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 500 090

Academic Regulations

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY, HYDERABAD
DEPARTMENT OF CIVIL ENGINEERING (B. Tech)
GR17 REGULATIONS

Gokaraju Rangaraju Institute of Engineering and Technology 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/University or 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. Tech Degree:** A student will be declared eligible for the award of B. 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, for 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 for 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 Oriented Mini 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/Assignments - 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 the road show at the department level for the benefit of all students and staff and the same is to be evaluated by Mini Project Review Committee for 10 marks. The mini project report shall be presented before Project Review Committee 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 conducted by 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 and prepare a technical report and present the same to a Committee consisting of HOD and two senior faculty and the seminar coordinator of the

department. The student shall be assessed for his/her understanding of the topic, its application and its relation with various courses studied during the programme of study for **50 marks.**

g) Major Project: The project work is evaluated for 200 marks. Out of 200, 50 marks shall be for internal evaluation and 150 marks for 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.

S. No.	Promotion	Conditions to be fulfilled
1	**First year first semester to first year second semester**	**Regular course of study of first year first semester.**
2	**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.
3	**Second year first semester to second year second semester**	**Regular course of study of second year first semester.**
4	**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.**
5	**Third year first semester to third year second semester**	**Regular course of study of third year first semester.**
6	**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.**
7	**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 >= 60 and Marks < 70**
B (Average)	**6**	**Marks >= 50 and Marks < 60**
C (Pass)	**5**	**Marks >= 40 and 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-C. 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 k^{th} semester(1 to 8) is the ratio of sum of the product of the number of credits and grade points to the total credits of all courses registered by a student, i.e.,

$$SGPA\ (S_k) = \sum (C_i \cdot G_i) / \sum C_i$$

Where C_i is the number of credits of the i^{th} course and G_i is the grade point scored by the student in the i^{th} 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 $k \geq 2$.

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 classes based on CGPA secured from the 192 credits.

	Class Awarded	CGPA Secured
14.1	**First Class With Distinction**	**CGPA 8.00 with no F or below grade/ detention anytime during the programme**
14.2	**First Class**	**CGPA 8.00 with rest of the clauses of 14.1 not satisfied**
14.3	**First Class**	**CGPA ≥ 6.50 and CGPA < 8.00**
14.4	**Second Class**	**CGPA ≥ 5.50 and CGPA < 6.50**
14.5	**Pass Class**	**CGPA ≥ 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 fulfil 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 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.

S. No.	Promotion	Conditions to be fulfilled
1	**Second year first semester to second year second semester.**	**Regular course of study of second year first semester.**
2	**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.**
3	**Third year first semester to third year second semester.**	**Regular course of study of third year first semester.**
4	**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.**
5	**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 8.00 with no F or below grade/ detention anytime during the programme**
3.2	**First Class**	**CGPA 8.00 with rest of the clauses of 3.1 not satisfied**
3.3	**First Class**	**CGPA ≥ 6.50 and CGPA < 8.00**
3.4	**Second Class**	**CGPA ≥ 5.50 and CGPA < 6.50**
3.5	**Pass Class**	**CGPA ≥ 5.00 and CGPA < 5.50**

I BTECH **I SEMESTER**

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

Group	Subject code	Name of subject	Credits			Total credits	Total Hours	Total Marks
			L	T	P			
BS	GR17A1003	Transform Calculus and Fourier Series	2	1		3	4	100
BS	GR17A1004	Numerical Methods	2	1		3	4	100
BS	GR17A1007	Physics for Engineers	2	1		3	4	100
HS	GR17A1005	English	2	1		3	4	100
ES	GR17A1011	Computer Programming & Data structures	2	1		3	4	100
ES	GR17A1020	Engineering Mechanics (Dynamics)	2	1		3	4	100
ES	GR17A1025	Engineering Workshop			2	2	4	75
BS	GR17A1029	Engineering Physics lab			2	2	4	75
ES	GR17A1028	Computer Programming & Data Structures lab			2	2	4	75
		Total	**12**	**6**	**6**	**24**	**36**	**825**

II BTECH **I SEMESTER**

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

II BTECH **II SEMESTER**

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

III BTECH **I SEMESTER**

Group	Sub-Code	Name Of Subject	Credits			Total credits	Total Hours	Total Marks
			L	T	P			
PC	GR17A3001	Concrete technology	3	1		4	5	100
PC	GR17A3002	Design of Reinforced Concrete Structures	3	1		4	5	100
HS	GR17A2104	Managerial Economics and Financial Analysis	2	1		3	4	100
Open Elective 1			**2**	**1**		**3**	**4**	**100**
Professional Elective 1			**3**	**1**		**4**	**5**	**100**
PE	GR17A3004	Advanced Structural Analysis						
PE	GR17A3114	Air Pollution and Control Engineering						
PE	GR17A3105	Environmental Impact assessment						
PC	GR17A3005	Concrete Technology Lab			2	2	4	75
PC	GR17A3006	Engineering Geology Lab			2	2	4	75
BS	GR17A3100	Advanced English Communication Skill Lab			2	2	4	75
Total			**13**	**5**	**6**	**24**	**35**	**725**

III BTECH **II SEMESTER**

Group	Sub-Code	Name Of Subject	Credits			Total credits	Total Hours	Total Marks
			L	T	P			
PC	GR17A3007	Design of Steel Structures	2	1		3	4	100
PC	GR17A3102	Management Science	3	1		4	5	100
PC	GR17A3010	Geotechnical Engineering-I	3	1		4	5	100
Open Elective 2			**2**	**1**		**3**	**4**	**100**
Professional Elective 2			**3**	**1**		**4**	**5**	**100**
PE	GR17A3108	Advanced Water Resource Engineering						
PE	GR17A3011	Disaster Management and Mitigation						
PE	GR17A3112	Advanced Reinforced Concrete Structural Design						
PC	GR17A3013	Geotechnical Engineering Lab			2	2	4	75
PC	GR17A3014	Highway Materials Lab			2	2	4	75
PC	GR17A3101	Industry Oriented Mini Project			2	2	4	75
Total			**13**	**5**	**6**	**24**	**35**	**725**

IV BTECH **I SEMESTER**

Group	Sub-Code	Name Of Subject	Credits			Total credits	Total Hours	Total Marks
			L	T	P			
PC	GR17A4001	Geotechnical Engineering-II	3	1		4	5	100
PC	GR17A4002	Estimating & Costing	2	1		3	4	100
PC	GR17A4003	Environmental Engineering	3	1		4	5	100
Open Elective 3			**2**	**1**		**3**	**4**	**100**
Professional Elective 3			**3**	**1**		**4**	**5**	**100**
PE	GR17A4007	Finite Element Methods						
PE	GR17A4004	Ground Water Development & Management						
PE	GR17A4009	Ground Improvement Techniques						
PC	GR17A4010	Irrigation Design & Drawing			2	2	4	75
PC	GR17A4011	Environmental Engineering Lab			2	2	4	75
PC	GR17A4012	Computer Applications in Structural Engineering (CASE) Lab			2	2	4	75
Total			**13**	**5**	**6**	**24**	**35**	**725**

IV BTECH **II SEMESTER**

Group	Sub-Code	Name Of Subject	Credits			Total credits	Total Hours	Total Marks
			L	T	P			
PC	GR17A4013	Construction Technology & Project Management	2	1		3	4	100
Professional Elective 4			**3**	**1**		**4**	**5**	**100**
PE	GR17A4005	Prestressed Concrete						
PE	GR17A4015	Pavement Analysis & Design						
PE	GR17A4016	Water Shed Management						
Professional Elective 5			**2**	**1**		**3**	**4**	**100**
PE	GR17A4017	Remote Sensing & GIS						
PE	GR17A4018	Airport, Docs & Harbour Engineering						
PE	GR17A4145	Advanced Steel Structural Design						
PC	GR17A4020	GIS Lab			2	2	4	75
SPW	GR17A4142	Comprehensive Viva			1	1	2	50
SPW	GR17A4143	Seminar			1	1	2	100
SPW	GR17A4144	Major Project			10	10	14	200
Total			7	3	**14**	**24**	**35**	**725**

Open Elective 1		Course Title	Department Offering
OE - I	GR17A3151	Water Resources Engineering	CE
	GR17A3152	Solar & Wind Energy Systems	EEE
	GR17A3153	Applied Thermodynamics	ME
	GR17A3154	Principles of E- Commerce	CSE
	GR17A3155	Data mining and Applications	IT
	GR17A3156	Computer Architecture and Organization	ECE
Open Elective 2		**Course Title**	**Department Offering**
OE - II	GR17A3161	Transportation Engineering	CE
	GR17A3162	Sensors & Transducers	EEE
	GR17A3163	Automobile Engineering	ME
	GR17A3164	Human Computer Interaction	CSE
	GR17A3165	Essentials of Big Data Analytics	IT
	GR17A3166	Principles of Operating Systems	ECE
Open Elective 3		**Course Title**	**Department Offering**
OE - III	GR17A4161	Green Building Technology	CE
	GR17A4162	Soft Computing Techniques	EEE
	GR17A4163	Operations Research	ME
	GR17A4164	Mobile Computing and Applications	CSE
	GR17A4165	Business Intelligence	IT
	GR17A4166	Principles Of Satellite Communications	ECE

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

CONCRETE TECHNOLOGY

Course Code: GR17A3001 **LT P C**
III Year I Semester **3 1 0 4**

UNIT I

Cements & Admixtures: Portland cement – Chemical composition – Hydration, setting of cement – Structure of hydrated cement – Tests on physical properties – Different grades of cement – Admixtures – Mineral and chemical admixtures.

UNIT II

Aggregates: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregate – Specific gravity, bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand – Deleterious substance in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Gap graded aggregate – Maximum size of aggregate.

UNIT III

Fresh Concrete: Workability – Factors affecting workability – Measurement of workability by different tests – Setting times of concrete – Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete – Steps in manufacture of concrete – Quality of mixing water.

Hardened Concrete : Water / Cement ratio – Abram's Law – Gel-space ratio – Nature of strength of concrete – Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compression & tensile strength - Curing.

UNIT IV

Testing of Hardened Concrete: Compression tests – Tension tests – Factors affecting strength – Flexure tests – Splitting tests – Non-destructive testing methods – codal provisions for NDT.

Elasticity, Creep &Shrinkage: Modulus of elasticity – Dynamic modulus of elasticity – Poisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage – Types of shrinkage.

UNIT V

Mix Design: Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical methods – Acceptance criteria – Proportioning of concrete mixes by various methods – BIS method of mix design.

Special concretes: Light weight aggregates – Lightweight aggregate concrete – Cellular concrete – No-fines concrete – High density concrete – Fibre reinforced concrete – Different types of fibres – Factors affecting properties & Applications of F.R.C – Polymer concrete –

Types of Polymer concrete – Properties of polymer concrete & Applications – High performance concrete – Self consolidating concrete – SIFCON.

TEXT BOOKS

1. Concrete Technology by M.S.Shetty. – S.Chand& Co. ; 2004

2. Properties of Concrete by A.M.Neville – Low priced Edition – 4th edition

REFERENCES

1. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi

2. Concrete Technology by A.R. Santha Kumar, Oxford university Press, New Delhi

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DESIGN OF REINFORCED CONCRETE STRUCTURES

	L	T	P	C
Course Code: GR17A3002				
III Year. I Semester	**3**	**1**	**0**	**4**

UNIT I

Concepts of R.C design: Limit state method-material stress, strain curves, safety factors, characteristic values. Stress block parameters. IS-456-2000- Working stress method.

UNIT II

Analysis and design of beams: Design of beams for flexure- Limit state analysis and design of singly reinforced, doubly reinforced, T and L beam sections.

Design of beams for shear, torsion and bond: Limit state analysis and design of section for shear and torsion- Concepts of bond- anchorage and development length-I.S. code provisions-design examples in simply supported and continuous beams and detailing.

UNIT III

Design of slabs: Design of Two-way slab, one way slab, continuous slab using I S coefficients.

Design of stair case and canopy: Design of stair case and Design of canopy (portico).

UNIT IV

Design of columns: Design of columns subjected to axial loads, combined axial load &uniaxial bending, combined axial load and biaxial bending- I S code provisions.

Design of footings: Different types of footings, design of isolated, square, rectangle, circular footings and combined footings.

UNIT V

Limit state design of serviceability: Limit state design of serviceability for deflection, cracking and codal provisions.

TEXT BOOKS

1. Limit state Design of reinforced concrete - P.C.Varhese ,Printice hall of India, New delhi.
2. Reinforced concrete design by N.KrishnaRaju and R.NPranesh, New age InterationalPulishers, New Delhi.
3. Reinforced concrete design by s.Unnikrishna Pillai & DevdasMenon, Tata Mc.Graw Hill, New Delhi.
4. Fundamentals of reinforced concrete by N.C. Sinha and S.K.Roy, S.Chand publishers.

REFERENCES

1. Fundamentals of reinforced concrete design by M.L.Gambhir, Printice Hall of India Private Ltd., New Delhi.
2. Reinforced concrete structural elements-behavior, analysis and design by Purushotam, Tata Mc.Graw Hill, New Delhi.
3. Limit State design by B.C.Punmia, Ashok Kumar Jain and arun Kumar Jain, Laxmi publication Pvt. Ltd., New Delhi.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Managerial Economics and Financial Analysis

Course Code: GR17A2104 **L T P C**
III Year. I Semester **2103**

UNIT I

Introduction & Demand Analysis: Definition and Scope: Definition, Nature and Scope of Managerial Economics. **Demand Analysis**: Demand Determinants, Law of Demand and its exceptions. **Elasticity of Demand**: Definition, Types, Measurement and Significance of Elasticity of Demand. **Demand Forecasting:** Factors governing demand forecasting,methods of demand forecasting.

UNIT II

Production & Cost Analysis: ***Production Function:*** Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. ***Cost Analysis*****:** Cost concepts. Break-even Analysis (BEA)- Determination of Break-Even Point (simple problems) - Managerial Significance.

UNIT III

Markets & New Economic Environment: ***Types of competition and Markets***, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. ***Pricing*****:** Objectives and Policies of Pricing. Methods of Pricing. ***Business:***Features and evaluation of different forms of Business Organisation: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types. ***New Economic Environment***: Changing Business Environment in Post-liberalization scenario.

UNIT IV

Capital Budgeting: ***Capital:*** Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital. ***Capital Budgeting***: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method, profitability index (simple problems).

UNIT V

Introduction to Financial Accounting & Financial Analysis: ***Accounting Concepts and Conventions*** - Double-Entry Book Keeping. ***Accounting Cycle:*** Journal, Ledger, Trial Balance, Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). ***Financial Analysis*****:** Analysis and Interpretation of Liquidity Ratios, Activity Ratios, Capital structure Ratios and Profitability ratios. Du Pont Chart.

Teaching Methodologies:

- Lectures
- Power Point presentations
- Seminars
- Working out problems on black/white boards,
- Conducting tutorials
- Giving homework and/or assignments etc.

TEXT BOOKS

1. Aryasri: Managerial Economics and Financial Analysis, TMH, 2009.
2. Atmanand: Managerial Economics, Excel, 2008.

REFERENCES

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.2009
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 2009
3. Lipsey & Chrystel, Economics, Oxford University Press, 2009

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED STRUCTURAL ANALYSIS
(Professional Elective-I)

	L	T	P	C
Course Code: GR17A3004				
III Year. I Semester	**3**	**1**	**0**	**4**

UNIT I

Indeterminate structural analysis: Determinate structural analysis, indeterminate structural analysis- static and kinematic indeterminacies-Solution of trusses with up to two degrees of internal and external indeterminacies-Castigliano's theorem applications.

UNIT II

Indeterminate structural analysis for rigid frames: Slope Deflection and Moment Distribution Methods of analysis to simple portal frames without and with sway - frames with inclined legs - Gable frames. Kani's Method of analysis to continuous beams, Portal frames (up to single bay two storey's).

UNIT III

Approximate analysis of building frames:

a) Substitute frame method
b) Portal method
c) Cantilever method

UNIT IV

Matrix method of analysis: Different approaches to matrix methods- analysis using flexibility and stiffness matrix methods for beams and frames.

UNIT V

Plastic analysis: Ductility-Ultimate load-Plastic hinges- mechanism- -Shape factors-Moment curvature relations- upper and lower bound theorem- Plastic analysis for beam-Portal frames-Portal survey mechanics.

TEXT BOOKS:

1. Theory of structures - B.C.Punmia, Jain, Ashok Kumar Jain & Arun Kumar Jain, Laxmi publications
2. Indeterminate Structural Analysis - K.U. Muthu, H. Narendra, Maganti *Janardhana,* M. Vijayanand – I K International Publishing House Pvt. Ltd.

REFERENCES

1. Analysis of structures by T.S.Thandava Murthy, Oxford University Press.
2. Advanced Structural Analysis" By Devdas Menon. Narosa Publishers

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

AIR POLLUTION AND CONTROL ENGINEERING
(Professional Elective-I)

Course Code: GR17A3114	**LT P C**
III Year. I Semester	**3 1 0 4**

UNIT I

Air Pollution and its definition – Factors influencing air pollution – Classification of pollutants and particulates. Gases-Sources of pollution, Air qualities standards.

UNIT II

Meteorology – Wind roses – lapses rates – mixing depth atmospheric dispersion –plume behavior accumulation, estimation of pollutants – Effective stack height.

UNIT III

Air Pollution effects on human beings, animals, plants and materials global conditions–Air Pollution Episodes in India and abroad.

UNIT IV

Control of air pollution – Removal of pollutants – particulate and gaseous – Air pollution control equipments (units) settling chamber, cyclones, wet scrubbers/collectors, centrifugal scrubbers, spray towers, packed beds, electrostatic precipitators, absorption– adsorption – Diffusion.

UNIT V

Air pollution monitoring and management.-Environmental guide lines for sitingindustries, Environmental Impact assessment, Environmental management plan, stack emission standards, stack emission monitoring, ambient air quality monitoring, ambient air quality survey.

TEXT BOOKS

1. Air Pollution Control Engineering by Nevers, , McGraw-Hill, Inc., 2000.
2. Elements of Air Pollution Control by Prof. T. Shivaji Rao, Lavanyalata Pub. 1988.

REFERENCES

1. Air Pollution Control by K.V.S.G. Murali Krishna, Kaushal & Co 1995.
2. Air Pollution and its Control by M.N.Rao. & H.V.N.Rao, TaTa Mc.Graw Hill, 15th reprint, 2000.
3. Fundamentals of Air Pollution by Dr. B.S.N. Raju, Oxford & I.B.H.
4. Air Pollution and Health by T. Holgate, Hillel S. Koren, Jonathan M. Samet, Robert L. Maynard publisher Academic Press.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENVIRONMENTAL IMPACT ASSESSMENT
(Professional Elective-I)

	L	T	P	C
Course Code: GR17A3105				
III Year. I Semester	**3**	**1**	**0**	**4**

UNIT I

Introduction: Impact of development projects – Sustainable development- Need for Environmental Impact Assessment (EIA) - Environmental Impact Statement (EIS) – EIA capability and limitations – Legal provisions on EIA-Stages of EIA, Types of EIA

UNIT II

E I A Methodologies: Introduction, Criteria for the selection of EIA Methodology, Methods of EIA – Check lists – Matrices – Networks – Cost-benefit analysis – Analysis of alternatives.

UNIT III

Prediction and Assessment: Environmental Impact on land, water, air, social & cultural activities and on flora & fauna- Mathematical models- Public participation

UNIT IV

Environmental Management Plan: Plan for mitigation of adverse impact on environment – Options for mitigation of impact on water, air, land and on flora & fauna - Addressing the issues related to the Project Affected People. Post project monitoring, introduction to ISO 14000.

UNIT V

Case studies: EIA for infrastructure projects – Dams – Highways – Multi-storey Buildings – Water Supply and Drainage Projects – Waste water treatment plants, STP.

TEXT BOOKS

1. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B.S. Publication, Sultan Bazar, Hyderabad.

2. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke – Prentice Hall Publishers

REFERENCES

1. Environmental Impact Assessment, by Larry Canter, 2nd edition, McGraw Hill Publishers

2. JudithPetts, “Handbook of Environmental Impact Assessment Vol. I & II”, Blackwell Science, 1999

3. Environmental Science and Engineering, by Suresh K. Dhaneja – S.K.,Katania& Sons Publication., New Delhi.

4. Environmental Pollution and Control, by Dr H.S. Bhatia – Galgotia Publication (P) Ltd, Delhi

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

CONCRETE TECHNOLOGY LAB

Course Code: GR17A3005	**L**	**T**	**P**	**C**
III Year. I Semester	**0**	**0**	**2**	**2**

List of experiments:

Task1: Normal consistency test on cement
Task2: Initial setting time and final setting time of cement
Task3: Fineness test on cement
Task4: Specific gravity of cement
Task5: Soundness test on cement
Task6: Compressive strength of cement
Task7: Sieve analysis of coarse and fine aggregates
Task8: Workability test on concrete by compaction factor slump and Vee-Bee consistometer
Task9: Young's modulus and compressive strength of concrete
Task10: Bulking of sand (Field test & Laboratory test)
Task11: Split Tensile strength test

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING GEOLOGY LAB

Course Code: GR17A3006	**L**	**T**	**P**	**C**
III Year. I Semester	**0**	**0**	**2**	**2**

Task1: Study of physical properties and identification of minerals referred under theory.

Task2: Megascopic description and identification of rocks referred under theory.

Task3: Interpretation and drawing of sections for geological maps showing tilted beds, faults, uniformities etc.

Task4: Simple Structural Geology problems.

LAB EXAMINATION PATTERN:

Task5: Description and identification of SIX minerals

Task6: Description and identification of Six rocks (including igneous, sedimentary and metamorphic rocks)

Task7: Interpretation of a Geological map along with a geological section.

Task8: Simple strike and Dip problems.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED ENGLISH COMMUNICATION SKILLS LAB

Course Code: GR17A3100	**L**	**T**	**P**	**C**
III Year. I Semester	**0**	**0**	**2**	**2**

This lab mainly focuses on training the students to speak fluent, intelligible, appropriate and functional English through classroom activities. The chapters prescribed provide tips to improve the basic language skills required to participate in various formal activities. It also helps the students to appear for professional competitive exams like GRE, TOEFL, IELTS etc. It includes a three tier evaluation – self-evaluation, peer group evaluation and teacher evaluation. The topics are dealt in a task based and skill oriented manner. The lab cum record work shallenable the student to develop the required skills in order to fit in apt into the existing market trends. This lab session also gives him an idea about the various ways and means to face the admission tests for the higher education.

Objectives

- ✓ To improve fluency in English
- ✓ To communicate ideas relevantly and coherently in writing.

Outcomes

1. Develop the ability to read and comprehend a wide range of text and understand the importance of lifelong learning.
2. Express ideas fluently and appropriately in social and professional fields and strengthen social etiquette.
3. Improve English language proficiency with an emphasis on LSRW skills.
4. Interpret academic subjects with better understanding.
5. Rebuild English language skills to meet the industry needs.
6. Ability to present themselves in various formal social and professional situations.
7. Improve literary sense through wide range of selections from various

Task-1

Functional English

Introduction to public speaking, analyzing and assimilating
Ideas role play, formal and informal expressions and conversations**.**

Task-2

Vocabulary

Synonyms & Antonyms**,** Word Roots**,** One word substitutes**,** Prefixes & Suffixes**,** Study of word origin**,** Idioms and Phrases**,** Analogy.

Task- 3

Group Discussion

Assimilation of ideas, analysis, sharing of ideas, initiation,
Leadership skill, team spirit and conclusion.

Task-4

Presentation Skills

Scope, features, sources to be explored, role of non-verbal
Communication, audience perspective, feedback.

Task-5
Résumé Writing and Letter Writing: Types and formats, tips to draft resume Manual and emailing, types and formats for letter writing, content and body of the Letter, email etiquette.

Task-6
Interview Skills: Introduction, types of interviews, model questions and answering Strategies, mock-interviews, check list for preparing for an interview.

Task-7
Reading comprehension: Types of reading, techniques qualities of a good reader.

Task-8
Report Writing: Introduction, importance, structure, formats and types of reports

REFERENCES

1. Effective Technical Communication, M. Ashraf Rizvi, Tata McGraw Hill.
2. Business Communication; HorySankarMukerjee;OUP.
3. Business Communication; Meenakshi Raman, Praksh Sing; Oxfor University Press.
4. English and Soft Skills; SP Dhanavel; Orient Black Swan.
5. Soft Skills for everyone; Jeff Butterfield; Cengage Learning.
6. Communication Skills;Viva Careers Skills Library.
7. Personality Development and Soft Skills; Barun K Mitra; Oxford University Press.
8. English for Engineers Made Easy, AedaAbidi, Ritu Chaudhry, Cengage Learning.
9. Communication Skills, Sanjay Kumar, PushpLatha, Oxford Higher Education.
10. Professional Presentations; Malcom Goodale; Cambridge University

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

WATER RESOURCES ENGINEERING
(Open Elective-I)

	L	T	P	C
Course Code: GR17A3151				
III Year. I Semester	**2**	**1**	**0**	**3**

UNIT I

Introduction to Engineering Hydrology and its applications: Hydrologic Cycle, types and forms of precipitation, rainfall measurement, types of Rain gauges, computation of average rainfall over a basin, processing of rainfall data-adjustment of record-Rainfall Double Mass Curve. Runoff-Factors affecting Runoff over a Catchment- Empirical and Rational Formulae.

Abstraction from rainfall: Evaporation, factors effecting evaporation, Measurement of evaporation- Evapotranspiration- Penman and Blaney & Criddle Methods -Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices'.

UNIT II

Distribution of Runoff: Hydrograph Analysis Flood Hydrograph – Effective Rainfall - Base Flow- Base Flow Separation - Direct Runoff Hydrograph– Unit Hydrograph, definition and limitations of application of Unit hydrograph, Derivation of Unit Hydrograph from Direct Runoff Hydrograph and vice versa S- hydrograph, Synthetic Unit Hydrograph.

UNIT III

Ground water Occurrence: Types of aquifers, aquifer parameters,' porosity' Specific yield, permeability, transmissivity and storage coefficient, Darcy's law, radial flow to wells in confined and unconfined aquifers, Types of wells, Well Construction - Well Development.

UNIT IV

Necessity and importance of irrigation: Advantages and ill-effects of irrigation, Types of irrigation, Methods of application of irrigation water, Indian Agriculture soils, Methods of improving soil fertility-Crop rotation, preparation land for irrigation, Standards of quality for irrigation water.

Soil-water-plant relationship: Vertical distribution of soil moisture, soil moisture constants, soil moisture tension, consumptive use, Duty and delta, factors Affecting duty- design discharge for a water course. The depth and frequency of Irrigation, Irrigation efficiencies-Water Logging.

UNITV

Classification of canals: Design of Irrigation canals by Kennedy's and Lacey's theories, balancing depth of cutting, IS standards for canal design canal lining.

Design discharge over a catchment: computation of design discharge–rational formula, SCS curve number method, flood frequency analysis introductory part only. Stream gauging-measurement and estimation of stream flow.

TEXT BOOKS

1. A text book of hydrology by P. Jaya Rami Reddy, laxmi publications pvt limited
2.Irrigation engineering and hydraulic structures skgarg, khanna publishers

3. Engineering hydrology- K. Subramanya Tata Mcgraw hill.

REFERENCES

l. Elementary hydrology by V. P. Singh PHI publications

2. Irrigation and Water- Resources &Water Power by P. N. Modi Standard

Book House.

3. Irrigation Water Management by D. K. MajundarPrintice Hall of Indra.

4. Irrigation and Hydraulic structures by S. K. Grag

5. Applied Hydrology by VenTe Chow, David R, Maidment, Larry W. Mays Tata MC.

6. Introduction to Hydrology by Warren ViessmanJrGaryl Lewis

7. Irrigation and Water Power Engineering – Dr. B. C. Punmia, Dr.Lal et.al

8. Water Resources engineering – Larry W. Mays, John Willey & Sons

9. Irrigation engineering theory and practice – A. M. MichealVikas Publishers

10. NPTEL web and video courses

GOKARAJURANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

SOLAR AND WIND ENERGY SYSTEMS
(Open Elective- I)

Sub. Code: GR17A3152 **L T P C**
III Year I Sem **2 1 0 3**

UNIT I

Solar Energy Basics: The sun as a source of energy, The Earth Sun, Earth Radiation Spectrums, Extra-terrestrial and Terrestrial Radiations, Spectral Energy Distribution of Solar Radiation, Depletion of Solar Radiation, Solar Radiation Data, Measurement of Solar Radiation, Solar Time(Local Apparent Time), Solar Radiation Geometry, Solar Day Length, Empirical Equations for Estimating Solar Radiation Availability on Horizontal Surface For Cloudy skies, Hourly Global, Diffuse and Beam Radiation on Horizontal Surface Under Cloudless Skies, Solar Radiation on Inclined Plane Surface

UNIT II

Solar Thermal Systems: Solar Collectors, Solar Water Heater, Solar Passive Space-Heating and Cooling Systems, Solar Ustrial Heating Systems, Solar Refrigeration and Air-Conditioning Systems, Solar Cookers, Solar Furnaces, Solar Green House, Solar Dryer, Solar Distillation(or Desalination of Water), Solar Thermo-Mechanical Systems.

UNIT III

Solar Photovoltaic Systems: Solar Cell Fundamentals, Solar Cell Characteristics, Solar Cell Classification, Solar Cell, Module, Panel and Array Construction, Maximizing The Solar PV Output and Load Matching, Maximizing Power point tracker(MPPT),Balance of System Components, Solar PV Systems, Solar PV Applications

UNIT IV

Wind Energy: Origin of Winds, Nature of Winds, Wind Turbine Siting, Major Applications of Wind Power, Basics of Fluid Mechanics, Wind Turbine Aerodynamics.

UNIT V

Wind Energy Conversion Systems: Wind Energy Conversion Systems (WECS), Wind-Diesel Hybrid System, Effects of Wind Speed and Grid Condition (System Integration), Wind Energy Storage, Environmental Aspects.

TEXT BOOKS

1. B.H.Khan, “Non- Conventional Energy Resources”, 2nd edition, Tata McGraw-Hill, New Delhi

REFERENCES

1. SP Sukhatme, Solar Energy - Principles of thermal collection and storage, 2nd edition, Tata McGraw-Hill, New Delhi

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

APPLIED THERMODYNAMICS
(Open Elective-I)

Course Code: GR17A3153 **LTPC**

III B. Tech I Semester **2 1 0 3**

UNIT I

Steam Power Cycles: Carnot cycle, Rankine cycle, Modified Rankine - Schematic layouts, Thermodynamic Analysis, Concept of Mean Temperature of Heat addition, Methods to improve cycle performance – Regeneration & Reheating. Binary vapour cycle

Combustion: Fuels and combustion, basic chemistry, combustion equations, stochiometric air fuel ratio, volumetric and mass basis conversion, Flue gas analysis by Orsat apparatus.

UNIT II

Boilers : Classification – Working principles – with sketches including H.P. Boilers, L.P. Boilers and Modern H.P. Boilers – Mountings and Accessories – Working principles, Boiler horse power, equivalent of evaporation, efficiency and heat balance. Draught, classification – Height of chimney for given draught and discharge, condition for maximum discharge, efficiency of chimney – Artificial draught: induced, forced, balanced and steam jet draught,

UNIT III

Steam Nozzles: Function of a nozzle – applications - types, Flow through nozzles, thermodynamic analysis, assumptions -velocity of nozzle at exit-Ideal and actual expansion in nozzle, velocity coefficient, condition for maximum discharge, critical pressure ratio, criteria to decide nozzle shape: Super saturated flow, its effects, degree of super saturation and degree of under cooling - Wilson line.

Steam Condensers: Requirements of steam condensing plant – Classification of condensers – working Principle of different types – vacuum efficiency and condenser efficiency – air leakage, sources and its affects, Air pump- cooling water requirement. Cooling towers.

UNIT IV

Steam Turbines: Classification – Impulse turbine ,De-Laval Turbine its features; Mechanical details – Velocity diagram – effect of friction – power developed, axial thrust, blade or diagram efficiency – condition for maximum efficiency.-.

Reaction Turbine: Mechanical details – principle of operation, thermodynamic analysis of a stage.-Degree of reaction –velocity diagram – Parson's reaction turbine – condition for maximum efficiency.

Compounding: Methods to reduce rotor speed-Velocity compounding and pressure compounding, pressure velocity compounding, Velocity and Pressure variation along the flow – combined velocity diagram for a velocity compounded impulse turbine.

UNIT V

Gas Turbines: Simple gas turbine plant – Ideal cycle, essential components – actual cycle – methods for improvement of performance - regeneration, inter cooling and reheating –Closed and Semi-closed cycles – merits and demerits, Brief concepts about compressors, combustion chambers and turbines of Gas Turbine Plant.

Jet Propulsion: Principle of Operation –Classification of jet propulsive engines – Working Principles with Schematic diagrams and representation on T-S diagram - Thrust, Thrust Power and Propulsion Efficiency– Turbo jet engines – Needs and Demands met by Turbo jet – Schematic Diagram, Thermodynamic Cycle, Performance Evaluation Thrust Augmentation – Methods.

Rockets: Working Principle – Classification – Propellant Type – Thrust, Propulsive Efficiency – Specific Impulse – Solid and Liquid propellant Rocket Engines.

TEXT BOOKS

1. Thermal Engineering / R.K. Rajput / Lakshmi Publications
2. Thermal Engineering-P.L.Ballaney/ Khanna publishers
3. Thermal Engineering/R.S.Khurmi/JS Gupta/S.Chand.

REFERENCES

1. Thermodynamics and Heat Engines / R. Yadav / Central Book Depot
2. Gas Turbines and Propulsive Systems – P.Khajuria & S.P.Dubey - /Dhanpatrai
3. Gas Turbines / Cohen, Rogers and SaravanaMuttoo / Addison Wesley – Longman
4. Thermal Engineering-M.L.Marthur & Mehta/Jain bros
5. Gas Turbines – V.Ganesan / TMH

Teaching Methodology: Power Point Presentations, Working models, White Board & Marker

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PRINCIPLES OF E-COMMERCE
(OPEN ELECTIVE I)

Course Code: GR17A3154 **L T P C**

III Year I Semester **2 1 0 3**

UNIT I

INTRODUCTION TO E-COMMERCE

E-commerce, Difference between E-commerce and E-business, Purpose of E-Commerce, Eight Unique Features of E-commerce Technology, Web 2:0, Types of E-commerce, Growth of the Internet and the Web, Origins and Growth of E-commerce, Understanding E-commerce.

UNIT II

E-COMMERCE BUSINESS MODELS AND CONCEPTS

E-commerce Business Models, Business-to-Consumer (B2C) Business Models, Business-to-Business (B2B) Business Models, Business Models in Emerging E-commerce Areas.

UNIT III

BUILDING AN E-COM WEB SITE

Building an E-commerce Web Site, Choosing Software, Choosing the Hardware, E-commerce Site Tools.

UNIT IV

ONLINE SECURITY AND PAYMENT SYSTEMS

Security Threats in the E-commerce Environment, Technology Solutions, payment systems, E-commerce Payment System, Electronic Billing Presentment and Payment.

UNIT V

ONLINE CONTENT AND MEDIA

Online Content, Online Publishing Industry, Online Entertainment Industry.

TEXT BOOK

Kenneth C. Laudon Carol GuercioTraver, “E-commerce: business, technology, society”, Fifth edition, Pearson Prentice Hall, 2009. (Unit-1:Chapter -1, Unit-II: Chapter-2, Unit-III: Chapter-4, Unit-IV: Chapter-5, Unit-V:Chapter-10)

REFERENCES

1. Dave Chaffey, "E-Business and E-Commerce Management: Strategy, Implementation and Practice", Fifth edition, Pearson Education, 2013.
2. K.K. Bajaj, Debjani Nag, "E-Commerce: The Cutting Edge of Business", Second edition, McGraw Hill Education (India) Private Limited, 2005.
3. David Whiteley,“E-Commerce: Strategy, Technologies And Applications”, McGraw Hill Education (India) Private Limited, 2001.
4. SteffanoKorper, "The E-Commerce Book: Building the E-Empire", Morgan Kaufmann, 2000.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DATA MINING AND APPLICATIONS

(Open Elective – I)

Course Code: GR17A3155	**L**	**T**	**P**	**C**
III Year I Semester	**2**	**1**	**0**	**3**

UNIT I

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Major issues in Data Mining. Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT II

Mining Frequent Patterns, Associations and Correlations: Basic Concepts, Efficient and Scalable Frequent Itemset Mining Methods, Mining various kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint- Based Association Mining

UNIT III

Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back propagation, Support Vector Machines, Associative Classification, Prediction, Accuracy and Error measures, Evaluating the accuracy of a Classifier or a Predictor.

Cluster Analysis Introduction :Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Outlier Analysis - Distance-Based Outlier Detection, Density-Based Local Outlier Detection

UNIT IV

Mining World Wide Web: Mining web page layout structure, Identification of authoritative web pages using web link structures, Automatic Classification of Web Documents, Web Usage Mining.

Spatial Mining: Mining spatial association and colocation patterns, spatial clustering methods, spatial classification and spatial trend analysis.

UNIT V

Text Mining: Text Data analysis and Information retrieval, Dimensionality reduction for text, text mining approaches.

Applications and trends in Data Mining : Data Mining for Financial Data Analysis, , Data Mining for Telecommunication Industry, Data Mining for Intrusion Detection, Various themes on Data Mining, Social impacts of data mining

TEXT BOOKS

1. Data Mining – Concepts and Techniques - Jiawei Han and Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, Second Edition, 2006.
2. Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson education.
3. Data Mining – Introductory and advanced topics – Margaret H. Dunham & S.Sridhar,

Pearson Education.

REFERENCES

1. Data Mining Techniques – Arun K. Pujari, Second Edition, Universities Press.
2. Data Warehousing in the Real World, Sam Anahory and Dennis Murray, Pearson Edn Asia.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPUTER ARCHITECTURE AND ORGANIZATION

(Open Elective-1)

Course Code: GR17A3156 **L T P C**

III Year I Semester **2 1 0 3**

UNIT I

Introduction

Computing and Computers, Evolution of Computers, VLSI Era, System Design; Register Level, Processor Level, CPU Organization, Data Representation, Fixed Point Numbers, Floating Point Numbers, Instruction Formats, Instruction Types, addressing modes.

UNIT II

Data Path Design

Fixed Point Arithmetic, Addition, Subtraction, Multiplication and Division, Combinational a nd SequentialALUs, Carry look ahead adder, Robertson algorithm, booth's algorithm, non-restoring division algorithm,Floating Point Arithmetic, Coprocessor, Pipeline Processing, Pip eline design, Modified booth's Algorithm

UNIT III

Control Design

Hardwired Control, Microprogrammed Control, Multiplier Control Unit, CPU Control Unit, Pipeline Control Instruction Pipelines, Pipeline Performance, Superscalar Processing, Nano Programming.

UNIT IV

Memory Organization

Random Access Memories, Serial Access Memories, RAM Interfaces, Magnetic Surface Recording,Optical Memories, multilevel memories, Cache & Virtual Memory, Memory Allo cation, Associative Memory.

UNIT V

System Organization

Communication methods, Buses, Bus Control, Bus Interfacing, Bus arbitration, IO and systemcontrol, IOinterface circuits, Handshaking, DMA and interrupts, vectored interrupts, PCI interrupts, pipelineinterrupts, IOP organization, operation systems, multiprocessors, faul t tolerance, RISC and CISC processors, Superscalar and vector processor.

TEXT BOOKS:

1. John P.Hayes, 'Computer architecture and Organisation', TMH Third edition, 1998.
2. V. Carl Hamacher, Zvonko G. Varanesic and Safat G. Zaky, "Computer Organisation", V edition, McGraw-Hill Inc, 1996.

REFERENCES:

1. Morris Mano, "Computer System Architecture", Prentice-Hall of India, 2000.

2. Paraami, “Computer Architecture”, BEH R002, Oxford Press.
3. P.Pal Chaudhuri, “Computer organization and design”, 2nd Ed., Prentice Hall of India, 2007.
4. G.Kane & J.Heinrich, “MIPS RISC Architecture”, Englewood cliffs, New Jersey, Prentice Hall, 1992.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DESIGN OF STEEL STRUCTURES

Course Code: GR17A3007	**L T P C**
III Year II Semester	**2 1 0 3**

UNIT I

Materials: Making of iron and steel, types of structural steel, mechanical properties of steel and yield strength. Loads and combination, local buckling behavior of steel and concepts of limit state. Design Strengths, deflection limits, serviceability and stability check.

UNIT II

Bolted connections and Riveted connections: IS – 800 – 2007 specifications, Design strength, efficiency of joint and prying action.

Welded connections: Types of welded joints, specifications and design requirements.

UNIT III

Design of tension member: Design strength, design of splice and lug angle.

Design of compression members: Design strength, buckling class, slenderness ratio, design strength, laced and battened columns, column splice, column slab base and gusset base.

UNIT IV

Design of Beams: Introduction, types of sections, lateral stability of beams, lateral torsional buckling, bending strength of beams, shear strength of beams web buckling, web crippling, deflection, built-up beams, lintels and purlins.

UNIT V

Eccentric and Moment connections: Introduction, beam-column connections, connections subjected to eccentric shear, bolted framed connections, bolted seat connections, bolted bracket connections, welded framed connections, welded seat connections, welded bracket connection, moment resistant connection, bolted moment connections and welded moment connections.

TEXT BOOKS:

1. Design of steel structures – N. Subramanian, Oxford University Press – 2009.
2. Limit State Design of steel structures, S.K.Duggal, Tata McGraw – Hill, 2010

REFERENCES

1. Design of Steel structures by K. S. Sai Ram, Person Education.
2. Design of Steel Structures Vol. 1 & 2 – Ramchandra, Standard Publications.
3. Design of steel structures , S. S. Bhavikatti, IK int Publication House, New Delhi, 2010
4. Design of steel structures, BC Punmia A. K. Jain , Ashok Kumar Jain, Laxmi Publications
5. Design of steel structures, S. Ramamrutham, DhanpatRai Publishing Company (p) Limited

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

MANAGEMENT SCIENCE

Course Code: GR17A3102 **LTPC**
III Year II Semester **3 1 0 4**

UNIT I

Introduction to Management &Organisation: ***Concepts of Management and Organization***: Nature, Importance, Functions and Theories of Management; Systems Approach to Management; Leadership Styles; Social Responsibilities of Management. ***Designing Organisational Structures:*** Basic concepts relating to Organisation; Departmentation and Decentralisation, Types and Evolution of mechanistic and organic structures of organisation and suitability.

UNIT II

Operations & Marketing Management: Principles and Types of Plant Layout, Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement. ***Statistical Quality Control***: Control Charts for Variables and Attributes (Simple Problems) and Acceptance Sampling, Deming's contribution to quality. Objectives of Inventory Control, EOQ, ABC Analysis, Purchase Procedures, Stores Management and Stores Records - Functions of Marketing, Marketing Mix, Marketing Strategies based on Product Life Cycle, Channels of Distribution.

UNIT III

Human Resources Management (HRM): Concepts of Personnel Management, HRM and HRD and Industrial Relations (IR), HRM vs. PMIR. Basic functions of HR Manager: Manpower planning, Recruitment and Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Analysis, Job Description, and Job Evaluation.

UNIT IV

Project Management *(PERT/CPM)*: Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).

UNIT V

Strategic Management and Contemporary Strategic Issues: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Contemporary Management Practices: Basic concepts of MIS, End User Computing, Materials Requirement Planning (MRP), Just-In-Time (JIT) System, Total Quality Management (TQM), Six Sigma and Capability Maturity Model (CMM) Levels, Supply Chain Management, Enterprise Resource Planning (ERP), Performance Management, Business Process Outsourcing (BPO), Business Process Re-engineering and Bench Marking, Balanced Score Card.

Teaching Methodologies:

a) Lecture Method
b) Use of OHP
c) Power Point Presentation
d) Tutorials and Assignments

TEXT BOOK

1. Aryasri: *Management Science,* TMH, 2009.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

GEOTECHNICAL ENGINEERING-1

Course Code: GR17A3010 **L T P C**
III Year II Semester **3 1 0 4**

UNIT I

Introduction: Soil formation, soil structure and clay mineralogy, adsorbed water, phase diagrams, mass-volume relationships, relative density.
Index properties of soils: Grain size analysis, sieve and hydrometer methods, consistency limits and indices, I.S. classification of soils.

UNIT II

Permeability: Capillary rise, Darcy's law, factors affecting permeability, laboratory determination of coefficient of permeability, Permeability of layered systems, In-situ permeability tests - pumping-out tests.
Seepage through soils: Total, neutral and effective stresses, quick sand condition, Flownets, characteristics and uses.

UNIT III

Stress distribution in soils: Introduction, Boussinesq's theory for point loads, uniformly loaded circular and rectangular areas, pressure bulb, variation of vertical stress under point load along the vertical plane and horizontal plane, Westergaard's theory, appropriate stress distribution methods - equivalent point load method and two to one method, Newmark's influence chart construction and use.

UNIT IV

Compaction: Mechanism of compaction, factors affecting compaction, effects of compaction on soil properties, field compaction and compaction quality control.
Consolidation: Computation of settlements, stress history of clay, over consolidation ratio, laboratory consolidation test – logarithm of time fitting method and square root of time fitting method, pre-consolidation pressure and its determination, Terzaghis 1-D consolidation theory.

UNIT V

Shear strength of soils: Importance of shear strength, Mohr circle of stress, Mohr's - Coulomb failure theories, types of laboratory strength tests, shear strength of sands and clays, critical void ratio, liquefaction.

TEXT BOOKS

1. GopalRanjan and ASR Rao, Basic and Applied Soil Mechanics, New Age International Pvt. Ltd, New Delhi, 2nd edition (2000), Reprint (2014).
2. K.R. Arora, Soil Mechanics and Foundation Engineering, Standard Publishers Distributors, Delhi, 5th edition (2000), Reprint (2009).

REFERENCES

1. B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Soil Mechanics and Foundations, Laxmi publications Pvt. Ltd., New Delhi, 16th edition, Reprint (2012).
2. C. Venkataramiah, Geotechnical Engineering, New age International publishers (2002), 4th edition (2012).
3. Dr. P. Purushotham Raj, Soil Mechanics and Foundation Engineering, Pearson Education India (2008).
4. S. K.Gulhati & ManojDatta, Geotechnical Engineering, Mc.Graw Hill Education Pvt Ltd., New Delhi (2005), 16th Reprint (2013).
5. Braja M. Das, Advanced Soil Mechanics, Taylor and Francis, 3rd edition (2008).
6. Donald P. Coduto, Geotechnical Engineering, Printice-Hall India Publications, 2nd edition (2010).

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED WATER RESOURCES ENGINEERING
(Professional Elective-II)

Course Code: GR17A3108 **LTPC**
III Year II Semester **3 1 0 4**

UNIT I

Overview of fundamental of Hydrology – Rainfall data collection and processing, Estimation of runoff, Measurement of evaporation and infiltration, Estimation of evapotranspiration. Unit hydrograph and S – curve hydrograph.

Storage Works-Reservoirs - Types of reservoirs, selection of site for reservoir' zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve-Reservoir Sedimentation –Benefit cost ratio analysis of a reservoir- Life of Reservoir.-Types of dams, factors affecting selection of type of dam, factors governing selection of site for a dam

UNITII

Gravity dams: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary, common profile and practical profile of a gravity dam, limiting height of a low gravity dam, Factors of Safety -'stability Analysis, Foundation for a Gravity Dam, drainage and inspection galleries and their impact, stress analysis of a gravity dam.

UNIT III

Earth dams: Types of Earth dams, causes of failure of earth dam, criteria for safe design of earth dam, seepage through earth dam-graphical method, measures for control of seepage through embankments and foundations.

Spillways: types of spillways, Design principles of Ogee spillways – Spillway gates. Energy Dissipators and Stilling Basins, Significance of jump, Indian types of Stilling Basins& USBR stilling basins.

UNIT IV

Diversion Head works: Types of Diversion head works- weirs and barrages,layout of diversion head work - components. causes and failure of weirs and Barrages on permeable foundations,-Silt Ejectors and Silt Excluders weirs on Permeable Foundations - creep Theories
- Bligh's, lane and Khosla's theories, Determination of uplift pressure- Various Correction Factors - Design principles of weirs on permeable foundations using creep theories - exit gradient, U/s and D/s Sheet Piles - Launching Apron

UNIT V

Canal falls: Types of falls and their location, design principles of Notch fall and sarda type fall. Canal regulation works, principles of design of distributor and head regulators, canal cross regulators-canal outlets, types of canal modules, proportionality, sensitivity and flexibility.

Cross drainage works types: Selection of site, design principles of aqueduct siphon aqueduct and super passage. Design of Type II Aqueduct (Under Tunnel).

TEXT BOOKS

1. Irrigation Engineering and Hydraulic Structures. S.K.Garg 2014- Khanna Publishers- 19^{th} edition.

REFERENCES

1. Irrigation and water power engineering. B.C.Punmia, Pande B.B.Lal, Ashok kumar jain, Arun kumar jain- Laxmi publications 16th edition.
2. Irrigation Engineering and Hydraulic structures. S.R.Sahasrabudhe, 2013,S.K.Kataria& sons.
3. Water Resources Engineering – Larry W.Mays -John Wiley & Sons W Inc.
4. Theory and Design of Irrigation Structures – R.S. Varshney, S.C. Gupta, R.L.Gupta – Nemchand & Bros., Rorkhee
5. Handbook of applied hydrology – V.T. Chow
6. Handbook of hydrology – David R. Maidment, McGraw Hill
7. Chow's handbook of applied hydrology – Vijay P Singh, McGraw Hill
8. NPTEL web and video courses

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DISASTER MANAGEMENT AND MITIGATION
(Professional Elective-II)

Course Code: GR17A3011 **L T P C**
III Year II Semester **3 1 0 4**

UNIT I

Environmental Hazards & Disasters: Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology-Landscape Approach- Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches.

Types of Environmental hazards & Disasters: Natural hazards and Disasters - Man induced hazards & Disasters - Natural Hazards- Planetary Hazards/ Disasters - Extra Planetary Hazards/ disasters - Planetary Hazards- Endogenous Hazards - Exogenous Hazards.

UNIT II

Endogenous Hazards: Volcanic Eruption - Earthquakes - Landslides -Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions - Earthquake Hazards/ disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - Earthquake Hazards in India - Human adjustment, perception & mitigation of earthquake.

Exogenous hazards/disasters: Infrequent events- Cumulative atmospheric hazards/ disasters, Infrequent events: Cyclones - Lightning - Hailstorms, Cyclones: Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes, distribution human adjustment, perception & mitigation), Cumulative atmospheric hazards/ disasters: Floods- Droughts- Cold waves- Heat waves

UNIT III

Floods: Causes of floods- Flood hazards India- Flood control measures (Human adjustment, perception & mitigation), Droughts:- Impacts of droughts- Drought hazards in India- Drought control measures- Extra Palnetary Hazards/ Disasters- Man induced Hazards /Disasters- Physical hazards/ Disasters-Soil Erosion Soil Erosion:- Mechanics & forms of Soil Erosion- Factors & causes of Soil Erosion- Conservation measures of Soil Erosion, Chemical hazards/ disasters, Release of toxic chemicals, nuclear explosion- Sedimentation processes.

Sedimentation processes - Global Sedimentation problems- Regional Sedimentation problems- Sedimentation & Environmental problems- Corrective measures of Erosion &

1. Pre- disaster stage (preparedness)
2. Emergency Stage
3. Post Disaster stage-Rehabilitation

UNIT IV

Natural Disaster Reduction & Management

a) Provision of Immediate relief measures to disaster affected people
b) Prediction of Hazards & Disasters
c) Measures of adjustment to natural hazards

Disaster Management: An integrated approach for disaster preparedness, mitigation &awareness.

Mitigation- Institutions- discuss the work of following Institution.

a. Meteorological observatory
b. Seismological observatory
c. Volcanology institution
d. Hydrology Laboratory
e. Industrial Safety inspectorate
f Institution of urban & regional planners
g. Chambers of Architects
h. Engineering Council
i. National Standards Committee

a) Education on disasters
b) Community involvement
c) The adjustment of Human Population to Natural hazards & disasters Role of Media

Monitoring Management: Discuss the programme of disaster research & mitigation of disaster of following organizations.

a) International Council for Scientific Unions (ICSU)- Scientific committee on problems of the Environment (SCOPE), International Geosphere-Biosphere programme(IGBP)
b) World federation of Engineering Organizations (WFED)
c) National Academy of Sciences
d) World Meteorological organizations (WMO)
e) Geographical Information System (GIS)
f) International Association of Seismology & Physics of Earth's Interior (IASPEI)
g) Various U.N agencies like UNCRD, IDNDR, WHO, UNESCO, UNICEF, UNEP.

UNIT V

a. A regional survey of Land Subsidence, Coastal Disaster, Cyclonic Disaster & Disaster in Hills with particular reference to India
b. Ecological planning for sustainability & sustainable development in India- Sustainable rural development: A Remedy to Disasters -Role of Panchayats in Disaster mitigations
c. Environmental policies &programmes in India- Institutions & National Centres for Natural Disaster reduction. Environmental Ixgislations in India,Awareness, Conservation Movement,Education& training.

TEXT BOOKS:

1. Disaster Mitigation: Experiences and Reflections by Pardeep Sahni ,PHI Learning private limited.
2. Natural Hazard’s & Disaster by Donald Hyndyman & David Hydman_Cengage Learning

REFERENCE BOOKS:

1. R.B.Singh (Ed) Environmental Geography, Heritage Publishers New Delhi, 1990.
2. Savinder Singh Environmental Geography, Prayag Pustak Bhawan, 1997.
3. Kates,B.I& White, GF The Environment as Hazards, oxford, New York, 1978.
4. R.B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi,2000.
5. H.K. Gupta (Ed) Disaster Management, Universiters Press, India, 2003.
6. R.B. Singh, Space Technology for Disaster Mitigation in India (INCED), University of Tokyo, 1994.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED REINFORCED CONCRETE STRUCTURAL DESIGN
(Professional Elective-II)

Course Code: GR17A3112	**LT P C**
III Year II Semester	**3 1 0 4**

UNIT I

Retaining walls: Introduction, design of cantilever type retaining wall and counter fort retaining wall.

UNIT II

Water Tanks: Introduction, design of rectangular and circular tanks resting on ground and rectangular and circular tanks overhead water tanks.

UNIT III

Bridges: Introduction, design of slab and T-Beam bridges.

UNIT IV

Flat Slabs: Introduction, design of Flat slabs interior and exterior panels.

UNIT V

Bunkers and Silos: Introduction, design of square and circular bunkers, design of shallow and deep bins.

TEXT BOOKS:

1. Design of RCC structures by Dr.B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain. Laxmi publications, New Delhi.
2. Design of RCC structures by S.Ramamrutham. Dhanpatti Rai publishing company.

REFERENCE BOOKS:

1. Reinforced concrete design by N.KrishnaRaju and R.N.Pranesh. New age international publishers, New Delhi.
2. Limit state design of Reinforced concrete by PC Verghese. PHI publishers, New Delhi.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

GEOTECHNICAL ENGINEERING LAB

Course Code: GR17A3013 **LTPC**
III Year. II Semester **0 02 2**

List of experiments:

Task1: Liquid limit and plastic limit

Task2: Grain size distribution by sieve analysis

Task3: Field density by core cutter method

Task4: Field density by sand replacement method

Task5: Relative density of sands

Task6: Standard and modified compaction test

Task7: Permeability of soil by constant and variable head test

Task8: California Bearing Ratio Test

Task9: Consolidation test

Task10: Unconfined compression test

Task11: Direct shear test

Task12: Vane shear test

Task13: Tri-axial test (Demonstration)

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

HIGHWAY MATERIALS LAB

Course Code: GR17A3014	**L**	**T**	**P**	**C**
III Year. II Semester	**0**	**0**	**2**	**2**

Task1: ROAD AGGREGATES

1. Crushing value
2. Impact value
3. Specific gravity and water absorption
4. Abrasion test
5. Shape test.

Task2: BITUMINOUS MATERIALS

1. Penetration test
2. Ductility test
3. Softening point test
4. Flash and fire point tests

Task3: BITUMINOUS MIXES

1. Specific gravity
2. Marshall stability test
3. Stripping Value test

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

TRANSPORTATION ENGINEERING
(Open Elective – II)

Course Code: GR17A3161 **L T P C**
III Year II Semester **2 1 0 3**

UNIT I

Highway development and planning: Highway development in India – Necessity for Highway Planning- Different Road Development Plans- Classification of Roads- Road Network Patterns – Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports.

UNIT II

Highway geometric design: Importance of Geometric Design- Design controls and Criteria- Highway Cross Section Elements- Sight Distances- Stopping sight Distance, Overtaking Sight Distance, intermediate Sight Distance and Head light sight distance- Design of Horizontal Alignment- Design of Super elevation and Extra widening- Design of Transition Curves-Design of Vertical alignment-Gradients- Vertical curves.

UNIT III

Traffic engineering: Traffic flow parameters-Volume, Speed, Density and headway- Traffic Volume Studies- Data Collection and Presentation-speed studies- Data Collection and Presentation- Parking Studies, Parking types and Parking characteristics- Road Accidents- Causes and Preventive measures- Accident Data Recording – Condition Diagram and Collision Diagrams.

Traffic regulation and management: Road Traffic Signs – Types and Specifications – Road markings-Need for Road Markings-Types of Road Markings- Design of Traffic Signals – Webster Method –IRC Method.

UNIT IV

Intersection design: Types of Intersections – Conflicts at Intersections- Types of At-Grade Intersections- Channelization: Objectives –Traffic Islands and Design criteria-Types of Grade Separated Intersections- Rotary Intersection – Concept of Rotary and Design Criteria- Advantages and Disadvantages of Rotary Intersection.

UNIT V

Introduction to railway and airport engineering: Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve – Crossings and Turn outs. Factors affecting Selection of site for Airport – Aircraft Characteristics- Geometric Design of Runway- Computation of Runway length – Correction for runway length – Orientation of Runway – Wind Rose Diagram – Runway Lighting system.

TEXT BOOKS:

1. Highway Engineering – S.K.Khanna&C.E.G.Justo, Nemchand& Bros., 9th edition (2011).

2. Railway Engineering – A text book of Transportation Engineering – S.P.Chandola – S.Chand& Co. Ltd. – (2001).

3. Highway Engineering Design – L.R.Kadiyali and Lal- Khanna Publications.

4. Airport Planning and Design- S.K.Khanna and Arora,Nemchand Bros.

5. Railway engineering- A Textbook of Railway Engineering- Subhash C. Saxena,

Satyapal Arora – DhanpatRai S Sons – (2012)

REFERENCES:

1. Highway Engineering – S. P. Bindra,DhanpatRai& Sons. – 4th Edition (1981)

2. Traffic Engineering & Transportation Planning – Dr.L.R.Kadyali, Khanna Publications – 8th Edition – 2011.

3. Railway Engineering –Prabha& Co., 15th Edition – August 1994.

4. Air Transportation Planning & design – Virendhra Kumar &StatishChandhra – Gal Gotia Publishers (1999).

5. Railway Engineering - A Text book of Railway Engineering - Subhash C. Saxena,

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

SENSORS AND TRANSDUCERS

(Open Elective – II)

Course Code: GR17A3162 **LTPC**
III Year II Sem **2 1 0 3**

UNIT I

Introduction: Sensors / Transducers, principles, classification, parameters, characterizations

UNIT II

Introduction to mechanical & Electro Mechanical Sensors: Resistive Potentiometer, Inductive sensors, Capacitive Sensors, Ultrasonic Sensors

UNIT III

Basics of Thermal and Magnetic Sensors: Gas thermometric sensors, Thermal expansion type thermometric sensors, acoustic temperature sensors, dielectric constant and refractive index thermo sensors. Sensors and principles: Yoke coil sensor, coaxial type sensor, Force and displacement sensor

UNIT IV

SMART Sensors: Introduction, Primary sensors, Excitation, Amplification, Filters, Converters, Compensation, Information coding / processing, Data Communication, The Automation

UNIT V

SMART Sensors: Introduction, Primary sensors, Excitation, Amplification, Filters, Converters, Compensation, Information coding / processing, Data Communication The Automation

TEXT BOOK:

1. Sensors & Transducers By D. Patranabis , PHI Publications

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

AUTOMOBILE ENGINEERING
(Open Elective-II)

Course code: GR17A3163 **L T P C**
III B. Tech II Semester **2 1 0 3**

UNIT I

INTRODUCTION, ENGINE AND LUBRICATION SYSTEM

Components of four wheeler automobile – chassis and body – power unit –power transmission – rear wheel drive, front wheel drive, 4 wheel drive – types of automobile engines, Engine construction, turbo charging and super charging, Engine lubrication, splash and pressure lubrication systems, oil filters, oil pumps – crank case ventilation – engine service, reboring, decarbonisation, Nitriding of crank shaft.

Emissions : Emission from Automobiles – Pollution standards National and international – Pollution Control – Techniques – Energy alternatives – Photovoltaic, hydrogen, Biomass, alcohols, LPG and CNG.

UNIT II

FUEL SYSTEM AND COOLING SYSTEM

Fuel System in S.I. Engine : Fuel supply systems, Mechanical and electrical fuel pump – filters– carburetor – types – air filters – petrol injection-Multi point fuel injection(MPFI).

Fuel System in C.I. Engines: Requirements of diesel injection systems, types of injection systems, fuel pump, nozzle, spray formation, injection timing, testing of fuel pumps. CRDI engines.

Cooling System: Cooling Requirements, Air Cooling, Liquid Cooling, Forced Circulation System – Radiators – Types – Cooling Fan - water pump, thermostat, evaporative cooling – pressure sealed cooling – anti freeze solutions.

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UNIT III

IGNITION SYSTEM AND ELECTRICAL SYSTEM

Ignition System: Function of an ignition system, battery ignition system, constructional features of storage, battery, auto transformer, contact breaker points, condenser and sparkplug – Magneto coil ignition system, electronic ignition system using contact breaker, electronic ignition using contact triggers – spark advance and retard mechanism.

Electrical System : Charging circuit, generator, current – voltage regulator – starting system, bendix drive mechanism solenoid switch, lighting systems, Horn, wiper, fuel gauge – oil pressure gauge, engine temperature indicator etc.

UNIT IV

TRANSMISSION AND STEERING SYSTEM

Transmission System: Clutches, principle, types, cone clutch, single plate clutch, multi plate clutch, magnetic and centrifugal clutches, fluid fly wheel – gear boxes, types, sliding mesh, constant mesh, synchro mesh gear boxes, epicyclic gear box, over drive, torque converter. Propeller shaft – Hotch – Kiss drive, Torque tube drive, universal joint, differential rear axles –types – wheels and tyres.

Steering System: Steering geometry – camber, castor, king pin rake, combined angle toein, center point steering. Types of steering mechanism – Ackerman steering mechanism, Davis steering mechanism, steering gears – types, steering linkages.

UNIT V

SUSPENSION AND BRAKING SYSTEM

Suspension System: Objects of suspension systems – rigid axle suspension system, torsion bar, shock absorber, Independent suspension system.

Braking System: Mechanical brake system, Hydraulic brake system, Master cylinder, wheel Cylinder, tandem master cylinder, Requirement of brake fluid, Pneumatic and vacuum brakes.

TEXT BOOKS:

1. Automobile Engineering -R B Gupta
2. Automotive Mechanics – William Crouse
3. Automobile Engineering Vol. 1 & Vol. 2 / Kripal Singh

REFERENCES

1. Automotive Engineering / Newton Steeds & Garrett
2. Automotive Mechanics / G.B.S. Narang
3. Automotive Mechanics / Heitner
4. Automotive Engines / Srinivasan
5. Automobile Engineering – K.K. Ramalingam / Scitech Publications (India) PVT.

Teaching Methodology:

Power point Presentations, Working models, white board & marker

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ESSENTIALS OF BIG DATA ANALYTICS

(Open Elective – II)

Course Code: GR17A3165 **L T PC**

III Year II Semester **2 1 0 3**

UNIT I

INTRODUCTION TO BIG DATA AND HADOOP: Types of Digital Data, Introduction to Big Data, Big Data Analytics, History of Hadoop, Apache Hadoop, Analysing Data with Unix tools, Analysing Data with Hadoop, Hadoop Streaming, Hadoop Echo System, IBM Big Data Strategy, Introduction to Infosphere BigInsights.

UNIT II

HDFS(Hadoop Distributed File System)

The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume and Scoop and Hadoop archives, Hadoop I/O, Compression, Serialization, Avro and File-Based Data structures.

UNIT III

Map Reduce

Map Reduce programming Model, Anatomy of a Map Reduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats, Map Reduce Features.

Introduction to Oozie. Overview of Managing job Execution

Pig: Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Pig Latin : Structure, statements, Expressions, Types, Schemas, Functions and Macros. Pig User Defined Functions, Data Processing operators.

UNIT IV

Data Stores on Hadoop Hive : Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions. Hbase: HBasics, Concepts, Schemas, Loading Data, Web queries, Hbase Versus RDBMS. Introduction to Zookeeper

UNIT V

IBM APPLICATIONS ON HADOOP

Big SQL: Introduction to Big SQL, Datatypes, Big SQL Statistics.

Big Sheets: Introduction, Processing and Accessing BigSheets, Big SQL Integration. **TEXT BOOKS**

1. Tom White “Hadoop: The Definitive Guide” Third Edit on, O’reily Media, 2012.
2. Seema Acharya, SubhasiniChellappan, “Big Data Analytics” Wiley 2015

REFERENCE BOOKS

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis”, Springer, 2007.
2. Jay Liebowitz, “Big Data and Business Analytics” Auerbach Publications, CRC press (2013)
3. Tom Plunkett, Mark Hornick, “Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop”, McGraw-Hill/Osborne Media (2013), Oracle press.
4. AnandRajaraman and Jefrey David Ulman, “Mining of Massive Datasets”, Cambridge University Press, 2012.
5. Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics”, John Wiley & sons, 2012.
6. Glen J. Myat, “Making Sense of Data”, John Wiley & Sons, 2007
7. Pete Warden, “Big Data Glossary”, O’Reily, 2011.

8. Michael Mineli, Michele Chambers, AmbigaDhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.
9. ArvindSathi, “Big Data Analytics: Disruptive Technologies for Changing the Game”, MC Press, 2012
10. Paul Zikopoulos, Dirk De Roos, Krishnan Parasuraman, Thomas Deutsch, James Giles, David Corigan, "Harness the Power of Big Data The IBM Big Data Platform", Tata McGraw Hill Publications, 2012.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PRINCIPLES OF OPERATING SYSTEMS
(OPEN ELECTIVE-II)

Course Code: GR17A3166 **L T P C**
III Year II Semester **2 1 0 3**

UNIT I

Computer System and Operating System Overview: Overview of computer operating systems, operating systems functions, operating systems structures and systems calls, Evaluation of Operating Systems.

UNIT II

Process Management – Process concept- process scheduling, operations, Inter process communication. Multi Thread programming models. Process scheduling criteria and algorithms, and their evaluation.

UNIT III

Concurrency: Process synchronization, the critical- section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors and Synchronization examples

Memory Management: Swapping, contiguous memory allocation, paging, structure of the page table, segmentation

UNIT IV

Virtual Memory Management: virtual memory, demand paging, page-Replacement, algorithms, Allocation of Frames, Thrashing

Principles of deadlock – system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery form deadlock,

UNIT V

File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

File System implementation- File system structure, allocation methods, free-space management

Mass-storage structure overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, Introduction to Storage Area Networks (SAN), Introduction to Network Attached Storage.

TEXT BOOKS:

1. Operating System Principles, Abraham Silberchatz, Peter B. Galvin, Greg Gagne 8th Edition, Wiley Student Edition.
2. Operating systems - Internals and Design Principles, W. Stallings, 6th Edition, Pearson.

REFERENCES:

1. Modern Operating Systems, Andrew S Tanenbaum 3rd Edition PHI.
2. Operating Systems A concept - based Approach, 2nd Edition, D. M. Dhamdhere, TMH.
3. Principles of Operating Systems, B. L. Stuart, Cengage learning, India Edition.
4. Operating Systems, A. S. Godbole, 2nd Edition, TMH
5. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
6. Operating Systems, S, Haldar and A. A. Arvind, Pearson Education.
7. Operating Systems, R. Elmasri, A. G. Carrick and D. Levine, McGraw Hill.
8. Operating Systems in depth, T. W. Doeppner, Wiley.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

HUMAN COMPUTER INTERACTION
(Open Elective-II)

Course Code: GR17A3164 **LTPC**
III Year II Semester **2 1 0 3**

UNIT I

Introduction: Importance of user Interface –definition, importance of good design. Benefits of good design. A brief history of Screen design The graphical user interface –popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics-Principles of user interface.

UNIT II

Design process –Human interaction with computers, importance of human characteristics, human consideration, Human interaction speeds, Understanding business junctions.

UNIT III

Screen Designing:-Design goals –Screen planning and purpose, organizing screen elements, ordering of screen data and content –screen navigation and flow –Visually pleasing composition –amount of information –focus and emphasis –presentation information simply and meaningfully –information retrieval on web –statistical graphics –Technological consideration in interface design.

UNIT IV

Develop System Menus and Navigation Schemes, -Select the proper kinds of Windows, -Select the proper Device based Controls, Choose the proper screen based controls.

UNIT V

Mobile Ecosystem: Platforms, Application frameworks- Types of Mobile Applications: Widgets, Applications, Games- Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools.

Interaction Devices – Keyboard and Function Keys – Pointing Devices – Speech Recognition Digitization and Generation – Image and Video Display – Drivers.

TEXT BOOKS

1. The essential guide to user interface design, Wilbert O Galitz, Wiley Dreamtech.
2. Designing the user interface. 3rd Edition Ben Shneidermann, Pearson Education Asia
3. Brian Fling, “Mobile Design and Development”, First Edition, O‟Reilly Media Inc., 2009

REFERENCES

1. Human – Computer Interaction. Alan Dix, Janet Fincay, GreGoryd, Abowd, Russell Bealg, Pearson Education
2. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech.
3. User Interface Design, Soren Lauesen, Pearson Education.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

GEOTECHNICAL ENGINEERING-II

Course Code: GR17A4001 **L T P C**
IV Year I Semester **3 1 0 4**

UNIT I

Soil exploration: Introduction, methods of soil exploration, boring and sampling methods, Field tests - penetration tests, plate load test, Menard pressuremeter test, planning and preparation of soil investigation report, borehole logs.

UNIT II

Earth slope stability: Infinite slopes, finite slopes, types of failures, factor of safety of infinite slopes, stability analysis by standard method of slices, total stress and effective stress method of analysis, Taylor's stability Number, stability of earth dam slopes under different conditions.

UNIT III

Earth pressure and retaining walls: Introduction, Rankine's theory of earth pressure, active and passive earth pressures, Coulomb's earth pressure theory, Culmann's graphical method, types of retaining walls, stability of cantilever retaining walls.

UNIT IV

Bearing capacity and settlement analysis of shallow foundations: Types and choice of foundation, location of depth, modes of soil failure, safe bearing capacity by Terzaghi, Meyerhof, Skempton and IS Methods, effect of water table on bearing capacity, safe bearing pressure based on N value, settlement analysis, contact pressure, settlement from plate load test, settlement from penetration tests.

UNIT V

Deep foundations: Types of piles, static pile formulae, dynamic pile formulae, pile load tests, load carrying capacity of pile groups in sands and clays, settlement of pile groups, negative skin friction, types and different shapes of well foundations, components of well foundations. **Ground improvement methods:** Introduction, soil stabilization using lime and cement.

TEXT BOOKS

1. GopalRanjan and ASR Rao, Basic and Applied Soil Mechanics, New Age International Pvt. Ltd, New Delhi, 2nd edition (2000), Reprint (2014).
2. B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Soil Mechanics and Foundations, Laxmi publications Pvt. Ltd., New Delhi, 16th edition, Reprint (2012).

REFERENCES

1. Braja M. Das, Principles of Foundation Engineering, Cengage Learning, New Delhi, 6th edition (2007), Reprint (2012).
2. Bowles, J.E., Foundation Analysis and Design, McGraw-Hill Publishing Company, Newyork, 5th edition (1997).
3. Swami Saran, Analysis and Design of Substructures, Oxford and IBH Publishing company Pvt Ltd., 2nd edition (2006).
4. S. K.Gulhati&ManojDatta, Geotechnical Engineering, Mc.Graw Hill Education Pvt Ltd., New Delhi (2005), 16th Reprint (2013).
5. Teng,W.C, Foundation Design, Prentice Hall, New Jersy, 13th edition, Reprint (1992).

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ESTIMATING & COSTING

Course Code: GR17A4002	**L**	**T**	**P**	**C**
IV Year I Semester	**2**	**1**	**0**	**3**

UNIT I

General items of work in building: Standard Units, Principles of working out quantities for detailed and abstract estimates, approximate methods of Estimating. Detailed Estimates of Buildings – centerline method, longwall short wall method.

UNIT II

Earthwork for roads hill roads (two level sections only) and canals. Quantities of materials for different types of roads.

UNIT III

Rate Analysis –Working out data for various items of work over head and contingent charges. Reinforcement bar bending and bar requirement schedules.

UNIT IV

Contracts: Types of contracts – contract Documents – Conditions of contract, contract procedures, Tendering process, Rights and responsibilities of parties to contracts

UNIT V

Valuation of buildings: Purpose and principles of valuation, Depreciation, methods of calculating depreciation, methods of valuation, Rental method, development method, profit based method

TEXT BOOKS

1. Estimating & Costing by B.N.Dutta, UBS publishers
2. Estimating & Costing by G.S.Birdie.
3. Valuation of real properties by S.C. Rangawala, Charotar publishing house.

REFERENCES

1. Estimating, Costing & Specifications by M.Chakraborthi, Laxmi publications.
2. Standard schedule of rates and standard Data Book by Public works department.
3. SP:27, Handbook of method of measurement of building works, Bureau of Indian Standards.
4. IS:1200, Methods of measurements
5. National Building code.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENVIRONMENTAL ENGINEERING

Course Code: GR17A4003 **L T P C**

IV Year I Semester **3 1 0 4**

UNIT I

Introduction: Waterborne diseases – protected water supply – Population forecasts, design period – water demand – factors affecting – fluctuations – fire demand – storage capacity – water quality and testing – drinking water standards.

Sources of water: Comparison from quality, quantity and other considerations – intakes – infiltration galleries.

UNIT II

Layout and general outline of water treatment units – sedimentation – principles – design factors – coagulation, flocculation, clarifier design – coagulants – feeding arrangements. Filtration – theory – working of slow and rapid gravity filters – multimedia filters – design of filters – troubles in operation comparison of filters – disinfection – theory of chlorination, chlorine demand, other disinfection practices- Miscellaneous treatment methods.

UNIT III

Distribution systems: requirements – methods and layouts, design procedures- Hardy Cross and equivalent pipe methods service reservoirs – joints, valves such as sluice valves, air valves, scour valves and check valves water meters – laying and testing of pipe lines – pump house.

UNIT IV

Conservancy and water carriage systems: sewage and storm water estimation – time of concentration – storm water overflows combined flow – characteristics of sewage – cycles of decay – decomposition of sewage, examination of sewage – B.O.D. – C.O.D. equations. Design of sewers – shapes and materials – sewer appurtenances manholes –inverted siphon – catch basins – flushing tanks – ejectors, pumps and pump houses – house drainage – components requirements – sanitary fittings-traps – one pipe and two pipe systems of plumbing – ultimate disposal of sewage – sewage farming – dilution.

UNIT V

Layout and general outline of various units in a waste water treatment plant – primary treatment design of screens – grit chambers – skimming tanks – sedimentation tanks – principles of design – biological treatment – trickling filters –standard and high rate.

Construction and design of oxidation ponds - Sludge digestion – factors effecting – design of Digestion tank – Sludge disposal by drying – septic tanks working principles and design – soak pits.

TEXT BOOKS:

1. Water Supply Engineering, Vol. 1, waste water Engineering, Vol. II, B.C.Punmia, Ashok Jain &Arun Jain, Laxmi Publications Pvt. Ltd, New Delhi.
2. Elements of environmental engineering by K.N. Duggal, S. Chand Publishers.
3. Water supply and sanitary Engineering by G.S. Birdi, Dhanpat Rai& Sons Publishers.

REFERENCS

1. Water and Waste Water Technology by Mark J Hammer and Mark J. Hammer Jr.
2. Water and Waste Water Technology by Steel
3. Water and Waste Water Engineering by Fair, Geyer and Okun
4. Waste water treatment- concepts and design approach by G.L. Karia and R.A. Christian, Prentice Hall of India
5. Wastewater Engineering by Metcalf and Eddy.
6. Unit operations in Environmental Engineering by R. Elangovan and M.K. Saseetharan, New age International

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

FINITE ELEMENT METHODS
(Professional Elective-III)

Course Code: GR17A4007 **LTPC**
IV Year I Semester **3 1 0 4**

UNIT I

Introduction: Concepts of FEM – Steps involved – merits & demerits – energy principles – Discretization – Rayleigh –Ritz method of functional approximation.

Principles of Elasticity: Equilibrium equations – strain displacement relationships in matrix form – Constitutive relationships for plane stress, plane strain and Axi-symmetric bodies of revolution with Axi-symmetric loading.

UNIT II

One Dimensional FEM: Stiffness matrix for bar element - shape functions for one dimensional elements – one dimensional problems.

UNIT III

Two Dimensional FEM : Different types of elements for plane stress and plane strain analysis – Displacement models – generalized co-ordinates – shape functions – convergent and compatibility requirements – Geometric invariance – Natural coordinate system – area and volume coordinates

UNIT IV

Generation of element stiffness and nodal load matrices for 3-noded triangular element and four noded rectangular elements.

Isoparametric formulation: Concepts of iso-parametric elements for 2D analysis - formulation of CST element, 4 –noded and 8-noded iso-parametric quadrilateral elements – Lagrangian and Serendipity elements.

UNIT V

Axi-symmetric analysis: Basic principles-Formulation of 4-nodediso-parametric axi-symmetric element

Solution Techniques: Numerical Integration, Static condensation, assembly of elements and solution techniques for static loads.

TEXT BOOKS

1. Finite Elements Methods in Engineering by Tirupati.R. Chandrepatla and Ashok D. Belegundu - Pearson Education Publications.
2. Finite element analysis by S.S. Bhavikatti-New age International publishers.
3. Finite element analysis by David V Hutton, Tata Mcgraw Hill, New Delhi.

REFERENCES

1. Concepts and Applications of Finite Element Analysis by Robert D.Cook, David S. Malkus and Michael E.Plesha. Jhon Wiley & Sons.
2. Finite Element analysis – Theory & Programming by C.S.Krishna Murthy- Tata Mc.Graw Hill Publishers.
3. Text book of Finite Element analysis by P.Seshu – Prentice Hall of India.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

GROUND WATER DEVELOPMENT & MANAGEMENT

(Professional Elective-III)

Course Code: GR17A4004	**L TPC**
IV Year I Semester	**3 1 0 4**

UNIT I

Ground Water Occurrence: Ground water hydrologic cycle, origin of ground water, rock properties effecting ground water, vertical distribution of ground water, zone of aeration and zone of saturation, geologic formation as Aquifers, types of aquifers, porosity, Specific yield and Specific retention.

UNIT II

Ground Water Movement: Permeability, Darcy's law, storage coefficient. Transmissivity, differential equation governing ground water flow in three dimensions derivation, ground water flow equation in polar coordinate system. Ground water flow contours their applications.

UNIT III

Analysis of Pumping Test Data – I: Steady flow groundwater flow towards a well in confined and unconfined aquifers, Dupit's and Theism's equations, Assumptions, Formation constants, yield of an open well interface and well tests.

Analysis of Pumping Test Data – II: Unsteady flow towards a well, Non equilibrium equations, Thesis solution, Jocob and Chow's simplifications, Leak aquifers.

UNIT IV

Surface and Subsurface Investigation: Surface methods of exploration, Electrical resistivity and Seismic refraction methods. Subsurface methods, Geophysical logging and resistivity logging. Aerial Photogrammetry applications along with Case Studies in Subsurface Investigation.

UNIT V

Artificial Recharge of Ground Water: Concept of artificial recharge, recharge methods, relative merits, Applications of GIS and Remote Sensing in Artificial Recharge of Ground water along with Case studies.

Saline Water Intrusion in aquifer: Occurrence of saline water intrusions, Ghyben-Herzberg relation, Shape of interface, control of seawater intrusion.

Groundwater Basin Management: Concepts of conjunction use, Case studies.

TEXT BOOKS:

1. Ground water Hydrology by David Keith Todd, John Wiley & Son, New York.
2. Groundwater by H.M.Raghunath, Wiley Eastern Ltd.

1. Groundwater by Bawvwr, John Wiley & sons.
2. Applied Hydrogeology by C.W.Fetta, CBS Publishers & Distributers.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

GROUND IMPROVEMENT TECHNIQUES
(Professional Elective-III)

Course Code: GR17A4009 **LTPC**
IV Year I Semester **3 1 04**

UNIT I

Introduction: Need for ground improvement, objectives, classification of ground improvement techniques.

Dewatering: Methods of dewatering - sumps, single and multi stage well points, vacuum well points, electro-osmosis method, horizontal wells and drains.

UNIT II

In-situ densification methods in granular soils: Vibration at the ground surface, impact at the ground surface, vibration at depth, impact at depth.

In-situ densification methods in cohesive soils: Preloading, vertical drains, sand drains, stone and lime columns, thermal methods.

UNIT III

Grouting: Characteristics of grouts, grouting methods, grouting technology, ascending, descending and stage grouting.

Stabilisation: Methods of stabilization, mechanism of cement and lime stabilization, factors effecting stabilization.

UNIT IV

Reinforced Earth: Mechanism, components of reinforced earth, types of reinforcing elements, applications, factors governing design of reinforced earth walls, design principles of reinforced earth walls, soil nailing.

UNIT V

Geosynthetics: Types of geosynthetics, functions and applications of geosynthetic materials - geotextiles, geogrids and geomembranes.

Expansive soils: Problems of expansive soils, tests for identification, swelling pressure tests, improvement of expansive soils, foundation techniques in expansive soils, under-reamed piles.

TEXT BOOKS

1. Hausmann M.R. Engineering Principles of Ground Modification, McGraw-Hill International Edition (1990).
2. Dr. P. Purushotham Raj, Ground Improvement Techniques, Laxmi Publications, New Delhi, 1st edition (1999), Reprint (2013).

REFERENCES

1. Moseley M.P. and K.Kirsch, Ground Improvement, Blackie Academic and Professional, Florida, 2nd edition (2007).
2. Xanthakos P.P, Abramson, L.W and Brucwe, D.A, Ground Control and Improvement, John Wiley and Sons, New York, USA (1994).
3. Robert M. Koerner, Designing with Geosynthetics, Xlibris Corporation, 6th edition (2012).
4. F.H.Chen, Foundations on Expansive soils, Elsevier Science, 2nd edition (1988).

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

IRRIGATION DESIGN & DRAWING

Course Code: GR17A4010 **LTPC**
IV Year I Semester **0 0 2 2**

Design and drawing of the following hydraulic structures.

GROUP A

1. Surplus weir
2. Syphon well drop
3. Trapezoidal notch fall
4. Tank sluice with tower head

GROUP B

1. Sloping glacis weir
2. Canal regulator

Final Examination Pattern

The question paper is divided into two parts with two questions in each part. The student has to answer ONE question from each part. Part I should cover the designs and drawings from Group A for 45 marks and Part II should cover only designs from Group B carrying 30 marks. However, the students are supposed to practice the drawings for Group B structures also for internal evaluation.

TEXT BOOKS:

1. Water Resources Engineering - Principles and Practice by ChallaSatyanarayana Murthy, New Age International Publishers.
2. Irrigation engineering and hydraulic structures by S.K.Garg, Standard Book House.

REFERENCES:

1. Irrigation Engineering by K.R.Arora.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENVIRONMENTAL ENGINEERING LAB

Course Code: GR17A4011 **LTPC**
IV Year I Semester **00 2 2**

List of Experiments

Task1: Determination of pH and Turbidity

Task2: Determination of Conductivity and Total dissolved solids.

Task3: Determination of Alkalinity/Acidity.

Task4: Determination of Chlorides.

Task5: Determination and Estimation of total solids, organic solids and inorganic solids.

Task6: Determination of iron.

Task7: Determination of Dissolved Oxygen.

Task8: Determination of Nitrogen.

Task9: Determination of total Phosphorous.

Task10: Determination of B.O.D

Task11: Determination of C.O.D

Task12: Determination of Optimum coagulant dose.

Task13: Determination of Chlorine demand.

Task14: Presumptive coliform test.

NOTE: At least 8 of the above experiments are to be conducted.

TEXT BOOKS:

1. Standard Methods for Analysis of water and Wastewater – APHA.
2. Chemistry for Environmental Engineering by Sawyer and Mc. Carty.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPUTER APPLICATIONS IN STRUCTURAL ENGINEERING (CASE) LAB

Course Code: GR17A4012 **L T P C**

IV Year I Semester **0 0 2 2**

Task1: Introduction to STAAD Pro Software

Task2: Design of beams for various supports (SSB,OHB,CT and FX) with PL and UDL

Task3: Design of beams for various supports (SSB,OHB,CT and FX) with UVL and ML

Task4: Analysis and Design of multi-storied building (2D frame)

Task5: Analysis and Design of multi-storied building (3D frame) with DL and LL

Task6: Analysis and Design of multi-storied building (3D frame) with DL LL and WL

Task7: Analysis and Design of multi-storied building (3D frame) with DL LL and EL

Task8: Analysis and Design of multi-storied building (3D frame) with plates

Task9: Analysis and Design of multi-storied building (3D frame) and Result analysis

Task10: Analysis and Design of RCC Rectangular Over Head Tank

Task11: Analysis and Design of RCC Circular Over Head Tank

Task12: Analysis and Design of beams for various cross section (I, C, T, L and composite sections)

Task13: Analysis and Design of various Steel Tubular Trusses

Task14: Analysis and Design of Industrial buildings with various Trusses

Task15: Analysis and Design of Steel Over Head Tank

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

GREEN BUILDING TECHNOLOGY

(Open Elective-III)

Course Code: GR17A4161	**L**	**T**	**P**	**C**
IV Year I Semester	**2**	**1**	**0**	**3**

UNIT 1

Concept of Green Buildings:

Green building Definition, Features, Necessity, Initiatives, Green buildings in India, Green building Assessment- Green Building Rating Systems (BREEAM,USGBC,LEED,IGBC,TERI-GRIHA, GREEN STAR),Criteria for rating, Energy efficient criteria ,environmental benefits economic benefits, health and social benefits , Major energy efficiency areas for building, Contribution of buildings towards Global Warming. Life cycle cost of buildings, Codes and Certification Programs

UNIT II

Sources of Energy:

Renewable and Non-renewable sources of energy ; Coal, Petroleum, Nuclear, Wind, Solar, Hydro, Geothermal sources; potential of these sources, hazards, pollution; Global scenario with reference to demand and supply in India, Global efforts to reduce carbon emissions, Performance testing (new and existing): Building modeling , Energy analysis, Commissioning, Metering, Monitoring.

Carbon emission: Forecasting, Control of carbon emission, Air quality and its monitoring carbon foot print; Environmental issues, Minimizing carbon emission, Energy retrofits and Green Remodels.

UNIT III

Green Building Materials: Sustainably managed Materials, Depleting natural resources of building materials; renewable and recyclable resources; energy efficient materials; Embodied Energy of Materials , Green cement, Biodegradable materials, Smart materials, Manufactured Materials, Volatile Organic Compounds (VOC's), Natural Non-Petroleum Based Materials, Recycled materials, Renewable and Indigenous Building Materials, Engineering evaluation of these materials.

Green Building Planning Methods, Energy Conservation Measures in Buildings, Waste &Water management and Recycling in Sustainable Facilities, Heating, Ventilation and Air Conditioning, Passive Solar & Daylight, Plumbing and its Effect on Energy Consumption

UNIT IV

Design of Green Buildings; Sustainable sites, Impact of building on environment, Life cycle assessment, Principles of sustainable development in Building Design ,Design on Bioclimatic **and Specifications:** Environment friendly and cost effective Building Technologies, Integrated Life cycle design of Materials and Structures, Green Strategies for Building Systems, Alternative Construction and solar passive architecture, Considerations of energy consumption, water use, and system reliability, indoor air quality, noise level, comfort, cost efficiency in building design, Advanced Green building technologies and innovations.

UNIT V

Construction of Green Buildings: Energy efficient construction, Practices for thermal efficiency and natural lighting. Eco- friendly water proofing; ECB codes building rating, Maintenance of green buildings, Cost and Performance Comparisons and Benchmarking, Green Project Management Methods and Best Practices, Cost/benefit analysis of green

buildings,Life-cycle analysis of green buildings, Case studies of rated buildings (new and existing)

TEXT BOOKS:

1. Alternative Building Materials and Technologies – By K S Jagadeesh, B V Venkatta Rama Reddy & K SNanjunda Rao – New Age International Publishers
2. Integrated Life Cycle Design of Structures – By AskoSarja – SPON Press
3. Non-conventional Energy Resources – By D S Chauhan and S K Sreevasthava – New Age InternationalPublishers
4. Green Buildings (McGraw hill publication): by Gevorkian
5. Emerald Architecture: case studies in green buildings, The Magazine of Sustainable Design
6. Understanding Green Building Guidelines: For Students and Young Professionals, Traci Rose Rider ,W. W. Norton & Company Publisher.
7. Understanding Green Building Materials,Traci Rose Rider, W. W. Norton & Company Publisher.

REFERENCES

1. IGBC reference guide
2. Free abridged versions of LEED reference guides
3. ECBC latest version
4. US GBC's Reference Material:

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

SOFT COMPUTING TECHNIQUES
(Open Elective-III)

Course Code: GR17A4162 **LTPC**
IV Year I Sem 2103

UNIT I

Neural Networks-I(Introduction & Architecture) Neuron, Nerve structure and synapse, Artificial Neuron and its model, activation functions, Neural network architecture: single layer and multilayer feed forward networks, recurrent networks. Various learning techniques; perception and convergence rule, Auto-associative and hetero-associative memory.

UNIT II

Neural Networks-II (Back propagation networks) Architecture: perceptron model, solution, single layer artificial neural network, multilayer perception model; back propagation learning methods, effect of learning rule co-efficient; back propagation algorithm, factors affecting back propagation training, applications.

UNIT III

Fuzzy Logic-I (Introduction) Basic concepts of fuzzy logic, Fuzzy sets and Crisp sets, Fuzzy set theory and operations, Properties of fuzzy sets, Fuzzy and Crisp relations, Fuzzy to Crisp conversion.

UNIT IV

Fuzzy Logic –II (Fuzzy Membership, Rules) Membership functions, interference in fuzzy logic, fuzzy if-then rules, Fuzzy implications and Fuzzy algorithms, Fuzzyfications & Defuzzificataions, Fuzzy Controller, Industrial applications.

UNIT V

Genetic Algorithm(GA) Basic concepts, working principle, procedures of GA, flow chart of GA, Genetic representations, (encoding) Initialization and selection, Genetic operators, Mutation, Generational Cycle, applications.

TEXT BOOKS:

1. S. Rajsekaran & G.A. Vijayalakshmi Pai, “Neural Networks,Fuzzy Logic and Genetic Algorithm:Synthesis and Applications” Prentice Hall of India.

2. Introduction to Artificial Neural Systems - Jacek M. Zuarda, Jaico Publishing House, 1997.

3. N.P.Padhy,”Artificial Intelligence and Intelligent Systems” Oxford University Press.

REFERENCES

1. Timothy J. Ross, “Fuzzy Logic with Engineering Applications” Wiley India

2. P. Vas: Artificial-Intelligence-Based Electrical Machines and Drives: Application of Fuzzy, Neural, Fuzzy- Neural, and Genetic-Algorithm-Based Techniques, Oxford University Press, 1999.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

OPERATION RESEARCH
(Open Elective-III)

Course Code: GR17A4163 **L T P C**
IV B. Tech I Semester **2 1 0 3**

UNIT I

INTRODUCTION: Development – Definition– Characteristics and Phases of operations Research– Types of models – operation Research models– applications.

ALLOCATION: Linear Programming Problem Formulation – Graphical solution – Simplex method –Artificial variables techniques -Two–phase method, Big-M method – Duality Principle.

UNIT II

TRANSPORTATION MODELS: Formulation – Methods for finding feasible solution, Optimal solution, unbalanced transportation problem –Degeneracy.

ASSIGNMENT MODELS - Formulation – Optimal solution **-** Variants of Assignment Problem

UNIT III

SEQUENCING: Introduction – Flow **–**Shop sequencing – n jobs through two machines – n jobs through three machines – Job shop sequencing – two jobs through 'm' machines.

INVENTORY : Introduction – Single item – Deterministic models – Purchase inventory models with one price break and multiple price breaks – shortages are not allowed – Stochastic models – demand may be discrete variable or continuous variable – Instantaneous production. Instantaneous demand and continuous demand and no set up cost.

UNIT IV

THEORY OF GAMES: Introduction – Minimax (maximin) – Criterion and optimal strategy – Solution of games with saddle points – Rectangular games without saddle points – 2 X 2 games – dominance principle– m X 2 & 2 X n games -graphical method.

WAITING LINES: Introduction – Single Channel – Poisson arrivals – exponential service times – with infinite population and finite population models– Multichannel – Poisson arrivals – exponential service times with infinite population single channel Poisson arrivals.

UNIT V

REPLACEMENT: Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely, group replacement.

DYNAMIC PROGRAMMING: Introduction – Bellman's Principle of optimality – Applications of dynamic programming- capital budgeting problem – shortest path problem – linear programming problem.

TEXT BOOKS :

1. Operations Research/ Prem Kumar Gupta,Dr.D.S. Hira
2. Operations Research / S. D.Sharma-Kedarnath
3. Operation Research /J.K.Sharma/MacMilan.

REFERENCES:

1. Operations Research / R.Pannerselvam,PHI Publications.
2. Introduction to O.R /Taha/PHI
3. Operations Research / Wagner/ PHI Publications.
4. Introduction to O.R/Hiller &Libermann (TMH).
5. Operations Research /A.M.Natarajan,P.Balasubramani,A. Tamilarasi/Pearson Education.
6. Operations Research: Methods & Problems / Maurice Saseini, ArhurYaspan& Lawrence Friedman
7. O.R/Wayne L.Winston/Thomson Brooks/cole

Teaching Methodology:

Power point Presentations, Working models, white board & marker

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

MOBILE COMPUTING AND APPLICATIONS

(Open Elective III)

Course Code: GR17A4164 **LTPC**

IV Year I Semester **2 1 03**

UNIT I

Introduction to Mobile Computing: Introduction, applications, simplified referenced model.

Medium Access Control: Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Comparison.

UNIT II

Telecommunication systems: GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services.

UNIT III

Mobility and location-based services: Introduction, Data Acquisition of Location Information, GIS, Location Information Modeling, Location-Based Services Applied, Utilizing Location-Based Services with Mobile Applications, Representing Location with UML, Security and Privacy of Location Information, Localization and Internationalization, Latest Developments in Location-Based Efforts

UNIT IV

The Mobile Development Process: Introduction, Back to the Dimensions of Mobility, Applying the Wisdom Methodology to Mobile Development, UML-Based Development Cycle for Mobile Applications

Architecture, Design, and Technology Selection for Mobile Applications: Introduction, Practical Concerns with Architectures, Architectural Patterns for Mobile Applications

UNIT V

Mobile Application Development Hurdles: Introduction, Voice User Interface Hurdles, Hurdles with Multimodal Applications, Problems with Building Location-Based Applications, Power Use.

Testing Mobile Applications: Introduction, Validating the Mobile Use Cases before Development, The Effect of the Dimensions of Mobility on Software Testing, Stress Testing and Scalability Issues, Testing Location-Based Functionality.

Support for Mobility: File systems: Consistency, coda, little work, Ficus, Mio-NFS, Rover.

Outlook: Architecture of future networks.

TEXT BOOKS

1. **Jochen Schiller**, "Mobile Communications", Second Edition, Pearson education, 2004. (Unit I-All chapters, Unit II-All chapters, & Unit V: Last two chapters)
2. **Reza B'far, "**Mobile Computing Principles: Designing And Developing Mobile Applications With UML And XML", Cambridge University Press, 2005. (Unit III-All chapters, Unit IV-All chapters and Unit V - First two chapters).

REFERENCES

1. **Adelstein, Frank, Gupta, Sandeep KS, Richard, Golden, Schwiebert, Loren,** "Fundamentals of Mobile and Pervasive Computing", ISBN: 0071412379, McGraw-Hill Professional, 2005.
2. **Hansmann, Merk, Nicklous, Stober**, "Principles of Mobile Computing", Springer, second edition, 2003.
3. **Martyn Mallick,** "Mobile and Wireless Design Essentials", Wiley DreamTech, 2003.

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY BUSINESS INTELLIGENCE

(Open Elective – III)

Course Code: GR17A4165 **LTPC**

IV Year I Semester **2 1 0 3**

UNIT I

Business Data and Business Intelligence: An Introduction: What is data? Data and business, Big Data, Information and insight, challenges in data decision, operational and informational data, Data decision challenge, Decision Support System, understanding Business Intelligence, Business Intelligence and its components, Importance of Business Intelligence, Business Intelligence areas, Business Intelligence Implementation, Business Intelligence and Integration Implementation, Overview of IBM Cognos BI.

UNIT II

Data warehouse: An Overview Data warehouse architecture, Data warehouse Modelling and Design, Challenges , Data Modelling requirements, Modelling Techniques; Entity relationship Modelling, Dimensional Modelling, Temporal Modelling, Multidimensional data modelling, ERM Vs MDDM, What is Metadata, Types of metadata, Benefits of metadata, Data Analytics Techniques: OLAP and OLTP systems

UNIT III

Building and Accessing a Data Warehouse: Enterprise data warehouse, Challenges of Building a Warehouse, Data warehouse for decision support system, Data Analytics, Data analytics techniques, Information Mining Vs Data mining, Usage of Data Mining, Information Integration, Data warehouse Master Data Management System, MDM Logical Architecture, DB2 UDB Warehouse

UNIT IV

IBM Cognos BI: IBM Cognos Framework Manager, Connection of Framework Manager to Cognos Business Intelligence, Framework Manager Query Model, Frame work manager Model Types, Enterprise Components, Architecture, Security, Query Modes, Model types, Framework Manager Workflow, Administration Workflow, Cognos Configuration

UNIT V

Query and Reporting: Query and Process flow, Report studio, Generation of different reports such as List, cross tab ,Charts, Prompts etc, Focus reports using prompts and filters, Drilling from one report to another, Report using Relational Data

TEXT BOOKS

1. Chuck Ballard, Dirk Herreman, Don Schau, Rhonda Bell,Data Modeling Techniques for Data Warehousing , IBM [ebook]
2. Business Analytics : Data Analytics & Decision Making by S. Christian Albright and Wayne L. Winston.
3. Analytics at Work by Morisson
4. Competing on Analytics - Davenport
5. IBM Cognos 10 Report Studio : Practical Examples by Philip & Roger
6. IBM Cognos BI 10.2 Administration Essentials by Mehmood Awan Khalid

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

PRINCIPLES OF SATELLITE COMMUNICATIONS
(OPEN ELECTIVE-III)

Course Code: GR17A4166	**L**	**T**	**P**	**C**
IV Year I Semester	**2**	**1**	**0**	**3**

UNIT I

Introduction: Origin of satellite communications, Historical background, basic concepts of satellite communications, frequency allocations for satellite services, applications, future trends of satellite communications.

UNIT II

Orbital Mechanics and Launchers: Orbital Mechanics look angle determination, orbital perturbations, orbit determination, launches and launch vehicles, orbital effects in communication systems performance.

UNIT III

Satellite Subsystems: Attitude and orbital control system, Telemetry, Tracking, command and monitoring, power systems, communication subsystems, satellite antenna equipment reliability and space qualification.

UNIT IV

Satellite Link Design: Basic transmission theory, system noise temperature and G/T ratio, design of down links, uplink design, design of satellite links for specified C/N, system design example.

UNIT V

Earth Station Technology: Introduction, transmitters, receivers, Antennas, tracking systems, terrestrial interface, primary power test methods.

Low Earth Orbit and Geo-stationary Satellite Systems: Orbit consideration, coverage and frequency considerations, delay and throughput considerations, system considerations, operational NGSO constellation designs.

TEXT BOOKS

1. Satellite communications-Timothi Pratt, Charles Bostian and Jeremy Allnutt, WSE, Wiley Publications, 2nd Edition, 2003.
2. Satellite communications Engineering-Wilbur L.Prichard, Robert A. Nelson & Henry

1. Satellite communications: Design principles-M. Richharia, BS publications, 2nd Edition, 2003.
2. Fundamentals of Satellite communications-K.N.Rajarao, PHI, 2004.
3. Satellite communications-Dennis Roddy, McGraw Hill, 2nd Edition, 1996.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

CONSTRUCTION TECHNOLOGY & PROECT MANAGEMENT

Course Code: GR17A4013 **L T P C**
IV Year II Semester **2 1 0 3**

UNIT I

Fundamentals of construction technology - Construction activities – Process - Construction schedule - Construction records – Documents – Quality – Safety - Codes and Regulations.

UNIT II

Construction method – Earthwork – Piling – Formwork - fabrication and erection Mechanized construction - construction equipment – Excavators – Rollers – Dozers – Scrapers – Cranes - Drag lines and Clamshells

UNIT III

Quality control - Assurance and Safety - ISO: 9000 Quality Systems - Principles on Safety-Personal, Fine and Electrical Safety, environmental protection – concept of green building

UNIT IV

Contract management – project estimation – types of estimation – contract document – classification with specific reference to PPP and BOT Projects – bidding – procurement process - Construction planning – project planning techniques – planning of manpower, material, equipment and finance.

UNIT V

Project scheduling – PERT – CPM, Preparation of network, determination of slacks or floats. Critical activities. Critical path, project duration, expected mean time, probability of completion of project, Estimation of critical path, problems. Resource leveling - Construction claims, Dispute and project closure Dispute Resolution – Arbitration – Construction Closure

TEXT BOOKS

1. Construction Technology by Subirk.Sarkar, SubhajitSaraswati-Oxford University Press.

2. Construction Project Management-Theory and Practice-NirajJha Pearson Education

REFERENCES

1. Construction Planning Equipment and methods by-Peurifoy R.L, Ledbetter W.B and Schexnayder C.J, TMH 2010.

2. Project Planning and Control with PERT & CPM – B.C. Punmia, K.K. Khandelwal-Laxmi Publication.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PRESTRESSED CONCRETE
(Professional Elective-IV)

Course Code: GR17A4005 **LTPC**
IV Year II Semester **3 1 0 4**

UNIT I

Introduction: Historic development – General principles of prestressing, pretensioning and post tensioning – Advantages and limitations of prestressed concrete – Materials – High strength concrete and high tensile steel their characteristics.

I.S.Code provisions, Methods and Systems of Prestressing; Pre-tensioning and post tensioning methods – Analysis of post tensioning - Different systems of prestressing like Hoyer System, Magnel System, Freyssinet system and Gifford – Udall System.

UNIT II

Losses of prestress: Loss of prestress in pre-tensioned and post-tensioned members due to various causes like elastic shortage of concrete, shrinkage of concrete, creep of concrete, Relaxation of steel, slip in anchorage bending of member and frictional losses.

Analysis of sections for flexure; Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons.

UNIT III

Design of sections for flexure and shear: Allowable stress, Design criteria as per I.S.Code – Elastic design of simple rectangular and I-section for flexure, shear, and principal stresses – design for shear in beams – Kern – lines, cable profile.

Analysis of end blocks: by Guyon's method and Mugnel method, Anchorage zone strusses – Approximate method of design – Anchorage zone reinforcement – Transfer of pre-tensioned members.

UNIT IV

Composite section: Introduction – Analysis of stress – Differential shrinkage – General designs considerations.

UNIT V

Deflections of prestressed concrete beams: Importance of control of deflections – factors influencing deflections – short term deflections of uncracked members, prediction of long term deflections, requirements of IS : 1343 - 2012

TEXT BOOKS:

1. Prestressed Concrete by N. Krishna Raju; - Tata Mc.Graw Hill Publications.
1. Prestressed Concrete by N.Rajasekharan; - Narosa publications.

REFERENCES

1. Design of Prestressed concrete structures (Third Edition) by T.Y. Lin & Ned H.Burns, John Wiley & Sons.
2. Prestressed concrete – A fundamental approach, Nawy Edward G., Prentice Hall, Englewood Cliffs
3. NPTEL Web and Video Courses on "Prestressed Concrete"

Codes:

1. Bureau of Indian Standards (BIS), Code of Practice for Prestressed concrete, IS: 1343-2012
2. Bureau of Indian Standards (BIS), Indian Standard Code of Practice for concrete Structures for the storage of liquids, Part-III, Prestressed concrete structures, IS:3370

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PAVEMENT ANALYSIS & DESIGN
(Professional Elective-IV)

Course Code: GR17A4015 **LTPC**
IV Year II Semester **3 1 0 4**

UNIT I

Introduction to pavement design: Types of Pavements-Functions of individual layers-Variables considered in Pavement Design- Factors affecting Pavement Design: Wheel loads, Tire Pressure, Contact Pressure, ESWL & ESAL concepts

UNIT II

Material characteristics: Tests on sub-grade, Tests on aggregates-Aggregate properties and their importance-Tests on Bitumen-Requirements of design mix-Marshall method of mix design.

UNIT III

Stresses in flexible and rigid pavements: Stresses in Flexible pavements-Layered systems concept-One layer system-Boussinesq two layer system-Burmister theory of Pavement design. Stresses in Rigid pavements-Importance of Joints in rigid Pavements-Types of joints-use of tie bars and dowel bars-Relative stiffness-Modulus of Subgrade Reaction-Stresses due to warping-Stresses due to loads-Stresses due to friction.

UNIT IV

Flexible and rigid pavement design: Flexible Pavement Design concepts-CBR method of Flexible Pavement design-IRC method of design-Asphalt Institute method and AASTHO methods. Rigid Pavement design concepts-IRC method of Rigid pavement design-PCA method-Design of tie bars and dowel bars.

UNIT V

Highway construction and maintenance: Construction: Construction of Bituminous Pavements, construction of Cement Concrete Roads, Soil Stabilization, Use of Geosynthetics. Highway maintenance –Pavement failures, failures in flexible Pavements, Rigid Pavement failures, Pavement evaluation-Benkelman Beam method, Overlay design.

TEXT BOOKS

1. Highway Engineering-S.K. Khanna &C.E.G. Justo, Nemchand& Bros.
2. Pavement Analysis and Design – Yang H. Huang
3. Principles of Pavement Design – E. J. Yoder, M. W. Witczak
4. Highway and traffic Engineering-Subash Saxena

REFERENCES

1. Principles of traffic and highway engineering- Garber & Hoel.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

WATERSHED MANAGEMENT
(Professional Elective-IV)

Course Code: GR17A4016	**L T P C**
IV Year II Semester	**3 1 0 4**

UNIT I

Introduction: Concept of watershed development, objectives of watershed development, need for watershed development in India, Integrated and multidisciplinary approach for watershed management.

UNIT II

Characteristics of watershed: size, shape, physiography, slope, climate, drainage, land use, vegetation, geology and soils, hydrology and hydrogeology, socio-economic characteristics, basic data on watersheds.

Principles of erosion: Types of erosion, factors affecting erosion, effects of erosion on land fertility and land capability, estimation of soil loss due to erosion, Universal soil loss equation.

UNIT III

Measures to control erosion: Contour techniques, ploughing, furrowing, trenching, bunding, terracing, gully control, rockfill dams, brushwood dam, Gabion.

Water harvesting: Rainwater Harvesting, catchment harvesting, harvesting structures, soil moisture conservation, check dams, artificial recharge, farm ponds, percolation tanks.

UNIT IV

Land management: Land use and Land capability classification, management of forest, agricultural, grassland and wild land. Reclamation of saline and alkaline soils.

Ecosystem management: Role of Ecosystem, crop husbandry, soil enrichment, inter, mixed and strip cropping, cropping pattern, sustainable agriculture, bio-mass management, dry land agriculture, Silvi pasture, horticulture, social forestry and afforestation.

UNIT V

Planning of watershed management activities, peoples participation, preparation of action plan, administrative requirements, strategic policies and their implementation

TEXT BOOKS

1. Watershed Management by JVS Murthy, - New Age International Publishers.
2. Water Resource Engineering by R.Awurbs and WP James, - Prentice Hall Publishers.

REFERENCES

1. Land and Water Management by VVN Murthy, - Kalyani Publications.
2. Irrigation and Water Management by D.K.Majumdar, Printice Hall of India.
3. Water resources system management by S.R. Sahasrabudhe – JP publications

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

REMOTE SENSING & GIS
(Professional Elective-V)

Course Code: GR17A4017 **LTPC**
IV Year II Semester **2 1 0 3**

UNIT I

Introduction to Photogrammetry: Principle and types of aerial photographs, stereoscopy, Map Vs Mosaic, ground control, Parallax measurements for height, determinations.

UNIT II

Remote Sensing – I: Basic concepts and foundation of remote sensing – elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology and units.

Remote Sensing – II: Energy resources, energy interactions with earth surface features and atmosphere, resolution, sensors and satellite visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of water bodies, introduction to digital data analysis.

UNIT III

Geographic Information System: Introduction, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS.

Types of data representation: Data collection and input overview, data input and output. Keyboard entry and coordinate geometry procedure, manual digitizing and scanning, Raster GIS, Vector GIS – File management, Spatial data – Layer based GIS, Feature based GIS mapping.

UNIT IV

GIS Spatial Analysis: Computational Analysis Methods (CAM), Visual Analysis Methods (VAM), Data storage-vector data storage, attribute data storage, overview of the data manipulation and analysis. Integrated analysis of the spatial and attribute data.

UNIT V

GIS Applications in Civil Engineering:

Water Resources Applications-I: Land use / Land cover in water resources, Surface water mapping and inventory, Rainfall – Runoff relations and runoff potential indices of watersheds, Flood and Drought impact assessment and monitoring, Watershed management for sustainable development and Watershed characteristics. Reservoir sedimentation, Fluvial Geomorphology, water resources management and monitoring, Ground Water Targeting, Identification of sites for artificial Recharge structures, Drainage Morphometry, Inland water quality survey and management, water depth estimation and bathymetry.

Applications in Highway Engineering, Environmental Engineering **TEXT BOOKS**

1. Remote Sensing and its applications by LRA Narayana, University Press 1999.
2. Principals of Geo physical Information Systems – Peter ABurragh and Rachael A. Mc Donnell, Oxford Publishers 2004.

3. Remote sensing and image interpretation by Thomas Lillesand, 7th Edition, John Wiley & sons.

REFERENCES

1. Concepts & Techniques of GIS by C.P.Lo Albert, K.W. Yonng, Prentice Hall (India) Publications.
2. Remote Sensing and Geographical Information systems by M.Anji Reddy JNTU Hyderabad 2001, B.S.Publications.
3. Remote sensing of the environment –An earth resource perspective by John R Jensen, Prentice Hall
4. GIS by Kang – tsungchang, TMH Publications & Co.,
5. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.
6. Fundamental of GIS by Mechanical designs John Wiley & Sons.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

AIRPORTS, DOCKS & HARBOUR ENGINEERING
(Professional Elective-V)

Course Code: GR17A4018 **L T P C**
IV Year II Semester **2 1 0 3**

PART-A (Airport Engineering)

UNIT I

Airport planning – Aircraft characteristics – Airport classifications – Site selection of an airport – Regional planning.

UNIT II

Airport obstructions: Airport obstruction- Zoning laws- Classification of obstructions- Imaginary surfaces- Approach zone-Turning zone.

Runway design: Analysis of wind- Wind rose diagram- data determination of the best orientation of the runway configurations- Basic runway length- Corrections to runway length by ICAO and FAA specification-Runway geometric design.

UNIT III

Visual aids: Airport marking – Airport lighting – Instrument Landing Systems (ILS).

PART-B (Docks&Harbor Engineering)

UNIT IV

Harbors& Ports: Water transportation- Harbors- Natural harbors- Site selection- Shape of the harbor- Harbor planning- Features of a harbor-Ports-Classification of ports.

Natural Phenomenon –Tides- Waves and wind- Effect of waves on coastal structures-Breakwaters-Classification of breakwaters-Construction of breakwaters.

UNIT V

Docks & Port facilities: Docks- Wet and dry docks- Working principles of dry dock- Dock entrances- Floating dry dock-Types of floating docks- Entrance locks.

Navigational facilities-Light house-Floating signals-Wreckage buoys-Cargo handling facilities-Apron-Transit sheds-Warehouse.

TEXT BOOKS:

1. Planning & Design of Airports- RobrtHoronjeff, Francis McKelvey; Tata McGraw hill.
2. Harbour, Dock & Tunnel Engineering- R.Srinivasan; Charotar Publishers, Ahmedabad.

REFERENCE BOOKS:

1. Airport Planning and Design- S.K.Khanna, M.G.Arora&S.S.Jain; NemChand& Bros, Roorkee, India.
2. Dock & Harbour Engineering- H.P.Oza&G.H.Oza; Charotar Publishers, Ahmedabad.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED STEEL STRUCTURAL DESIGN
(Professional Elective-V)

Course Code: GR17A4145 **LTPC**
IV Year II Semester **2 1 0 3**

UNIT I
Design of roof trusses: Introduction, types of roof trusses, components of a roof truss, spacing of purlins, roof coverings, design of purlins and design of roof trusses.

UNIT II
Design of Plate girder: Introduction, components of a plate girder, design elements, design of web plate and flanges, curtailment of flange plates, stiffeners, splices and design of plate girder.

UNIT III
Design of steel bridges: Introduction, solid web girders and deck type plate girder bridges.

UNIT IV
Design of steel water tanks: Introduction, design loads, design of rectangular and cylindrical tanks.

UNIT V
Design of Gantry girder: Introduction, types of gantry girders and crane rails, construction details and design procedure.

TEXT BOOKS
1. Design of steel structures by Dr B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain., Laxmi publications, New Delhi
2. Design of Steel Structures by N Subramanian, Oxford University Press
3. IS 800: 2007 - Indian Code of Practice for Construction in Steel 4. IS: 875 (Part III)
4. Hand book of Steel Tables.

REFERENCES
1. Structural design and drawing by N.KrishnaRaju University press, Hyderabad.
2. Limit state Design of steel structures by Dr.V L Shaw, Structures Publications,
3. Limit state Design of Steel Structures by S K Duggal, TMH, and New Delhi.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

GIS LAB

Course Code: GR17A4020 **LTPC**
IV Year II Semester **0 02 2**

SOFTWARE:
1. Q GIS 2.4

EXCERCISES:

Task1: Digitization of Map/Toposheet
Task2: Creation of thematic maps.
Task3: Study of features estimation
Task4: Developing Digital Elevation model
Task5: Simple applications of GIS in water Resources Engineering & Transportation Engineering.

TEXT BOOKS

. Concept and Techniques of GIS by C.P.L.O Albert, K.W. Yong, Printice Hall Publishers