses, Pointer Expressions and Pointer Arithmetic, Pointers andFunctions, Pointers and Arrays, Pointers and Strings, Array of Pointers, Pointer to Pointers.

UNIT-IV

Structures: Basics of Structures, Nested Structures, Arrays of Structures, Arrays withinStructures, Structures and Functions, Self Referential Structures, Unions.

Files: Introduction, Types of Files, File Access Functions, I/O on Files, Random Access to Files,Error Handling, Command Line Arguments.

Unit-V

Sorting: Bubble sort, Merge sort, Insertion sort, Selection Sort, Quick Sort. Searching: Linear Search, Binary Search.
Introduction to Data Structures: Stack Operations using Arrays: Push and Pop,
Queue Operations using Arrays: Insert, Delete

Teaching Methodologies: White board and marker, power point presentation

Text Books

1. The C Programming Language, BRIANW. KERNIGHAN Dennis M.Ritchie, Second Edition, PHI.

2. Programming in C, PradipDey, Manas Ghosh, Second Edition, Oxford University Press.

3. Computer Programming and Data structures by EBalaguruswamy, published by McGraw Hill.

Reference Books

1. Data structures using C, A.K. Sharma,Pearson publication
2. Let Us C, YashwanthKanetkar, 10th Edition, BPB Publications.
3. C& Data structures, P.Padmanabham, B.S. Publications.
4. Computer science, A structured programming approach using C, B.A. Forouzan and R.F. Gilberg, Third edition, Thomson.

5. Programming with problem solving, J.A.Jones&K.Harrow, Dreamtech Press.
6. Programming in C, Stephen G.Kochan, III Edition, Pearson Education.
7. Data Structures and Program Designing, C,R.Kruse, C.L.Tondo, B P Leung, Shashi M, Second Edition, Pearson Education.

8. Programming in C, Ashok N Kamthane, 2nd edition, Pearson Publication.
9. Introduction to Data Structures in C, Ashok N Kamthane , Pearson Publication.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
ENGINEERING MECHANICS-DYNAMICS

Course Code: GR17A1020   **L:3 T:1 P:0 C:4**

Prerequisites: A good working knowledge of calculus, vector algebra, General Physics &Engineering Mechanics-statics is required.

Unit-I

KINEMATICS OF PARTICLES- RECTILINEAR MOTION: Introduction- Rectilinear motion of aparticle, displacement, velocity and acceleration. Rectilinear motion along X-axis, Determination of motion of particle using methods of differentiation and integration.

UNIFORMLY ACCELERATED MOTION: Velocity-time, displacement-time & velocity-displacement relationship. Motion curves-graphical representation of motion of particles. Motion along vertical Y-axis. Motion of the particle projected horizontally in air.

KINEMATICS OF PARTICLES-CURVILINEAR MOTION: Introduction, curvilinear motion of aparticle, rectangular components of velocity, acceleration components of particle-tangential & normal acceleration components, radial & transverse components of acceleration. Projectile motion, Projectile on Inclined Plane.

Unit-II

KINETICS OF PARTICLES: Introduction-Definitions of Matter, body, particle, mass, weight,inertia, momentum. Newton's law of motion. Relation Between force & mass. Motion of a particle in rectangular coordinates. Motion of Lift. Motion of body on an inclined plane. Motion of connected Bodies.D'Alembert's Principle and applications.

WORK ENERGY METHOD: Law of conservation of Energy, Application of Work Energy Method toparticle motion and connected system.

Unit-III

IMPULSE AND MOMENTUM: Introduction- Impact, Momentum, Impulse & Impulsive forces,Units. Law of conservation of Momentum, Newton's law of collision of elastic bodies-coefficient of Restitution. Recoil of Gun. Impulse Momentum Equation, Non-Impulsive Forces, Impact of jet on a stationary perpendicular flat plate, Impact of jet on a Moving Perpendicular Flat plate.

Unit-IV

KINEMATICS OF RIGID BODIES: Types of Rigid body motions- Motion of translation, Motion of Rotation, & General Plane Motion. Rotational motion about a fixed axis- Angular

displacement, Angular Velocity, Angular acceleration. Equations of circular motion-Rotational motion with constant Angular Acceleration & angular Velocity. Relation between linear & angular acceleration.

KINETICS OF RIGID BODIES: Definitions-Force & Translation, Moment of couple & rotation,Torque & rotation. Newton's Law of Rotation. Relation between torque & Moment of inertia. Motion of bodies tied to a string and passing over a pulley.

UNIT-V

MECHANICAL VIBRATIONS: Introduction-simple harmonic motion, Definitions. Equations ofSimple Harmonic Motion, Motion of a body attached to a spring, Springs in series and in parallel, Horizontal Motion of a block attached to a spring. Simple pendulum, Seconds pendulum, Gain & loss of oscillations due to change in gravity (g) & length (l) of a simple pendulum, Compound pendulum and Torsional pendulum.

Text Books

1. Engineering Mechanics by A. Nelson, Tata-McGrawhill
2. Engineering Mechanics-Timoshenko & Young, Tata-McGrawhill

Reference Books

1. Engineering Mechanics by Pakirappa, Durga publications.
2. Engineering Mechanics- R.S Khurmi, S Chand Publications
3. Engineering Mechanics- R.C. Hibbler, twelfth edition, Prentice hall.
4. Engineering Mechanics- A.K Tayal, Uma Publications

ENGINEERING WORKSHOP

Course Code: GR17A1025   **L:2 T:1 P:0 C:3**

Prerequisites: Knowledge in dimensions and units, Usage of geometrical instruments and analytical ability

Unit-I

Carpentry Shop – 1:

Introduction to various types of wood such as Teak, Mango, Sheesham, etc. (Demonstration and their identification).

Demonstration, function and use of commonly used hand tools. Care, maintenance of tools and safety measures to be observed. Job I Marking, sawing, planning and chiselling& their practice

Introduction to various types of wooden joints, their relative advantages and uses. Job II Preparation of half lap joint Job III Preparation of Mortise and Tenon Joint

Safety precautions in carpentry shop.

Unit-II

Fitting Shop – 2:
Introduction to fitting shop tools, common materials used in fitting shop.
Description and demonstration of simple operation of hack-sawing, demonstration and description of various types of blades and their specifications, uses and method of fitting the blade.

Job I: Marking of job, use of marking tools and measuring instruments.
Job II: Filing a dimensioned rectangular or square piece of an accuracy of + 0.5 mm
Job III: Filing practice (production of flat surfaces). Checking by straight edge.
Job IV: Making a cutout from a square piece of MS Flat using hand hacksaw such as T-fit and V-fit 2.3.Care and maintenance of measuring tools like callipers, steel rule, try square.

Unit-III

House wiring – 3:
Study, demonstration and identification of common electrical materials such as wires, cables, switches, fuses, PVC Conduits. Study of electrical safety measures and demonstration about use of protective devices such as fuses, and relays including earthing.
JobI: Identification   of phase,   neutral and   earth of   domestic appliances and their connection to two pin/three pin plugs.
JobII: Preparation of a house wiring circuit on wooden board using fuse, switches,

socket, holder, ceiling rose etc. in PVC conduit and PVC casing and capping wiring system.
Job III: Two lamps in series and parallel connection with one way switch
JobIV: Two lamps in series and one lamp in parallel connection with one way switch.
Job V: Stair case lamp connection with two way switch.

Unit-IV

Tin- smithy – 4:

Introduction to tin -smithy shop, use of hand tools and accessories e.g. different types of hammers, hardand soft mallet, sheet and wire gauge, necessary allowance required during job fabrication, selection ofmaterial and specifications.

Introduction and demonstration of hand tools used in tin -smithy shop.
Introduction and demonstration of various raw materials used in sheet metal shop e.g. M.S. sheet,galvanized-iron plain sheet, galvanised corrugated sheet, aluminium sheets etc.

corrugated sheet, aluminium sheets etc.
corrugated sheet, aluminium sheets etc.
4.4. Preparation of a rectangle tray and open scoop/ funnel.

Reference Books

1. Workshop Technology I,II,III, by S K Hajra, Choudhary and A K Chaoudhary. Media Promoters and Publishers Pvt. Ltd., Bombay
2. Workshop Technology by Manchanda Vol. I,II,III India Publishing House, Jalandhar.

3. Manual on Workshop Practice by K Venkata Reddy, KL Narayanaet. al; MacMillan India Ltd.
4. Basic Workshop Practice Manual by T Jeyapoovan; Vikas Publishing House (P) Ltd.,New Delhi
5. Workshop Technology by B.S. Raghuwanshi, DhanpatRai and Co., New Delhi.

6. Workshop Technology by HS Bawa, Tata McGraw Hill Publishers, New Delhi.

Course Code: GR17A1029   **L:0 T:0 P:2 C:2**

Prerequisites: Fundamentals of Physics and Mathematics.

List of Experiments:

Task1: Determine the energy gap of a given semiconductor.

Task 2: Calculate the energy loss in a given Ferro magnetic material by plotting B-H curve.

Task 3: Calculate the Numerical Aperture of a given optical fiber.

Task 4: Determine the Dielectric constant and Curie temperature of PZT material.

Task 5: Calculate the Acceptance angle of a given optical fiber.

Task 6: Draw V-I & L-I Characteristics of LASER diode.

Task7: Determine the bending losses in a given optical fibers.
Task8: Determine the Air-gap losses in a given optical fibers.

Task9: Determine the Hall Coefficient in Ge semiconductor by using Hall Experimental setup.

Task10: Determine the carrier concentration, mobility of charge carrier in Ge semiconductor.

Task11: Measure Ac voltage and frequency through CRO.

Task12: Measure Resistance and Capacitance by using digital multimeter.

Task13: Determination of wave length of a source -Diffraction Grating.

Task14: Determination of Rigidity modulus of a given wire - Torsional Pendulum
Task15: Dispersive power of the material of a prism
Task16: Determination of wave length of a source using N
Task17: Draw V-I and L-I characteristics - LED

INSTITUTE OF ENGINEERING AND TECHNOLOGY
COMPUTER PROGRAMMING AND DATA STRUCTURES LAB

Course Code: GR17A1028   **L:0 T:0 P:2 C:2**

Prerequisite: Basic operations of computer

Task- I

a) The heights of three students are 165, 148, 154 cm. respectively. Write a c program to sort the heights of the students in descending order.

b) Write a C program to find the roots of a quadratic equation using if-else.

c) The program should request the user to input two numbers and display one of the following as per the desire of user.
> (a) sum of numbers
> (b) difference of numbers
> (c) product of the numbers
> (d) division of the numbers.

Write a C program using switch statement to accomplish the above task.

d) In a mathematical number sequence let the first and second term in the sequence are 0 and 1. Subsequent terms are formed by adding the preceding terms in the sequence. Write a C program to generate the first 10 terms of the sequence.

Task-II

a) Write a C program to construct pyramid of numbers.
b) The reliability of an electronic component is given by reliability $r = e-\lambda t$ where λ is the component failure rate per hour and t is the time of operation in hours. Determine the

reliability at various operating times from 0 to 3000 hours by plotting a graph using a C program. The failure rate λ is 0.001. Plot the graph with a special symbol.

c) Write a C program to accept the date of birth and the current date to find the age of the person . The output should specify the age of a person in terms of number of years, months and days.

Task-III

a) Write a C program to calculate the following Sum: Sum=1-x2/2!+x4/4!-x6/6!+x8/8!-x10/10!

b) For a certain electrical circuit with an induction (L) and Resistance (R) , the damped natural frequency is given by $f=\sqrt{(1/LC – R2/ 4C2)}$. Write a C program to calculate the frequency for different values of C starting from 0.01 to 0.1.

c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Task-IV

a) Write a C program to find both the largest and smallest number in a list of integers.
b) Write a C program to count the lines, words and characters in a given text.
c) Write a C program to sort the names of 5 students in the alphabetical order.
Ex: Rita, Sneha, Priti, Briya, kitti   as Briya ,Kitti, Priti, Rita, Sneha

Task-V

a) Write a C program to print all the rotations of a given string.
1. Ex: Rotations of the string "NEWS" are NEWS EWSNWSNESNEW

b) Write a C program to perform the following operations:
i) To insert a sub-string in a given main string at a given position.
ii) To delete n Characters from a given position in a given string.

Task-VI

a) Write a C program that uses functions to perform the following:
i) Transpose of a matrix
ii) Addition of Two Matrices
iii) Multiplication of two matrices

Task-VII

a) Write a C programs that use both recursive and non-recursive functions
i) To find the factorial of a given integer.
ii) To find the GCD (greatest common divisor) of two given integers.

Task-VIII

a) Using pointers, write a function that receives a character string and a character as argument and deletes all occurrences of this character in the string.

b) Write a function using pointer parameter that compares two integer arrays to see whether they are identical. The function returns 1 if they are identical, 0 otherwise.

Task-IX

a) Write a c program which accepts employee details like (outer structure : name, employid, salary and (inner structure : area, street number, houseno)).Display the employee names and id belonging to a particular area.

b) Write a C program that uses functions to perform the following operations:
i) Addition of two complex numbers
ii) Multiplication of two complex numbers
(**Note:** represent complex number using a structure.)

Task-X

a) Write a C Program to display the contents of a file.
b) Write a C Program merging of two files in a single file.
c) Write a C Program to append data into a file.
d) Write a C program to reverse the first n characters in a file. (**Note:**
The file name andn are specified on the command line.)

Task-Xl

a) Write a C Program to Search for a given element using Linear & Binary Search Techniques.

b) Write a C Program to Sort a given list of integers using Bubble Sort Technique.

Task-XII

a) Write a C Program to Sort a given list of integers using Merge Sort Technique.
b) Write a C Program to Sort a given list of integers using Insertion Sort Technique.

Task-XIII
a) Write a C Program to Sort a given list of integers using Quick Sort Technique.
b) Write a C Program to Sort a given list of integers using Selection Sort Technique.

Task-XIV

a) Write a C program to implement the following using arrays.
i) Push and pop operations of a stack
ii) Insert and delete operations of a queue

Text Books

1. The C Programming Language, BRIANW. KERNIGHAN Dennis M.Ritchie, Second Edition, PHI.

2. Programming in C, PradipDey, Manas Ghosh, Second Edition, Oxford University Press.

3. Computer Programming and Data structures by EBalaguruswamy, published by McGraw Hill.

Reference Books

1.   Data structures using C, A.K. Sharma,Pearson publication
2.   Let Us C, YashwanthKanetkar, 10th Edition, BPB Publications.

3.   C& Data structures, P.Padmanabham, B.S. Publications.

4.   Computer science, A structured programming approach using C, B.A. Forouzan and R.F. Gilberg, Third edition, Thomson.
5.   Programming with problem solving, J.A.Jones&K.Harrow, Dreamtech Press.

6.   Programming in C, Stephen G.Kochan, III Edition, Pearson Education.

7.   Data Structures and Program Designing, C,R.Kruse, C.L.Tondo, B P Leung, Shashi M, Second Edition, Pearson Education.
8.   Programming in C, Ashok N Kamthane, 2nd edition, Pearson Publication.

9.   Introduction to Data Structures in C, Ashok N Kamthane , Pearson Publication.

II YEAR   I SEMESTER
SYLLABUS

BUILDING MATERIALS AND CONSTRUCTION PLANNING

Course Code: GR17A2003   **L:2 T:1 P:0 C:3**

Prerequisites

•   Knowledge of Building Materials
•   Knowledge of Engineering Drawing

Course Objectives: The objective of this course is to provide the student
•   Introduction to techniques of construction planning
•   Understanding the significance of properties of building materials.
•   Skill to choose suitable material and construction process for given situation
•   Visualization of different types of masonry construction.
•   Knowledge of the various building and general construction products and their associated quality, durability, warrantees and availability.

Course Outcomes: At the end of course, the student will be able to

•   Apply knowledge of science and engineering for eco friendly construction.
•   Recognize the methods to control cost of construction.
•   Create awareness about green building practice
•   Develop a team environment to analyze existing building types, develop a list of programmatic requirements, sketch a schematic design, and use this information to develop drawings and models sufficient to present a competent architectural design solution.

•   Express the fundamental knowledge of the systems and processes used to construct the built environment, including an understanding of industry terminology.

•   Generalize the various quality control aspects of civil engineering materials
•   Describe the properties, uses and variety of materials important in construction.

Unit-I

Building Stones, Bricks, Tiles: Stone- Building stones, classification of building stones, quarrying procedures, structural Requirement, dressing, and tools for dressing of stones. BRICKS-Composition of brick earth, manufacturing of brick, structural requirements, field and lab test. TILES - Types of tiles, manufacturing of tiles, structural requirements of tiles.

Unit-II
Cement, Lime, Admixtues: Ingredients of cement, manufacturing of cement, field and lab tests. ADMIXTURES - Mineral admixtures, chemical admixtures. LIME-Various ingredients of lime, constituents of limestone and classification of lime, manufacturing of lime.

Unit-III

WOOD, GLASS, PAINTS: WOOD-Structure, types of wood, properties of wood, seasoning, defects, alternative material for wood. GLASS-Types of glasses, manufacturing of glass. PAINTS-Constituents of paints, types of paints. BUILDING COMPONENTS-Lintel, arches, staircase, floors, roofs, foundation, dcp. JOINARYS-Doors, windows, materials and types.

Unit-IV

Masonry and Finishing, Form Works
BRICK MASONRY- Types, bonds. STONE MASONRY- Types, composite masonry, concrete reinforced bricks, and glass reinforced brick. FINISHING SLOPE- plastering, pointing, and cladding- Types of ACP (Aluminum composite panel). FORM WORKS - requirements, standards, Scaffolding, shoring, under pinning.

Unit-V

Building Services and Building Planning
BUILDING SERVICES- Plumbing services, water distribution, sanitary lines and fittings, ventilators, functional requirements, systems of ventilators, air conditioning essentials and types, acoustics. CHARACTERISTICS- Absorption, fire protections, fire hazards, classification of fire resistance materials and construction. BUILDING PLANNING - Principles of building planning, classification of building and building by-laws.

Teaching Methodologies

1.   White board marker

2.   PPT

Text Books

1.   SK Duggal, Building Materials, New Age Publications 4th Edition, April, 2014.

2.   B C Punmia, Ashok Kumar Jain and Arun Kumar Jain, Building Construction, Laxmi Publications (P) Ltd., New Delhi, 10th Edition, 2013.

Reference Books

1.   Roy Chudley "Construction Technology" Vol. – 1 & 2,2nd Edition, Longman,UK, 1987.

2.   P C Varghese, Building Construction, Prentice Hall of India Private Ltd., New Delhi, 2nd Edition, 2007.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
ELECTRICAL TECHNOLOGY

Course Code: GR17A2004   **L:2 T:1 P:0 C:3**

Course objectives: On completing this course student will be able to

•   Learn the basic principles of electricity and terminology.
•   Understand and apply fundamental electrical theory and laws in basic series and parallel dc circuits including ohm's law, power, application of ohm's law & Kirchhoff's laws.
•   Learn the principle, working operations of various DC and AC machines.
•   Measure the fundamental electrical quantities using digital and analog multi-meters and an oscilloscope.
•   Learn the basic semiconductor switching devices and its characteristics.
•   Learn how to use a single generator to obtain a desired voltage or frequency.
•   Learn the rectification (AC to DC) by using diodes.

Course outcomes: At the end of the course, the student will be able to

•   Analyse circuit models for elementary electronic components.
•   Know the application of ohms law & Kirchhoff's laws.
•   Familiar with ac and dc circuits solving.
•   Find role of electrical machinery in simple & complex applications.
•   Demonstrate the designing and conducting experiments, to analyze and interpret data, and also provides the ability to visualize and work on laboratory and multidisciplinary tasks.
•   Measure the fundamental electrical quantities using oscilloscope.
•   Know about fundamental principles of electrical machines.

Unit-I

ELECTRICAL CIRCUITS

Basic definitions, Types of elements, Ohm's Law, Resistive networks, Kirchhoff's Laws, Inductive networks, Capacitive networks, Series, Parallel circuits and Star-delta and deltastar transformations.

Unit-II

DC MACHINES AND AC MACHINES

Principle of operation of DC Generator – emf equation - types – DC motor types – torque equation – applications – three point starter.

Principle of operation of alternators – regulation by synchronous impedance method – Principle of operation of induction motor – slip – torque characteristics – applications.

Unit-III

TRANSFORMERS AND INSTRUMENTS
Principle of operation of single phase transformers – EMF equation – losses – efficiency and regulation.Basic Principle of indicating instruments – permanent magnet moving coil and moving iron instruments.

CATHODE RAY OSCILLOSCOPE

Principles of CRT (Cathode Ray Tube), Deflection, Sensitivity, Electrostatic and Magnetic deflection, Applications of CRO - Voltage, Current and frequency measurements.

Unit-IV

DIODE AND ITS CHARACTERISTICS
P-N junction diode, symbol, V-I Characteristics, Diode Applications, Rectifiers – Half wave, Full wave and Bridge rectifiers (simple Problems)

Unit- V

TRANSISTORS
P-N-P and N-P-N Junction transistor, Transistor as an amplifier, SCR characteristics and applications

Teaching Methodologies

1.   ET PPTs
2.   Assignments uploaded in website

Text Books

1. David V. Kerns, JR. J. David Irwin, Essentials of Electrical and Computer Engineering.
2. V.K.Mehta, S.Chand & Co, Principles of Electrical and Electronics Engineering.

Reference Books

1. M.S Naidu and S. Kamakshaiah, Introduction to Electrical Engineering, TMH Publications.

2. Kothari and Nagarath, Basic Electrical Engineering, TMH Publications, 2nd Edition.

STRENGTH OF MATERIALS-I

Course Code: GR17A2005   **L:3 T:1 P:0 C:4**

Prerequisites

•   Fundamentals of Engineering Mathematics
•   Knowledge of Engineering Mechanics

Course objectives: The objective of this course is to provide the student

•   Knowledge of stresses, strains and elastic constants of different material and the concept of strain energy.

•   Skill to determine the Principal stresses and strains under different loading using Mohr's Circle method.

•   Understanding of the shear force and bending moment for different types of beams such as cantilever, simple supports and fixed beams etc.

•   Ability to evaluate the flexural and shear stress concepts for the different materials and shapes of the structure.

•   Knowledge on deflection of beam for different materials under various loading conditions by moment area, double integration & Macaulay's method.

Course outcomes: At the end of course, the student will be able to

•   Determine the stresses, strains, elastic constants such as modulus of elasticity, modulus of rigidity, Poisson's ratio and bulk density. And also to determine the strain energy for various types of loading.

•   Determine the shear force, bending moment diagrams and identify the point of contra flexure for different types of beams such as cantilever, simple supports and fixed beams etc. with different loading.

•   Formulate the bending equation and shear equation to calculate the bending stresses and shear stresses for the different sections of the structural members.

•   Evaluate the slope and deflection of different beams for the different end conditions and loading by using different methods such as double integration and moment area method etc.

•   Analyze the principal and tangential stresses in the different planes by using analytical and graphical methods.

- Utilize appropriate materials in design considering engineering properties, sustainability.

- Perform engineering work in accordance with ethical and economic constraints related to the design of structures.

Unit-I

Simple Stresses and Strains: Elasticity and plasticity-Types of stresses and strains-Hooke's law-Elastic constant and the relationship between them. Stress-strain diagram for mild steel-Lateral strain, poisson's ratio and volumetric strain-Bars of varying section-composite bars-Temperature stresses, Working stress, factor of safety.

Strain Energy: Resilience-Gradual, sudden, impact and shock loadings-simple applications.

Unit-II

Shear Force and Bending Moment: Definition of beam-Types of beams, loading and support conditions-concept of shear force and bending moment-S.F and B.M diagrams for various types of statically determinate beams like cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed load, uniformly varying loads and applied moments and combination of these loads-point of contra flexure-Relation between S.F, B.M and rate of loading at a section of a beam

Unit-III

Stresses in Beams Flexural Stresses: Theory of simple bending-Assumptions-Derivation of pure bending equation: $M/I=f/y=E/R$-Neutral axis-Determination of bending stresses-section modulus of rectangular and circular sections (solid and hollow), I-Section, T-Section, Angle and Channel sections-Design of simple beam sections & flitched beams.

Shear Stresses: Derivation of formula-Shear stress distribution across various beam sections like rectangular, circular, triangular, I-Section, T-Section and angle sections.

Unit-IV

Deflection of Beams: Bending into a circular arc-slope, deflection and radius of curvature-Differential equation for the elastic line of a beam-Double integration and Macaulay's methods-Determination of slope and deflection for cantilever and simply supported beams, subjected to point loads, U.D.L, Uniformly varying loads-Mohr's theorems-moment area method-application to simple cases including overhanging beams.

Unit-V

Principal Stresses and Strains: Introduction-stresses on an inclined section of a bar under axial loading-compound stresses-Normal and Tangential stresses on an inclined plane for biaxial stresses-two perpendicular normal stresses accompanied by a state of simple shear- Mohr's circle of stresses-principal stresses and strains-Analytical and graphical solutions-Various theories of failures like Maximum Principal stress theory-Maximum shear stress theory-Maximum strain energy theory-Maximum shear strain energy theory.

Teaching Methodologies

1.   White board and markers

Text Books

1. Dr. B. C. Punmia, Mechanics of Materials, Laxmi publications, 10th Edition, 2013.

2. B. S. Basavarajaiah, Strength of Materials, University Press, Hyderabad, 3rd Edition, 2010.
3. Dr. R. K. Bansal, Strength of material, Laxmi Pulications, New Delhi, 5th Edition, 2012.

Reference Books

1. Ferdinand Beer and others, Mechanics of Solid, Tata Mc. Graw Hill publications, 6th Edition, 2000.

2. Schaum's out line series, Strength of materials, Mc. Graw Hill International Editions, 6th Edition, 2011.
3. R. K. Rajput, Strength of materials, S. Chand & Co, New Delhi, 5th Edition, 2010.

4. A.R.Basu, Strength of materials, Dhanpat Rai & Co, Nai Sarah, New Delhi, 2nd Edition, 2010.
5. Bhavi Katti, Strength of materials, New Age Publications, 3rd Edition, 2008, Re-print 2009.

6. R. Subramanian, Strength of materials Oxford University Press, New Delhi, 2nd Edition, 2010.

7. S. Ramamrutham, Strength of material- Dhanpat Rai Publishing Company, New Delhi, 15th Edition, 2007.
8. R.S. Khurmi, Strength of material- S. Chand & Company Ltd., New Delhi, 2010 Re-print.

Course Code: GR17A2006   **L:3 T:1 P:0 C:4**

Prerequisites

•   Knowledge of Mathematics

Course Objectives: The objective of this course is to provide the student

•   Knowledge to take the measurements between two points which is useful for determining the area or volume of a land
•   Skill of determining the elevations using available survey instruments
•   Scope for the application of basic knowledge of maths, science as well as civil engineering into surveying
•   Introduction to advanced surveying tools like G.P.S and G.I.S
•   Knowledge of recording the field data directly into computer
•   Understanding the importance of professional licensure to protect the public in the practice of land surveying
•   Gaining an appreciation of the need for lifelong learning

Course Outcomes: At the end of course, the student will be able to

•   Interpret a plan and setting out the frame work in the field
•   Function as a member of a survey party in completing the assigned field work
•   Illustrate the need for licensed surveyors to establish positioning information for property and structures
•   Illustrate the need for accurate and thorough note taking in field work to serve as a legal record
•   Classify the difference between plane surveying and geodetic surveying
•   Utilize vertical angle measurement devices to solve complex distance measurements.
•   Apply advanced survey software tools like G.P.S Q-GIS and arch-GIS

Unit-I

Introduction: Definition-Objectives, principles and classification of plane surveying, Compass survey-meridian, Azimuthal and bearing, declination, computation of angles, types of Compass, Chain-uses of chain and tape, types, testing on chain, chain correction problems, Ranging, Plane table-methods of plane table surveying, instruments used in plane table surveying.

Unit-II
Leveling : Basic Definitions in leveling, temporary and permanent adjustments of a level,

calculations of reduced level by H.I & Rise and fall method, problem on radius of curvature, refraction ,Reciprocal Surveying.

Contouring: Definition, characteristics, methods of contouring and plotting.

Unit-III

Computation of Areas and Volumes: Areas of field notes, computations of areas along irregular boundaries and regular boundaries, embankments and cutting for level section and two level section, volume of borrow pit.

Theodolite survey: Components and their description, uses and adjustments (temporary and permanent), measurement of vertical and horizontal angles, principles of Electronic Digital Theodolite, trigonometric leveling.

Unit-IV

Tacheometric Surveying and Curves: Stadia and tangential methods of tacheometry, distance and elevation formulae for staff vertical position.

Curves- Types of curves, design and setting out of simple curves.

Unit-V

Advances in Surveying Total Station: Components, Principles and working of Total Station, operational procedure of Total Station, Global Positioning System and introduction to Geographical Information System, applications of G.P.S, Segments of G.P.S and components of Geographical Information System.

Text Books

1.   B.C Punmia, Ashok Kumar Jain and Arun Kumar Jain, Surveying (Vol – 1, 2&3), B Laxmi Publications(P) Ltd., New Delhi, 16th Edition 2005.

2.   Duggal S K Surveying (Vol – 1&2) Tata Mc.Graw Hill Pvt.Ltd., New Delhi, 4th Edition June 2013.

3.   R Subramanian, Surveying and leveling, Oxford University Press, New Delhi, 2ndEdition, Dec 2007.

Reference Books

1.   Arthur R Benton and Philip J Taety, Element of plane surveying Tata Mc. Graw Hill Pvt. Ltd., New Delhi 2000.
2.   Arora KR Surveying (Vol – 1, 2&3) standard book house, New Delhi 2004.
3.   Chandra AM, "Plane Surveying" New Age International Publications Pvt. Ltd., New Delhi 2002.

4.   Chandra AM, "Higher Surveying" New Age International Publications Pvt. Ltd., New Delhi 2002.

Course Code: GR17A2007   **L:3 T:1 P:0 C:4**

Prerequisites

*   Concepts about behavior of Fluid flows
*   Knowledge of Mathematics

Course Objectives: The objective of this course is to provide the student

*   Introduction to fluid properties, fluid statics and types of manometers
*   Knowledge about hydrostatic forces on submerged planes
*   To understand the fluid Dynamics and fluid kinematics
*   Visualisation of Boundary layer characteristics over solid bodies
*   Knowledge of head losses in pipe flows and skill seeing of measurement of flows.

Course Outcomes: At the end of course, the student will be able to

*   Comprehend the various fluid properties and fluid path lines.
*   Analyze the concept of hydrostatic forces on Inclined, Horizontal and curved planes
*   Identify the path line, stream line and streak line, uniform and various types of flows.
*   Compute Boundary Layer thickness and Drag and lift forces.
*   Distinguish Laminar and Turbulent flows in pipes and calculate the shear and velocity values.
*   Estimate the major and minor head losses in pipe flows
*   Predict the different discharge measurement using irrigation and water resources fields.

Unit-I

Introduction: Dimensions and units-Physical properties of fluids specific gravity, Viscosity, surface tension, vapor pressure and their influences on fluid motion pressure at a point, Pascal's law, Hydrostatic law-atmospheric, gauge and vacuum pressure measurement of pressure. Pressure gauges, Manometers: differential and Micro Manometers.

Unit-II

Hydrostatic forces on submerged plane, Horizontal, Vertical, inclined and curved surfaces-Center of pressure. Derivations and problems.

Unit-III

Fluid Kinematics: Description of fluid flow, Stream line, path line and streak lines and stream tube. Classification of flows: Steady, unsteady, uniform, non uniform, laminar, turbulent,

rotational and Irrotational flows - Equation of continuity for one, two , three dimensional flows stream and velocity potential functions, flow net analysis.

Fluid Dynamics: Surface and body forces- Euler's and Bernoulli's equations for flow along a stream line for 3-D flow, (Navier - stokes equations (Explanatary)
Momentum equation and its application -forces on pipe bend.

Unit-IV

Boundary layer Theory Approximate Solutions of Navier Stoke's Equations, Boundary layer concepts, Prandtl contribution, Characteristics of boundary layer along a thin flat plate, Vonkarman momentum integral equation, laminar and turbulent Boundary layers (no derivations), BL in transition, separation of BL, control of BL, flow around submerged objects-Drag and Lift- Magnus effect.

Laminar & Turbulent Flows: Reynolds experiment - Characteristics of Laminar & Turbulent flows. Flow between parallel plates, Flow through long tubes, flow through inclined tubes.

Unit-V

Closed Conduit Flow: Laws of Fluid friction -Darcys equation, Minor losses _ pipes in series - pipes in parallel - Total energy line and hydraulic gradient line. Pipe network problems, variation of friction factor with Reynolds number -Moodys Chart.
Measurement of Flow: Pitot tube, Venturimeter and orifice meter –classification of orifices, flow over rectangular, triangular and trapezoidal and Stepped notches -Broad crested weirs.

Text Books

1. Modi and Seth, Fluid Mechanics, Standard book house, 19th Edition, 2011.
2. S.K.Som & G.Biswas, Introduction to Fluid Machines, Tata Mc.Graw Hill publishers, Pvt. Ltd., 3rd Edition, 2012.
3. Edward J. Shaughnessy, M. Katz and James P. Schaffer, Introduction to Fluid Machines, Oxford University Press, New Delhi, 1st Edition, 2005.

References Books

1. J.F.Douglas, J.M. Gaserek and J.A.Swaffirld, Fluid Mechanics, 5th longman Edition, 2005.
2. Frank.M. White, Fluid Mechanics, Tata Mc. Graw Hill Pvt. Ltd, 4th Edition, 2013.
3. A.K. Mohanty, Fluid Mehanics, Prentice Hall of India Pvt. Ltd., New Delhi, 2nd Edition, 1994.
4. Dr. R.K. Bansal, A text of Fluid mechanics and hydraulic machines, Laxmi Publications (P) ltd., New Delhi, 9th Edition, 2012.

FLUID MECHANICS LAB

Course Code: GR17A2008   **L:0 T:0 P:2 C:2**

Prerequisites

•   Knowledge of Fluid Mechanics

Course Objectives: The objective of this course is to provide the student

•   Understanding of discharge coefficients of discharge measuring equipments.
•   Skill of determining different head losses in pipes.
•   Visualization of the types of flows in pipes.
•   Demonstration of the discharge through notches and orifices.

Course Outcomes: At the end of course the student will be able to:

•   Estimate the coefficient of discharge through venturimeter, orificemeter.
•   Distinguish between losses of head due to contraction and enlargement.
•   Predict the major losses in pipes.
•   Differentiate the laminar, turbulent and trasitional flows.
•   Calculate the discharge through orifice, mouthpiece and wiers.
•   Estimate the energy heads.
•   Apply knowledge in Irrigation and water distribution systems.

Contents

1.   Calibration of Venturimeter.

2.   Calibration of Orifice meter.

3.   Determination of hydraulic Coefficient of orifice.

4.   Determination of hydraulic coefficient of mouth piece.

5.   Calibration of Rectangular Notch .

6.   Calibration of Triangular Notch.

7.   Determination of friction factor in pipes.

8.   Determination of minor losses in pipes due to sudden enlargement.

9.   Determination minor losses in pipes due to sudden contraction.

10.   Verification of Bernoulli's equation.

11.   Reynolds Experiment.

SURVEYING LAB- I

Course Code GR17A2009   **L:0 T:0 P:2 C:2**

Prerequisites

• Fundamentals of Engineering Mathematics
• Fundamentals of Surveying and Leveling

Course Objectives: The object of this course is to provide the student

• Introduction to the applicability of basic survey instruments.
• Skill of determining relative positions in land surveying.
• Visualization of elevations, areas and volumes.
• gSkill of plotting existing geographical surface information.
• Knowledge to judge the compatibility of instruments.

Course Outcomes: At the end of the course, the student will be able to,

• Define the characteristics and applications of basic survey instruments.
• Generalise the methods of obtaining geographical information.
• Apply knowledge of mathematics, science and engineering in land measurement techniques.
• Calculate distances, inclinations, elevations, areas and volumes.
• Generate maps of earth surfaces
• Analyse data from existing maps and transfer relevant points onto ground.
• Evaluate the compatibility of instruments.

Contents
1. Introduction to different survey Instruments.

2. Measurement of an area by Chain Survey.

3. Chaining across obstacles(Three Exercises).

4. Measurement of an area by compass survey.

5. Determination of distance between two inaccessible points with compass.

6. Plane Table Survey. (Radiation, traversing and intersection methods).

7. Two point and three point problem in P.T.S.

8. Simple, fly, Differential Leveling.

9. Exercise of L.S and C.S and plotting.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
CAD LAB

Course Code: GR17A2010   **L:0 T:0 P:2 C:2**

Prerequisites

•   Basic Knowledge of Building Drawing and Planning.

Course Objectives: The Objective of this course is to provide the student:

•   Introduction of CAD Software and describe its applications in different fields.
•   Understanding of the basic analytical fundamentals that are used to create and manipulate geometric models by CAD System.
•   Knowledge of advanced capabilities of CAD and how they can be used to increase productivity.
•   Visualize the Real time Components of Building Drawings.
•   Skill of Design to create Real time Building Drawings.

Course Outcomes: At the end of the course, the student will be able to:

•   Comprehend the fundamentals of Building Drawings.
•   Analyse the Concept of Design Problems with Field Orientation.
•   Demonstrate common drafting techniques and shortcuts used by professionals.
•   Demonstrates a readiness to take action to perform the task or objective in field.
•   Compare different values, and resolve conflicts between them to form an internally consistent system of values in Drawings.
•   Adopts a long-term value system that is "pervasive, consistent, and predictable" throughout the Draftsman's Career.
•   Apply full-scale CAD software system for geometric modelling.

Course Contents:

1.   Introduction to CAD (Computer Aided Drafting).
2.   Software for CAD and Introduction to different Softwares.
3.   General Commands and Practice exercises on CAD Software.
4.   Drawing of Material Symbols, Sanitary Symbols and Electrical Symbols.
5.   Drawing of Various Bonds in Brick Work.
6.   Drawing of Plans of Buildings using software
(a)   Single storeyed Buildings (b) Multi Storeyed Buildings
7.   Developing Sections and Elevations for
(a)   Single Storeyed Buildings (b) Multi Storeyed Buildings
8.   Detailing of Building Components like
a) Doors   b) Windows   c) Trusses

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND
TECHNOLOGY
VALUE EDUCATION AND ETHICS

Course Code: GR17A2002   **L:2 T:0 P:0 C:0**

Prerequisites: General awareness on Moral Science

Course Objectives: The objective of this course is to provide

*   Define and classify values, ethics
*   Explain about self analysis, importance of values
*   Organise constructive thinking and team work to create mutual happiness and prosperity
*   Elaborate on ethics and professional ethics using case studies.
*   Importance of continuous learning, choosing right work and career.

Course Outcomes: At the end of the course, the student will be able to

*   Choose the right value system by self analysis and right understanding
*   Make use of positive thinking, dignity of labour for building harmony and peace in self, family and society
*   Analysing the importance of personality on effective behavior
*   Identify and solve ethical dilemmas by finding value based and sustainable solutions in professional life.
*   Find sustainable technological solutions for saving environment
*   Compile value and ethical systems for continuous happiness and prosperity
*   Take part in effective team work bringing out win-win solutions for complex problems

Unit-I
Values and self-development –social values and individual attitudes, Work ethics, Indian vision of Moral and non-moral valuation, Standards and principles. Importance of cultivation of values, Sense of duty, Devotion, Self-reliance, Confidence, Concentration, Truthfulness, Honesty, Humanity, and National unity. .Basic manners-courtesy, respect; humility, modesty, politeness Discovery and acceptance of one's own abilities, talents, strengths/ weaknesses; optimism to face challenges with hope and resilience.

Unit-II
Personality and Behavior Development-God and scientific attitude, Positive thinking, Integrity and discipline, Punctuality, Love and Kindness, Avoiding fault finding, Free from anger, Dignity of labor, Universal brotherhood and religious tolerance, True friendship, Happiness Vs suffering,Doing best, Saving nature.SWOT Analysis, Who am I, Attributes, Importance of Self Confidence, Self Esteem.

Unit-III
Character and Competence-Science Vs God, Holy books Vs blind faith, Self-management and good health, Equality:Social equality, Economic equality, Egalitarianism, Equality before the law, Equal opportunity, Racial equality
All religions and same message, Mind your mind, Self-control, Honesty, Studying effectively.

Unit-IV

Professional consciousness Ethics: Ethical Human conduct, Development ofhuman consciousness, Holistic technologies, Universal human order, Code of conduct.Professional Ethics and Information Professions, Ethlcal Principles and Professional Relationships

Unit-V

Legislative procedures: Supreme Court and High Courts-jurisdiction, powers, appointment and transfer of judges; Separation of Powers; Distribution of Legislative and Administrative Powers between Union and States

Rights and Rules, Human Rights, Copy rights, IPR, RTI Act, Lokpal.

Text Books

1. Chakraborty,S.K., Values and Ethics for Originations Theory and Practice, Oxford University Press, New Delhi, 2001
2. R R Gaur, R Saugal, G P Bagaria, "A foundation course in Human values and Professional Ethics", Excel books, New Delhi, 2010.

Reference Books

1. Frankena, W.K., Ethics, Prentice Hall of India, New Delhi, 1990.

2. Kapoor, S.K., Human rights under International Law and Indian Law, Prentice Hall of India, New Delhi, 2002.

Course Code: GR17A2106   **L:0 T:0 P:3 C:2**

Course Objectives

- To develop students sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

Course Outcomes: At the end of the course, the student will be able to

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labour and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

Unit-I
UNDERSTANDING GENDER: Gender: Why should we study it? (Towards a world of Equals: Unit – 1) Socialization: Making women, making men (Towards a World of Equals: Unit -2) Introduction. Preparing for Woman hood. Growing up Male.First lessons in Caste.Different Masculinities.Institutional/System Influences on Gender Stereotypes Legal and Political Frameworks for Gender Equality

Unit-II
GENDER AND BIOLOGY: Missing Women: Sex Selection and its Consequences (Towards a World of Equals: Unit – 4) Declining Sex Ratio. Demographic Consequences. Gender Spectrum: Beyond the Binary (Towards a World of Equals: Unit – 10) Two or Many? Struggles with Discrimination. Developmental changes in the female, Reproductive Health, Special Health Risks to Women and Ethical concerns in Women's Health

Unit-III
GENDER AND LABOUR: Housework: the Invisible Labour(Towards a World of Equals: Unit – 3) "My Mother doesn`t Work". "Share the Load". Women`s Work: Its Politics and Economics (Towards a World of Equals: Unit – 7) .Gender equality and the world of work, Gender and working poverty and Gender dimensions of various key labour market indicators.

Unit-IV
ISSUES OF VIOLENCE: Sexual Harassment: Say No! (Towards a World of Equals: Unit – 6) Sexual Harassment, not Eve – teasing – Coping with Everyday Harassment – Further Reading: "Chupulu" Domestic

Violence: Speaking Out (Towards a World of Equals: Unit – 8) Is Home a Safe Place? – When Women Unite [Film]. Rebuilding Lives. Further Reading. Wife battering.,Domesticabuse.,Intimate Partner Violence (IPV),Family violence.,Relationship violence.,Spousal violence and Dating violence.

Unit-V

GENDER STUDIES: Knowledge: Through the Lens of Gender (Towards a World of Equals: Unit – 5) Point of View. Gender and the Structure of Knowledge. Further Reading. Unacknowledged Women Artists of Telangana. Whose History? Questions for Historians and Others (Towards a World of Equals: Unit – 9) .Abortion rights,Femicide, Femme invisibility,First-wave feminism, Heterosexual transvestites, Partial-birth abortion, Radical feminism, Same-sex marriage and Women's suffrage
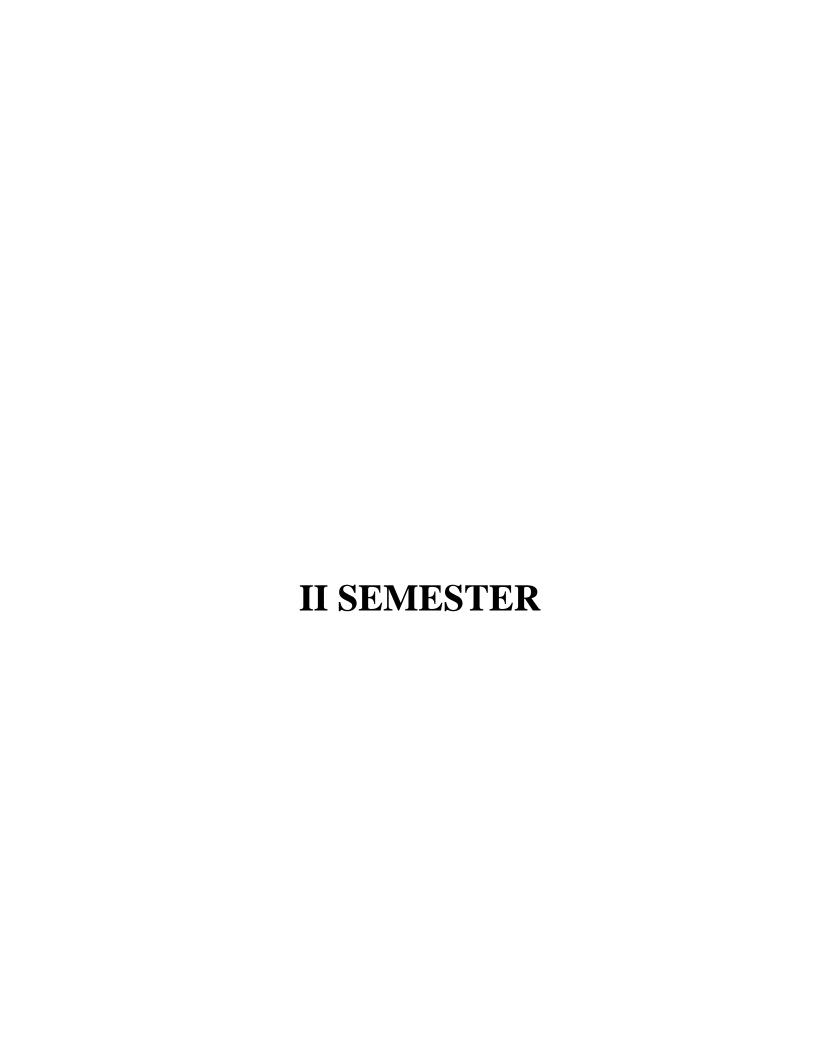
Text Books
1. Towards a World of Equals: A Bilingual Textbook on Gender" Telugu Akademi, Hyderabad Written by A. Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, GoguShyamala, Deepa Sreenivas and Susie Tharu.

2. Sen, Amartya. "More than Once Million Women are Missing". New York Review of Books 37.20 (20 December 1990). Print. `We Were Making History......' Life Stories of Women in the Telangana People`s Struggle. New Delhi : Kali for Women, 1989.

3. TriptiLahiri. "By the Numbers: Where India Women Work." Women`s Studies Journal (14 November 2012) Available online at: http://blogs. Wsj.com/India real time/2012/11/14/by

– the –numbers – where- Indian- women-work.

4. K. Satyanarayana and Susie Tharu (Ed.) Steel Nibs Are Sprouting: New Dalit Writing

From South India, Dossier 2 : Telugu And Ka n n a d a http://harpercollints.co.in/BookDetail.asp?Book Code=3732

Reference Books

1. Vimala "Vantilu (The Kitchen)". Omen Writing in India: 600BC to the Present, Volume II The 20th Century. Ed. Susie Tharu and K. Lalita. Delhi: Oxford University Press, 1995. 599-601.

2. Shatrughna, Veena et al. Women`s Work and its Impact on Child Health and Nutrition, Hyderabad, National Institute of Nutrition, India Council of Medcial Research 1993. B.Tech (ANE) R-15 Malla Reddy College of Engineering and Technology (MRCET) 113

3. Stress Shakti Sanghatana. "We Were Making History....'Life Stories of Women in the Telangana People`s Struggle. New Delhi:Kali of Women, 1989.

4. Menon, Nivedita. Seeing Like a Feminist. New Delhi. Zubaan-Penguin Books, 2012.

5. Jayaprabha, A. "Chupulu (Stares)". Women Writing in India: 600BC to the Present. Volume II: The 20th Century Ed. Susie Tharu and K. Lalita. Delhi: Oxford University Press, 1995. 596-597.

6. Javeed, Shayam and AnupamManuhaar. "Women and Wage Discrimination in India: A Critical Analysis". International Journal of Humanilities and Social Science Invention 2, 4(2013).

7. Gautam, Liela and Gita Ramaswamy. "A 'Conversation' between a Daughter and Mother". Broadsheel on Contemporany Politics. Special Issue on Sexuality and Harassment: Gender Politics on Campus Today. Ed.Madhumeeta Sinha and Asma Rasheed. Hydrabad: Anveshi research Center for Women`s Studies, 2014.

8. Abdulali Sohaila. " I Fought For My Life...and Won." Available online at: http://www.thealternative. In/lifestyle/i-fought-for-my lifeand-won-sohaila-abdulal/

9. Jeganathan Pradeep, Partha Chatterjee (Ed). "Community, Gender and Violence Subaltern Studies XI". Permanent Block and Ravi Dayal Publishers, New Delhi, 2000

10. K. Kapadia. The Violence of Development: The Politics of Identity, Gender and Social Inequalities in India. London: Zed Books, 2002.

11. S. Benhabib. Situating the self: Gender, Community, and Postmodernism in Contemporary Ethics, London: Routledge, 1992.

12. Virginia Woolf A Room of One`s Oxford: Black Swan. 1992.

13. T. Banuri and M. Mahmood, Just Development: Beyond Adjustment with a Human Face

II SEMESTER

PROBABILITY AND STATISTICS

Course Code: GR17A2011   **L:2 T:1 P:0 C:3**

Prerequisites: Fundamentals in Basic Mathematics.

Course Objectives: The objective of this course is to provide

- State the fundamentals of Probability and Statistics.
- Describe the properties of random variables and distributions.
- Apply the tests of hypothesis.
- Distinguish between explanatory and response variables and analyse multi variable data using correlation and regression.
- Evaluate random processes.

Course Outcomes: At the end of the course, the student will be able to

- Estimate the chance of occurrence of various uncertain events in different random experiments with strong basics of probability.
- Evaluate random processes which occur in engineering applications governed by the Binomial, Poisson, Exponential, Normal and Uniform distributions.
- Apply various sampling techniques.
- Forecast the models using Regression Analysis.
- Estimate the system performance measures in different queueing processes.
- Apply Inferential Statistics to make predictions or judgments about the population from which the sample data is drawn.
- Develop models for Stochastic Processes.

Unit-I

Probability: Basic concepts in Probability - Conditional probability–Addition and Multiplication theorems for two events,(Concepts without derivations)- Bayes' theorem, Boole's inequality.
Random variables: Definition of a random variable, discrete and continuous random variables – Distribution function and statement of its properties. Probability mass function, probability density function with illustrations -Joint, marginal and conditional distributions with illustrations, statistical independence - Mathematical expectation and variance of ar.v with examples and statement of their properties.
Unit-II
Distributions: Distributions: Binomial, Poisson, Normal, Gamma andExponential distributions(definition, Statements of their Mean and Varianceand problems).evaluation of parameters inBinomial and Poisson distributions.
Sampling distribution: Definition of Population and sample, Overview of types of sampling(Purposive,Random, SRS with and without replacement cases, Stratified and Systematic random samplings) – Sampling distribution, standard error, statements of sampling distribution of mean(s) (Population variance(s)known and unknown) and proportion(s) (Population proportion(s)known and unknown) with examples.
Unit-III

Estimation and Testing of Hypothesis: Estimation &Testing of Hypothesis:Definitions of Point and Interval estimation. Confidence intervals for single mean, difference of two means, single proportion and difference of two proportions. Concepts of Null and Alternative hypotheses, Critical region, Type I and Type II errors, one tail and two tail tests, Level of significance and power of a test.

Large Samples Tests: Tests of hypothesis for mean(s) (single and difference between means), Tests of hypothesis for proportion(s) (single and difference between proportions), Chi-square test for testing goodness of fit and independence of attributes.

Unit-IV

Small samples: Student's t-test for testing the significance of single mean, difference of means(independent samples and paired samples), F-test for equality of variances (Concepts and problem solving)

Correlation & Regression: Product moment correlation coefficient, Spearman's rank correlation coefficient and Statements of their properties – Simple linear regression, Lines of Regression, Regression coefficients and Statements of their properties, Multiple regression for three variables only.

Unit-V

Stochastic Process: Definitions of stochastic process, parameter space and state space.Classification of stochastic processes. Definitions of a Markov chain, transition probability matrix, initial probability distribution. Classification of states in a Markov chain and limitingdistribution.

Queuing theory: Queue description, characteristics of a queuing model, Poisson process, concept of Birth and death process, steady state solutions of (M/M/1: ∞/FIFO) and (M/M/1: N/FIFO).(Concepts and problem solving).

Teaching Methodologies

1.   Chalk &Talk
2.   Ppts

Text Books

1. Probability and statistics for engineers (Erwin Miller and John E. Freund), R.A Johnson and C. B. Gupta, Pearson education.

2. Fundamentals of Stochastic process-Medhi (for Unit-V), New age international publications.

3. Probability and Statistics, Dr. T. K. V. Iyengar, Dr. B. Krishna Gandhi et.al, S. Chand.

Reference Books

1. Fundamentals of Mathematical Statistics, S.C. Gupta ,V. K. Kapoor, S. Chand.
2. Probability, Statistics and Queuing Theory with Computer Applications-Arnold O.Allen, Academic press.

3. Introduction to Probability and Statistics, 12th edition, W. Mendenhall, R.J. Beaverand,
4. B.M. Beaver, Thomson. (Indian edition)

5. Probability, Statistics and Queuing Theory, 2nd Edition, Trivedi, John Wiley and Sons.

STRENGTH OF MATERIALS-II

Course Code: GR17A2012   **L:3 T:1 P:0 C:4**

Prerequisites

* Basic concepts of Mechanics of Solids
* Basic Knowledge on Structural Stability

Course Objectives: The objective of this course is to provide the student

* Knowledge of internal and external pressure acting in pressure vessels.
* Introduction about springs and their various types of combination connections.
* Knowledge of columns and struts with different end conditions and awareness about laterally loaded struts.
* Visualise direct and bending stresses in concrete structures like retaining wall, chimney and dams.
* Understanding of unsymmetrical bending and beams curved in plan.

Course Outcomes: At the end of course, the student will be able to

* Define stresses in thin and thick cylinders under pressure, show stress distribution diagrams.
* List the various stresses in cylinders, and define Lame's theorems
* Differentiate between closed and open coiled helical springs
* Evaluate the buckling/failure load for axially loaded and eccentrically loaded columns.
* Identify function of slenderness ratio in axially loaded columns.
* Explain the effect of equivalent length in long columns for various end conditions.
* Analyze the torsional strength of structural members

Unit-I

Thin and Thick Cylinders: Derivation of formula for longitudinal and circumferential stresses (hoop), longitudinal and volumetric strains, changes in diameter, volume of thin cylinders and thin spherical shells.

Introduction-Lame's theory for thick cylinders-Derivation of Lame's formulae, distribution of hoop, radial stresses across thickness due to internal pressure, design of thick cylinders and thick spherical shells.

Unit-II

Torsion Of Circular Shafts: Theory of pure torsion-derivation equations: $T/J = q/r = N\emptyset/L$. Assumptions made in the theory of pure torsion, torsional moment of resistance, polar section

modulus, power transmitted by shafts. Combined bending, torsion and end thrust. Design of shafts according to theories of failure.

Springs Introduction, types of springs, deflection of close and open coiled helical springs under axial pull and axial couple. Springs in series and parallel – carriage or leaf springs.

Unit-III

Columns and Struts: Introduction –Types of columns – short, medium and long columns. Axially loaded compression members, crushing load. Euler's theorem for long columns, assumptions, derivation of Euler's critical load formulae for various end conditions. Effective length of a column, slenderness ratio, euler's critical stress. Limitations of Euler's theory. Rankine's formula, Gordon formula. Long columns subjected to eccentric loading. Secant formula, Empirical formulae. Straight line formula.

Beam Columns: Laterally loaded struts subjected to uniformly distributed concentrated loads, Maximum B.M and stress due to transverse and lateral loading.

Unit-IV

Direct And Bending Stresses: Stresses under the action of direct loading and bending moment, core of a section. Determination of stresses in the case of chimneys, retaining walls and dams. Conditions for stability of dams. Stresses due to direct loading and bending moment about both axis.

Unit-V

Unsymmetrical Bending: Introduction – Centroidal principal axes of section – Graphical method for locating principal axes –Moment of inertia referred to any set of rectangular axes. Stresses in beams subjected to unsymmetrical bending. Principal axes- Resolution of bending moment into two rectangular axes through the centroid - Location of neutral axis. Deflection of beams under unsymmetrical bending .

Beams Curved in Plan: Introduction – Circular beams loaded uniformly and supported on symmetrically placed columns and Semi circular beams simply supported on three equally spaced supports.

Text Books

1.   R.K Bansal, A text book of Strength of materials, Laxmi Publications(P) Ltd., New Delhi, 5th Edition, 2012.

2.   Basavrajaiah and Mahadevappa, Strength of materials, University Press, Hyderabad, 3rd Edition, 2010.

3.   Bhavikatti, Strength of materials, Vikas Publications, 3rdEdition, 2008.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
HYDRAULICS AND HYRAULIC MACHINERY

Course Code: GR17A2013   **L:2 T:1 P:0 C:3**

Prerequisites

- Knowledge of Fluid Behavior
- Fundamentals of Engineering Mathematics

Course Objectives: The objective of this course is to provide the student

- Introduction to different types of channel flows and types of channels
- Skill of designing the most economical channel section
- Visualization of type of channel surface profiles and channel bed slopes.
- Knowledge of types of models and correlating with prototypes and force exerted by jets.
- Knowledge of Hydraulic machines and hydraulic pumps and type of hydropower plants.

Course Outcomes: At the end of course, the student will be able to

- Express the properties of different types of channel flows and types of channel sections.
- Identify the efficient channel geometrical section
- Compute the specific energy and hydraulic jump energy losses in open channel flow.
- Analyze the dimensions of models and prototypes of irrigation structure and force of Jet.
- Estimate the efficiency, heads and design of Pelton wheel, Francis and Kaplan turbine.
- Compute the efficiency, heads and design of centrifugal pumps.
- Calculate the capacity of pumps connecting in parallel and series and types of hydropower plants.

Unit-I

Open Channel Flow-I: Types of flows - Type of channels Velocity distribution Energy and momentum correction factors Chezy's, Manning's; and Bazin's formulae for uniform flow Most Economical sections. Critical flow: Specific energy-critical depth computation of critical depth critical subcritical and super critical flows.

Unit-II

Open Channel Flow-II: Non uniform flow-Dynamic equation for G.V.F., Mild, Critical, Steep, horizontal and adverse slopes-surface profiles-direct step method- Rapidly varied flow, hydraulic jump, energy dissipation.

Unit-III
Hydraulic Similitude: Dimensional model analysis-Rayleigh's method and Buckingham's pi theorem-study of Hydraulic models Geometric, kinematic and Dynamic similarities-dimensionless numbers model and prototype relations.

Basics Of Turbo Machinery: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, jet striking centrally and at tip, velocity triangles at inlet and outlet, expressions for work done and efficiency-Angular momentum principle, Applications to radial flow turbines.

Unit-IV

Hydraulic Turbines-I: Layout of a typical Hydropower installation Heads and Efficiencies-classification of turbines-pelton wheel, Francis turbine, Kaplan turbine-working, working proportions, velocity diagram, work done and efficiency, hydraulic design, draft tube theory and function efficiency.

Hydraulic Turbines-II: Governing of turbines-surge tanks-unit head and specific speed of turbines-unit power-specific speed performance characteristics geometric similarity-cavitations.

Unit-V

Centrifugal Pumps: Pump installation details-classification-work done- Manometric head-minimum starting speed-losses and efficiencies-specific speed multistage pumps-pumps in parallel- performance of pumps-characteristic curves- NPSH-cavitations.

Hydropower Engineering: Classification of Hydropower plants Definition of terms Load factor, utilization factor, capacity factor, estimation of hydropower potential.

Text Books

1.   K. Subramanya, Open Channel flow, Tata Mc. Graw Hill Publishers (2006).
2.   Dr. R.K. Bansal, A text of Fluid mechanics and hydraulic machines, Laxmi Publications
(P)   Ltd., New Delhi, 19th Edition, 2011.
3.   D.S. Kumar, Fluid Mechanics & Fluid Power Engineering,Kataria & Sons, 7th Edition, 2008-09.

References Books

1.   Modi & Seth, Fluid Mechanics, Hydraulic and Hydraulic Machines, Standard book house, 19th Edition, 2011.

2.   Ranga Raju, Elements of Open channel flow, Tata McGraw Hill, Publications.

ENGINEERING GEOLOGY

Course Code: GR17A2014   **L:3 T:1 P:0 C:4**

Prerequisites

Knowledge of minerals, their formation & chemical composition

Course objectives: The objectives of this course is to make the student to

- Identify the importance of study of Engineering Geology for the construction of any Civil Engineering structure.
- Express knowledge on the structure of earth, formation of various types of rocks and minerals and their study.
- Find and analyse various geological structures like faults, folds, effect on civil engineering structures and precautions to be taken.
- Identify various surface and subsurface flows like Rivers, Canals, Lakes and Ground water studies etc.
- Recognize the failures of tunnels, dams and reservoirs due to geological reasons.

Course outcomes: At the end of the course, the student will be able to

- Recognize the importance of geology from civil engineering point of view.
- Find the physical properties of minerals and their role for common rock forming.
- Distinguish features of igneous, sedimentary and metamorphic rocks.
- Distinguish various geological structures.
- Analyse the failures of dams, reservoirs and tunnels due to geological reasons.
- Indicate importance of ground water, earthquakes and landslides.
- Discuss about the rocks, minerals and geological structures from Civil Engineering point of view.

Unit-I

Introduction: Importance of geology from Civil Engineering point of view. Importance of Physical geology, Petrology and Structural geology.

Weathering of rocks: Its effect over the properties of rocks, importance of weathering with reference to dams, reservoirs and tunnels.

Unit-II

Mineralogy: Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Role of study of physical properties of minerals in the identification of minerals. Study of physical properties of following common rock forming minerals: Feldspar, Quartz, Flint, Jasper, Olivine, Augite, Hornblende

Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of other common economics minerals such as Pyrite, Hematite, Magnetite, Chromite, Galena, Pyrolusite, Graphite, Magnesite, and Bauxite.

Petrology: Geological classification of rocks into igneous, sedimentary and metamorphic rocks. Dykes and sills, common structures and textures of igneous, sedimentary and metamorphic rocks and their distinguishing features. Megascopic study of Granite, Dolerite, Basalt, Pegmatite, Laterite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate.

Unit-III

Structural geology: Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults, unconformities and joints - their important types and their importance.

Unit-IV

Ground water, Earth quakes and Land-slides: common types of ground water, springs, cone of depression, geological controls of ground water movement, ground water exploration. Earth quakes, their causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precautions to be taken for building construction in seismic areas. Land-slides, their causes and effect, measures to be taken to prevent their occurrence.

Unit-V

Geology of dams, reservoirs and tunnels: Geological considerations in the selection of a dam site. Analysis of dam failures of the past. Factors contributing to the success of a reservoir. Geological factors influencing water Lightness and life of reservoirs. Purposes of tunneling, Effects of tunneling on the ground. Role of geological considerations (Lithological, structural and ground water) in tunneling, over break and lining in tunnels.

Teaching methodologies

1.   Power Point presentations
2.   Tutorial Sheets
3.   Assignments

Text Books

1.   N.Chennkesavulu, Mc-Millan, Text book of Engineering Geology, India Ltd. 2005, 2nd edition, 2009, Reprint 2012

2.   K.V.G.K. Gokhale, Principles of Engineering Geology, B.S publications, 2005

References Books

1.   P.C.Varghes, Engineering Geology for Civil Engineers, PHI learning, New Delhi,2012
2.   F.G. Bell, Fundamental of Engineering Geology, Butterworths Publications London, New Delhi, B.S publications-2005

3.   Krynine& Judd, Principles of Engineering Geology & Geotechnics, McGraw Hill New york 1956

INSTITUTE OF ENGINEERING AND TECHNOLOGY
STRUCTURAL ANALYSIS

Course Code: GR17A2015   **L:3 T:1 P:0 C:4**

Prerequisites

•   Knowledge of Engineering Mechanics
•   Knowledge of Mechanics of Solids/Strength of Materials

Course Objectives: The objective of this course is to provide the student

•   Skill to Estimate the deflections of simple beams and pin-jointed trusses using energy
        theorems.
•   Ability to Analyze three and two hinged, circular and parabolic arches.
•   Knowledge to Analyze statically in-determinate structures using force and displacement
        methods.
•   To understand the effect of moving loads and analyze indeterminate beams and trusses
•   To understand the effect using influence diagrams in analysis of beams and trusses

Course Outcomes: At the end of course, the student will be able to

•   Determine deflections of beams and trusses using energy methods.
•   Analyze three and two hinged, circular and parabolic arches.
•   Analyze indeterminate beams of 1st degree statical indeterminacy using force method for
        Propped cantilever beams.
•   Analyze 2nd and 3rd degree statically indeterminate beams using Clappeyorn's three
        moment theorem.
•   Apply Slope deflection, Moment distribution and Kani's methods to analyze statically
         indeterminate structures.
•   Analyze statically determinate and indeterminate structures using rolling load method.
•   Analyze statically determinate and indeterminate structures using influence line method.

Unit-I

Energy Theorems: Introduction – strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces – Castigliano's first theorem – Deflections of simple beams and pin jointed trusses.

Unit-II

Arches: Types of arches- three and two hinged arches – Circular and parabolic arches – yielding of supports –Effect of shortening of rib-Effect of temperature changes –Tied and linear arch.

Unit-III

Indeterminate Beams (Force method):

a.   Propped cantilever's
b.   Fixed beams
c.   Continuous Beams (By Clapeyron's theorem of three moments)

Unit-IV

Analysis of Beams (Indeterminate Structures):
a.   Slope Deflection method
b.   Moment Distribution method
c.   Kani's Method

Unit-V

Moving Loads and Influence line Diagrams: Introduction, maximum SF and BM at a given section and absolute maximum S.F and B.M due to single concentrated load, U.D load longer than the span, U.D load shorter than the span, two point loads with fixed distance between them and several point loads – Equivalent uniformly distributed load – focal length.

Definition of influence line for SF, Influence line for B.M- load position for maximum SF at a section –Load positions for maximum BM at a section – Point loads , UDL longer than the span, UDL shorter than the span- Influence lines for forces in members of Pratt and Warren trusses.

Teaching Methodologies

1.   White Board and marker
2.   Assignments
3.   Tutorials

Text Books
1.   V. N. Vazirani & M. M. Ratwani, Analysis of structures – Vol. & Vol. II, Khanna Publications, New Delhi.
2.   T.S. Thandavamoorthy, Analysis of structures, Oxford University Press, New Delhi
3.   S.S Bhavikatti, Structural Analysis, Vikas Publishing House

Reference Books
1.   S.B. Junnakar, Mechanics of structures, Charotar Publishing House, Anand, Gujarat.
2.   Pandit & Gupta, Theory of structures, Tata Mc. Graw Hill Publishing Co. Ltd., New Delhi.
3.   R. S. Khurmi, Theory of structures, S. Chand Publishers.
4.   B. C. Punmia, Strength of materials and Mechanics of Structures, Khanna Publications, New Delhi
5.   B.D. Nautiyal, Introduction to structural analysis, New age international publishers, New Delhi.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
STRENGTH OF MATERIALS LAB

Course Code: GR17A2016   **L:0 T:0 P:2 C:2**

Prerequisites

•   Knowledge of Mechanics of Solids
•   Knowledge on Properties of civil engineering materials

Course Objectives: The objective of this course is to provide the student

•   Understanding the effect of tension in mild steel bars under tensile loading.
•   Skill to examine the resistance of various materials using hardness test and impact test
•   Find the modulus of rigidity in springs using spring test.
•   An idea on the compressive stress of concrete, wood etc.
•   Knowledge of pure bending theory and evaluate the Young's modulus of materials.
•   Visualizations of the importance of Maxwell's reciprocal theorem.

Course Outcomes: At the end of course, the student will be able to

•   Determine the important mechanical properties of materials
•   Identify the stiffness of an elastic isotropic material
•   Evaluate the Reciprocal theorem
•   Measure any substance's resistance to uniform compression.
•   Resistance of various materials against abrasion.
•   Assess the quality of materials
•   Identify the resistance of materials against impact loads

Contents

1.   Tension test on metals.
2.   Torsion test on metals.
3.   Hardness test on metals.
4.   Spring test on metals.
5.   Compression test on wood or concrete or brick or block.
6.   Impact test on metals.
7.   Deflection test on continuous beam.
8.   Deflection test on cantilever beam.
9.   Deflection test on simply supported beam.
10.   Verification of Maxwell's Reciprocal theorem on beams.

HYDRAULICS AND HYDRAULIC MACHINERY LAB

Course Code: GR17A2017   **L:0 T:0 P:2 C:2**

Prerequisites

•   Knowledge of Fluid Mechanics and Hydraulics Machinery

Course objectives: The objective of this course is to provide the student

•   Knowledge of estimation of force exerted by the jet on different surfaces.
•   Skill to predict the efficiency and the Impulse the Turbines and reaction turbine
•   Understanding of the type of pumps
•   Visualization of the types of flows in open channel flows
•   Skill to determine the efficiency of hydraulic machines in civil engineering field

Course outcomes: At the end of the course the student will be able to

•   Calculate the impact factor and force exerted on flat and curved vanes
•   Determine the efficiency of Peltonwheel turbine
•   Predict The efficiency of Francis turbine
•   Compute the efficiency of centrifugal pumps
•   Compute the efficiency of reciprocating pumps
•   Estimate the input and output efficiency of hydraulic turbine
•   Compute the energy dissipation in open channel flows

Contents

1.   Impact of jet on vanes.
2.   Study of Hydraulic jump.
3.   Performance test on impulse turbine .
4.   Performance test on reaction turbine.
5.   Efficiency test on Single Stage Centrifugal Pump.
6.   Efficiency test on Multi Stage Centrifugal Pump.
7.   Efficiency test on Single acting Reciprocating Pump.
8.   Efficiency test on Double acting Reciprocating Pump.

SURVEYING LAB-II

Course Code: GR17A2018   **L:0 T:0 P:2 C:2**

Prerequisites

•   Knowledge of Engineering Mathematics
•   Knowledge of Surveying and Leveling

Course Objectives: The objective of this course is to provide the student:

•   Introduction to the applicability of modern survey equipment.
•   Skill of determining relative positions in land surveying.
•   Visualization of elevations, areas and volumes.
•   Skill of plotting existing geographical surface information.
•   Knowledge to judge the compatibility of instruments.

Course Outcomes: At the end of the course, the student will be able to,
•   Define the characteristics and applications of modern survey equipment.
•   Generalise the advanced methods of obtaining geographical information.
•   Apply knowledge of mathematics, science and engineering in land measurement
        techniques.
•   Calculate distances, inclinations, elevations, areas and volumes using Theodolite & Total
        station.
•   Generate maps of earth surfaces
•   Analyse data from existing maps and transfer relevant points onto ground.
•   Evaluate the compatibility of instruments.
Contents
1.   STUDY OF THEODOLITE- Measurement of horizontal and vertical angles-(Repetition
and Reiteration method).
2.   TRIGONOMETRIC LEVELLING- Heights and distances problems.
3.   Calculation of R.L and distance using tacheometric survey.
4.   Curve setting by any two methods.
5.   Introduction to total station and operational procedure.
6.   Determine the area of the traverse using total station.
7.   Column and foundation marking using Total Station.
8.   Distance, gradient, differential height between two inaccessible points using Total
Station.

ENVIRONMENTAL SCIENCE

Course Code: GR17A2001   **L:0 T:0 P:2 C:2**

Prerequisites: Basic knowledge on basic sciences and natural resources

Course Objectives
•   To understand about the importance and scope of Environment.
•   To identify, analyze and solve the problems in Environment.
•   To participate in team oriented activities aiding constructive thinking and
         recognize the value of continuing education.

Course Outcomes: At the end of the course, the Student will be able to
•   Importance of environment, its purpose, design and perspectives
•   Environmental issues related to the exploitation of natural resources and
         development of the mankind
•   Role of professionals in protecting the
         environment   from degradation
•   The solutions for environmental problems created by local, national and global
         developmental activities.
•   Critically evaluate literature on environmental problems;
•   Develop relevant research questions for environmental investigation
•   Use methods and tools of environmental research, including statistical analysis,
         GIS, and other techniques;

Unit-I

Introduction to Environment, Ecology and Ecosystems: Definition, Scope and Importance ecosystem, public awareness and Participation, Ecology, Concept of ecosystem, Classification of ecosystem, Structure , components and function of ecosystem, Typical ecosystem, Food chain, Food web, Biodiversity-Types and Values, biogeochemical cycles.
Unit–II

  Natural Resources: Definition, Occurrence, Classification of resources, Important Natural Resources for Human society, Utilization-Positive and negative effects of water resources, Mineral resources, forest resources, Energy resources, Land resources, renewable and non-renewable resources.

Unit-III

  Environmental Pollution: Definition, Classification of pollution, Types of pollution and pollutants, Cause, effects and control of Air pollution, water pollution, Soil pollution, Noise pollution, Thermal and Nuclear pollution.
  .

Unit-IV

Environmental Problems and Management Policies: Natural Disasters-Types, Causes and Effects, Global warming, climate change-EI NiNo-La Nina, Ozone layer-location, role and degradation, Deforestation and desertification, Green belt Development, Rain water harvesting, Renewable and alternative resources.

Unit-V

National Policy on Environment Protection and Sustainability: Air (pollution and prevention) act 1981, Water(Pollution and prevention) Act 1974, Pollution Act 1977, Forest conservation Act; wild life protection act; Municipal solid waste management and handling Act, Hazardous waste management and handling rules, Role of IT in environment, environmental ethics, environmental economics.

Sustainable development: cause and threats to sustainability, stratagies for achieving sustainable development, Concept of green buildings and clean development Mechanism (CDM).

Teaching Methodology

1.   White board and marker
2.   OHP and Field visit

Text Books

1.   Text Book of Environmental Studies, ErachBarucha. University Press

2.   Text book of Environmental Science and Technology by M.Anji Reddy 2007

Reference Books

1.   Biotechnology & Environmental Chemistry. Surinder Jeswal& Anupama
      Deswal, DhanpatRai & Co Pvt. Ltd.
2.   A Text Book of Environmental Science. Aravind Kumar. APH Publishing Corporation.

3.   Glimpses of Environment. Dr. KVSG. Murali Krishna. Environmental Protection Society