

ACADEMIC REGULATIONS
COURSE STRUCTURE AND SYLLABUS

B.TECH.
CIVIL ENGINEERING

Effective for the B.Tech. students admitted into first year from the academic year
2015-16



ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES (AUTONOMOUS)
Approved by AICTE & Affiliated to Andhra University
SANGIVALASA-531162, BHEEMUNIPATNAM MANDAL, VISAKHAPATNAM DISTRICT

Institute Vision

ANITS envisions to emerge as a world-class technical institution whose products represent a good blend of technological excellence and the best of human values.

Institute Mission

To train young men and women into competent and confident engineers with excellent communicational skills, to face the challenges of future technology changes, by imparting holistic technical education using the best of infrastructure, outstanding technical and teaching expertise and an exemplary work culture, besides molding them into good citizens.

Quality Policy

ANITS is engaged in imparting quality technical education. It constantly strives towards achieving high standards of teaching, training and development of human resources by encouraging its faculty and staff to work as a team and to update their knowledge and skills continually to match the needs of industry.

Department of Civil Engineering

Vision

Our Vision is to be among the preeminent Civil Engineering Departments of the Country and the World for building future Civil Engineers characterized by technological excellence and human values.

Mission

Our Mission is Education. We achieve this mission through teaching, research, and consultancy in Civil Engineering with creativity, quality, sustainability, service and values as the foundational hall marks.

Programme Educational Objectives

The Program is expected to enable the students, within 3 to 5 years of their graduation, to:

1. engage successfully in the practice of civil engineering profession within industry, government, or through private practice, post-graduate studies or alternate career paths
2. analyse, design and build safe, sustainable and economical civil engineering structures by applying their knowledge in one or more of the major areas of civil engineering, including environmental, geotechnical, structural, transportation, and water resources
3. apply the knowledge of mathematics, basic science, core and civil engineering to the formulation and solution of complex engineering problems as members of multidisciplinary teams.
4. develop their communication skills and leadership skills and become competent, ethical and responsible professionals
5. engage in life-long learning and service to their profession for betterment of society and environment

Program Outcomes

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes

1. **Civil Engineering Knowledge:** Analyse & design solutions to complex problems by applying fundamentals of sciences and civil engineering in one or more of its major areas such as structural, geo-technical, water resources, transportation and environmental engineering.
2. **Conduct investigations of complex civil engineering problems:** Use modern techniques and tools to design and conduct experiments, prepare and interpret plans and reports with valid conclusions and recommendations.
3. **Civil engineer and society:** Develop civil engineering solutions based on societal, health, safety, legal, cultural and environmental considerations for sustainable development.

ACADEMIC REGULATIONS

(Effective for the B.Tech. students admitted into first year from the academic year 2015-16)

I. Admissions:

Admissions into first year of B.Tech. Programme and admissions into second year (lateral entry) of B.Tech. Programme of the Institute will be as per the norms stipulated by Andhra University & Andhra Pradesh State Council for Higher Education (APSCHE), Govt. of Andhra Pradesh. The academic regulations of Autonomous status mentioned herewith will be applicable from 2016-17 in case of Lateral Entry admissions.

II. Programmes Offered:

The following are the B.Tech. Programmes offered by the Institute.

- 1 Chemical Engineering
- 2 Civil Engineering
- 3 Computer Science & Engineering
- 4 Electrical & Electronics Engineering
- 5 Electronics & Communication Engineering
- 6 Information Technology
- 7 Mechanical Engineering

III. Structure Of The B. Tech. Programme:

The programme of instruction will consist of Humanities, Basic Sciences, Engineering Sciences and Technology. The complete programme is distributed over eight semesters with two semesters per academic year. Every branch of B.Tech programme will have a curriculum and syllabi for the courses recommended by the Board of Studies and approved by the Academic Council. The academic programmes of the Institute follow the credit system. The curriculum of B.Tech programme is designed to have a total of about 189 credits of which a student should acquire a minimum of 180 credits to get the degree awarded. If a student earns all the total credits, then the best 180 credits are considered to determine the final CGPA. The lateral entrants shall have a total of about 146 credits of which one should acquire a minimum of 137 credits to get the degree awarded. If a student takes all the credits, then the best 137 credits are considered to determine the final CGPA. However, the credits which a student can forego will be in accordance with the mandatory courses and electives offered by the individual departments.

IV. Duration Of The Programme:

The duration of the programme is four academic years consisting of two semesters in each academic year. A student is permitted to complete the programme in a stipulated time frame of 8 consecutive academic years from the date of initial admission. Students joining the programme in the 2nd year through lateral entry scheme shall have to complete the programme in a stipulated time frame of 6 consecutive academic years from the date of initial admission.

V. Medium Of Instruction:

The medium of instruction and examination is English.

VI. Minimum Instruction Days:

Each semester normally consists of a minimum of 16 weeks of instruction.

VII. Academic Calendar:

The dates of all important events, such as commencement of class work, examinations, vacations, etc., during the academic year will be specified in the Academic Calendar of the Institute, as approved by the Academic Council.

VIII. Examinations & Evaluation Process:

The performance of a student in each semester shall be evaluated subject-wise with a maximum of 100 marks each for theory and practical/drawing subjects.

(a) Theory Course:

For all lecture based theory courses, the assessment shall be for 40 marks through internal evaluation and 60 marks through external semester-end examination of three hours duration except for the subjects with 100% internal assessment in which case an internal examination will be conducted for 60 marks along with the semester-end examinations.

i) Internal evaluation:

The sessional marks shall be awarded through internal evaluation by the teachers concerned based on the continuous assessment which includes class tests, quiz, viva-voce, assignments, student regularity, two mid-examinations etc., according to a scheme notified by the department at the beginning of the semester.

Out of the 40 internal evaluation marks, 20 marks are assigned for 2 internal-mid exams, 10 marks are assigned for assignments, 5 marks are assigned for projects/ case studies /quiz/tests and 5 marks are assigned for attendance. The average of 2 internal-mid exams is considered for the 20 marks allocated.

Under any circumstances, no re-examination shall be conducted for the internal mid examinations.

ii) External evaluation:

The question paper shall be set externally and the answer scripts are valued through a double valuation system.

The average of the two valuations will be taken for award of marks. In case, the difference of the marks obtained in the two valuations is more than 20% then a third examiner shall value the script. Out of the three valuations, the average of marks obtained in third valuation and the marks obtained nearer to third valuation out of first two valuations shall be considered. No revaluation for any subject/course shall be entertained as already double valuation system is in existence. However, recounting is allowed on the request of the candidate on payment of specified fee. Challenge valuation shall also be entertained on payment of specified fee.

(B) Laboratory Course:

Each student will perform about 10 to 12 experiments in each laboratory course. Laboratory course will be evaluated for 100 marks, out of which 50 marks are for external examination and 50 marks are for internal evaluation. The internal marks are awarded based on continuous assessment, record work, internal lab examination and student regularity. The external examination will be conducted by two examiners, one of them being laboratory class teacher as internal examiner (nominated by the Principal on recommendation of HOD) and an external examiner nominated by the Principal from the panel of experts recommended by the HOD.

A candidate shall be declared to have passed in any theory subject/course if he secures not less than 40% in external theory examination and also a minimum of 40% of total marks of that course which assures a minimum of 'E' grade.

A candidate shall be declared to have passed in any practical course if he secures not less than 50% in external laboratory examination and also a minimum of 50% of total marks of that course which assures a minimum of 'D' grade.

Only in the case of quantitative and verbal aptitude – I & II, if a candidate fails he is given an opportunity to improve to pass grade (E) irrespective of the score he gets over and above pass mark in the reexamination within one month on payment of special examination fee.

Any student appearing for the semester-end practical examination is eligible only if he submits the bonafide record certified by the laboratory class teacher and the HOD.

(C) Project Work:

The project work is evaluated for 300 marks out of which 100 through internal assessment in the IV Year I semester through continuous assessment followed by final evaluation by a committee nominated by the HOD. For the 200 marks in IV year II semester assessment is done for 100 marks internally and the remaining 100 marks by the committee consisting of at least one external expert nominated by the Principal. If a student fails in the fourth year first semester project he has to appear for reassessment within one month for which he has to pay the reexamination fee.

(D) Industrial Training:

The industrial training is assessed internally for 100 marks by an evaluation committee of the department constituted by the HOD.

(E) Supplementary Exam:

There will be supplementary examination for the programme such that for odd semester courses the supplementary exams will be conducted during summer vacation and for the even semester courses the exams will be conducted during the winter vacation.

IX. Attendance Regulations:

Attendance of a student is computed by considering total number of periods conducted in all courses as the denominator and the total number of periods actually attended by the student in all courses, as the numerator. It is desirable for a student to put in 100% attendance in all the subjects. However, a candidate shall be permitted to appear for the semester end examination provided he/she maintains a minimum of 75% overall attendance in the semester.

The shortage of attendance on medical grounds can be condoned up to a maximum of 9% provided the student puts in at least 66% attendance and provided the Principal is satisfied with the genuineness of the reasons. The Medical Certificates are to be submitted to the Head of the Department when the candidate reports to the classes immediately after the leave. Certificates submitted afterwards shall not be entertained. Condonation fee as fixed by the college for those who put in attendance between $\geq 66\%$ and $<75\%$ shall be charged before the semester-end examinations.

In the case of students who participate in co-curricular, extra-curricular activities like student seminars, N.S.S, N.C.C, Inter-collegiate tournaments and any such other activities involving the representation of the Institute, with the prior approval of the Principal, the candidate may be deemed to have attended the classes during the actual period of such activity, solely for the purpose of attendance.

A student, who could not satisfy the minimum attendance requirement of 66% in any semester, shall be declared 'Detained'. He/she is not eligible to appear for the semester end examinations. He will not be promoted to the next semester and shall have to repeat that semester with the next batch(es) of students. Such students who are detained and seek readmission, should submit undertaking/declaration that they will abide by the regulations existing at the time of readmission.

X. Minimum Academic Requirements:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item No. IX.

- A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory subject if only he secures not less than 40% marks in the semester-end examination and a minimum of 40% marks in the sum of the internal evaluation and semester-end examination taken together. In the labs/projects, the student should secure a minimum of 50% marks in the external examination and a minimum of 50% marks in the sum of internal evaluation and external examination evaluation taken together.
- A student will be promoted to the next semester, if only he satisfies the minimum attendance requirement.
- A student shall be promoted from II Year to III Year only if he fulfils the academic requirement of total 50 % of all credits from regular and supplementary examinations of I Year and II Year – I Semester { i.e., total 3 semesters } examinations, irrespective of whether the candidate takes the examination in all the subjects or not.

- A student shall be promoted from III Year to IV Year only if he fulfils the academic requirements of total 50% of credits from regular and supplementary examinations of I Year, II Year and III Year- I Semester {i.e., total 5 semesters}, irrespective of whether the candidate takes the examinations in all the subjects or not.
- For lateral entry students, there is no credit based restriction for promotion from II year to III year. But a lateral entry student shall be promoted from III year to IV year only if he fulfills the academic requirements of total 50% of credits from regular and supplementary examinations of II year and III year- I Semester {i.e., total 3 semesters} irrespective of whether the candidate takes the examinations in all the subjects or not.
- Students, who fail to complete their B.Tech. Programme within eight academic years from the year of their admission or fail to acquire the credits stipulated for the programme shall forfeit their seat in B.Tech. Programme and their admission shall stand cancelled. For lateral entry, students they have to complete the programme in six years from their year of admission.

XI. Award of Grades:

The absolute grading system is adopted as follows:

S.No.	Range of Marks { % }	Grade	Description	Grade Points
1	90-100	O	Outstanding	10
2	80-89	A	Excellent	9
3	70-79	B	Very Good	8
4	60-69	C	Good	7
5	50-59	D	Fair	6
6	40-49	E	Satisfactory	5
7	39 and below.	F	Fail	0
8	The grade 'I' represents absent (subsequently changed into pass or higher grades.)	I	Absent	0

Note: Minimum grade to pass in a laboratory course is 'D'.

The performance of a student at the end of the each semester is indicated in terms of Semester Grade Point Average (SGPA). The SGPA is calculated as below:

$$SGPA = \frac{\sum (\text{Credits of a course} \times \text{Grade points awarded for a course})}{\sum (\text{Credits of a course})}$$

SGPA is calculated for the candidates who have passed in all the courses in that semester.

Cumulative Grade Point Average (CGPA) will be calculated from II semester onwards up to the final semester and its calculation is similar to that of SGPA, considering all the courses offered from the first semester onwards.

CGPA is calculated for those who clear all the courses in all the previous semesters.

XII. Award Of Class:

For award of class, a total of best 180 credits are considered in case of four year programme and best 137 credits in case of lateral entry admitted students. A candidate, who becomes eligible for the award of B.Tech. Degree, shall be placed in one of the following classes.

S.No.	Class	CGPA
1	First Class with Distinction	7.5 or more*
2	First Class	6.5 or more but less than 7.5
3	Second Class/Pass	5.0 or more but less than 6.5

***First class with Distinction will be awarded only to those students who clear all the subjects of the program in first attempt of regular examinations.**

The CGPA can be converted to aggregate percentage by multiplying CGPA with 10, in case of requirement by any other university or for any other purpose.

XIII. Eligibility For Award Of B.Tech. Degree:

A student shall be eligible for the award of the B.Tech degree if he/she fulfils all the following conditions:

- 1) Registered and successfully completed all the components prescribed for eligibility in the Programme of study to which he/she is admitted within the stipulated period,
- 2) Obtained CGPA greater than or equal to 5.0 (Minimum requirement for Pass),
- 3) No disciplinary action is pending against him/her and
- 4) Has no dues to the Institute including hostels.

XIV. Malpractices:

The Controller of Examinations/Dean of Examinations shall refer the cases of suspected malpractices in mid examinations and semester-end examinations to Malpractice Enquiry Committee constituted by the Institute. Such committee shall follow the approved scales of punishment. The Principal shall take necessary action against the erring students based on the recommendations of the committee.

XV. Amendments To Regulations:

The Institute may, from time to time, revise, amend, or change the Regulations, Schemes of Examinations, and / or Syllabi and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the Institute.

XVI. General:

- (i) Where the words 'he', 'him', 'his', occur in the regulations, they include 'she', 'her', 'hers'.**
- (ii) The academic regulation should be read as a whole for the purpose of any interpretation.**
- (iii) In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.**



ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

B.TECH. 4 YEAR DEGREE COURSE STRUCTURE

(Effective for the B.Tech. students admitted into first year from the academic year 2015-16)

B.TECH. I Year - I Semester

Code	Subject	Cat.	Periods				Sessional Marks	End Exam Marks	Total Marks	Credits
			L	T	P	Total				
CIV111	English	HS	3	1	-	4	40	60	100	3
CIV112	Engineering Mathematics – I	BS	3	1	-	4	40	60	100	3
CIV113	Engineering Physics	BS	3	1	-	4	40	60	100	3
CIV114	Engineering Drawing	ES	1	-	3	4	40	60	100	3
CIV115	Environmental Sciences	HS	3	1	-	4	40	60	100	3
CIV116	Engineering Physics Lab	BS	-	-	3	3	50	50	100	2
CIV117	Programming with C Lab	ES	-	1	3	4	50	50	100	3
CIV118	Workshop	ES	-	-	3	3	50	50	100	2
CIV AC1	NSS/NCC/Sports	MC	-	-	3	3	-	-	-	-
Total			13	5	15	33	350	450	800	22

B.TECH. I Year – II Semester

Code	Subject	Cat.	Periods				Sessional Marks	End Exam Marks	Total Marks	Credits
			L	T	P	Total				
CIV121	Engineering Mathematics - II	BS	3	1	-	4	40	60	100	3
CIV122	Engineering Chemistry	BS	3	1	-	4	40	60	100	3
CIV123	Professional Ethics & Human Values	HS	2	1	-	3	100	-	100	2
CIV124	Mathematics for Civil Engineers	BS	3	1	-	4	40	60	100	3
CIV125	Civil Engineering Materials	PC	3	1	-	4	40	60	100	3
CIV126	Engineering Chemistry Lab	BS	-	-	3	3	50	50	100	2
CIV127	Language Lab	HS	-	-	3	3	50	50	100	2
CIV AC2	NSS/NCC/Sports	MC	-	-	3	3	-	-	-	-
Total			14	5	9	28	360	340	700	18

B.TECH (CIVIL ENGINEERING)
DETAILED SYLLABUS

(Effective for the B.Tech. students admitted into first year from the academic year 2015-16)

I Year I Semester

CIV111 ENGLISH

(Common for All Branches of Engineering)

L	T	P	C	Sessional marks	End Exam marks
3	1	0	3	40	60

Course Objectives

1. To improve the language proficiency of the students in English with emphasis on Reading and Writing skills.
2. To enable the students to study engineering subjects with greater comprehension & cognizance.
3. To strengthen the vocabulary of the students
4. To enable the students to write grammatically correct structures with logical flow.
5. To equip the students with the knowledge of different formats of business communication.

Course Outcomes

By the end of the course, the student will be able to:

- a) Analyze the structure of the phrases, clauses and sentences
- b) Apply his enriched vocabulary to give better shape to his communication skills.
- c) Effectively use different formats of business correspondence.
- d) Use idiomatic expressions and foreign phrases in his communication.
- e) Use correct structures to write sentences.

UNIT I

10 Periods

Vocabulary: One Word Substitutes – using the root words and their meanings.

Grammar: Articles (concept and function; definite ,indefinite and omission of articles)

Writing Skills:

- 1) Formal Letter writing – format, style of letter writing and types of letters --- Complaint, enquiry, requesting quotations, invitation, regret and Acceptance.
- 2) Story Building-Developing a story from the key words, giving a title and describing learning outcomes.

UNIT –II

10 Periods

Vocabulary: Foreign word, phrase or expression-origin word form, pronunciation and meaning.

Grammar: Prepositions or prepositional phrases

Writing Skills:

1. Technical Report writing – Formal reports and types: Informational reports, Analytical reports and Recommendation reports--- Status, feasibility, progress, incident and project.
2. Essay writing.

UNIT –III

10 Periods

Vocabulary: Phrasal Verbs derived from the following dynamic verbs: Go, Get, Run, Take, Look, Put, Hold, Stand etc.

Grammar: Noun : Kinds of nouns, Noun Phrase, Gerunds

Writing Skills:

1. Preparation of C.V. and Resume-format, style purpose and objective.
2. Précis- writing technique with suitable title.

UNIT –IV

9 Periods

Vocabulary: Idiomatic expressions- meaning and usage.

Grammar: Adjectives : Quantifiers, qualifiers, determiners, nouns as adjectives, verbs as adjectives, adjective phrase

Writing Skills:

1. Reading comprehension – questions based on facts, interpretation, logical deduction, vocabulary.
2. E-mail etiquette- format, style and language

UNIT –V

9 Periods

Vocabulary: Synonyms and Antonyms (From the prescribed text only)

Grammar: Pronouns: Kinds of pronouns, relative pronouns – who and whom, whose, which Verbs - Aspects, moods, tenses, direct and indirect speech (active and passive voice), concord, Infinites and verb participles, verb phrase, Conditionals – probable, improbable, impossible, If-clause, Correction of sentences

PRESCRIBED TEXT BOOK:

Life through language: *A Holistic Approach to Language Learning*. Delhi: Pearson Publication

REFERENCE BOOKS:

1. *A Practical Course for Developing Writing Skill in English*. GJ.K. Gangal. PHI.
2. *Handbook of English Grammar & Usage*. Mark Lester and Larry Beason, Tata McGraw Hill.
3. *Current English Grammar And Usage*. S.M.Gupta, PHI.
4. *The Functional Aspects of Communication Skills*. Dr. P. Prasad, Rajendra K Sharma, Katson Books.
5. *Common errors in English*. Abul Hashem. Ramesh publishing house.
6. *Effective Technical Communication*. M. Ashraf Rizvi. Tata Mc-Graw Hill.
7. *Objective English*. Edgar Thorpe & Showick Thorpe. Pearson.

CIV112 ENGINEERING MATHEMATICS – I

(Common for All Branches of Engineering)

L	T	P	C	Sessional marks	End Exam marks
3	1	0	3	40	60

PURPOSE

1. To impart analytical ability in solving mathematical problems as applied to the respective branches of Engineering

INSTRUCTIONAL OBJECTIVES

- a) To equip themselves familiar with the functions of several variables.
- b) To have thorough knowledge in Fourier series
- c) To expose to the concept of three dimensional analytical geometry
- d) To have knowledge in multiple calculus
- e) To familiarize with special functions

UNIT –I : Partial Differentiation :

(12 Periods)

Function of two or more variables – Partial Derivatives – which variable is to be treated as constant – Homogeneous functions – Euler’s theorem – Total Derivative - Change of Variables . Jacobians – Taylor’s theorem for functions of two variables – Maxima and Minima functions of two variables.

UNIT-II : Fourier series:

(12 Periods)

Introduction – Euler’s formula – conditions for a Fourier expansion – Functions having points of Discontinuity – Change of interval – Even and Odd functions – Half range series-Parseval’s formula.

UNIT III : Three Dimensional Analytical Geometry:

(12 Periods)

Equation of a sphere – Plane section of a sphere – Tangent Plane - Equation of a cone – Right circular cone – Equation of a cylinder – Right circular cylinder.

UNIT-IV: Multiple Integrals:

(14 Periods)

Double integrals – Change of order of integration – Double integral in polar co-ordinates – Area enclosed by plane curves – Triple Integrals. Volume of Solids- Change of Variables-Area of curved surfaces, Calculation of mass.

UNIT – V : Beta & Gamma functions :

(10 Periods)

Beta function – Gamma function relation between Beta and Gamma functions –results and problems, error function.

Text Book Prescribed :

1. Dr. B.S. Grewal, Higher Engineering Mathematics, 43rd edition, Khanna Publishers, New Dehli.

Reference books :

1. N.P. Bali, Dr . Ashok Saxena,Dr.N.Ch.S. Narayana, A Text book on Engineering Mathematics
Laxmi pub.(p)Ltd. New Dehli.
2. H.K.Dass, Advanced Engineering Mathematics,S.chand and company ltd.
3. Dr.M.K. Venkataraman, Higher Engineering Mathematics National Pub.Co.Madras.
4. Erwin kreyszig. Advanced Engineering Mathematics,John Wiley and sons, Newyork

CIV113 ENGINEERING PHYSICS

(Common for All Branches of Engineering)

L	T	P	C	Sessional marks	End Exam marks
3	1	0	3	40	60

Course Objectives

- To impart knowledge in basic concepts of physics relevant to engineering applications
- To introduce advances in technology for engineering applications

Course Outcomes

1. To design and conduct simple experiments as well as analyze and interpret data in engineering applications
2. Capability to understand advanced topics in engineering
3. Identify formula and solve engineering problems
4. Apply quantum physics to electrical phenomena

UNIT – I

10 periods

Thermodynamics:

Heat and work, first law of thermodynamics and its applications, reversible and irreversible processes, heat engine, Carnot cycle and its efficiency, Carnot's theorem, second law of thermodynamics, entropy – entropy change in reversible and irreversible processes, entropy and second law, entropy and disorder, entropy and probability, third law of thermodynamics

Text Book: A text book of Engineering Physics, M.N.Avadhanulu & P.G.Kshirasagar, S.Chand Publications

UNIT-II

10 periods

Electromagnetism:

Faraday's law of induction, Lenz's law, Integral and differential forms of Faraday's law, self-inductance, energy stored in electric and magnetic fields, Poynting vector, displacement current, Maxwell's equations in integral form (no derivation), wave equation, propagation of electromagnetic waves in free space.

Text Book: Physics Volume II, Resnick & Halliday, Wiley India Publications

Ultrasonics: Properties of ultrasonic waves, production of ultrasonic waves by magnetostriction and piezoelectric methods, applications of ultrasonics.

Text Book: A text book of Engineering Physics, M.N.Avadhanulu & P.G.Kshirasagar, S.Chand Publications

UNIT–III

10 periods

Optics

Interference: Introduction, principle of superposition, coherence, Young's double slit experiment, conditions for interference, interference in thin films by reflection, wedge shaped film and Newton's rings

Diffraction: Introduction, Fresnel and Fraunhofer diffraction, diffraction at a single slit

Polarisation: Introduction, types of polarized light, double refraction in uniaxial crystals, Nicol's prism, quarter and half-wave plate, production and detection of plane, circular and elliptically polarized light.

Text Book: A text book of Engineering Physics M.N.Avadhanulu & P.G.Kshirasagar, S.Chand Publications

UNIT–IV

10 periods

Lasers: Introduction, characteristics of a laser beam, spontaneous and stimulated emission of radiation, population inversion, Ruby laser, He-Ne laser, semiconductor laser, applications of lasers

Fibre optics: Introduction to optical fibers, principle of propagation of light in optical fibers,, acceptance angle and acceptance cone, numerical aperture, types of optical fibers, modes of propagation and refractive index profiles, attenuation in optical fibers, advantages of optical fibers in communications, fiber optics communication system, applications of optical fibers, fiber optic sensors

Text Book: Modern Engineering Physics, S.L.Gupta & Sanjeev Gupta, Dhanpat Rai Publications

UNIT–V

10 periods

Quantum mechanics:

Planck's hypothesis, wave-particle duality, introduction to quantum theory, de-Broglie concept of matter waves, Heisenberg's uncertainty principle, Schrodinger's time independent and time dependent wave equations, physical significance and properties of the wave function ψ , application of Schrodinger wave equation for a particle in one dimensional well – Eigen wave functions and energy Eigen values of the particle

Elements of Statistical mechanics: Elementary concepts of Maxwell-Boltzman, Bose-Einstein and Fermi-Dirac statistics (no derivation)

Text Book: Modern Engineering Physics, S.L.Gupta & Sanjeev Gupta, Dhanpat Rai Publications

Reference Books:

1. Engineering physics, V. Rajendran, McGrawHill Education Private Ltd
2. Engineering Physics, S.O.Pilai and Sivakami, New Age International Publishers
3. University Physics, Young & Freedman, Pearson Education
4. Engineering Physics, A.Marikani, PHI Learning Private Limited
5. Physics Volume I, Resnick & Halliday, Wiley India Publications
6. Engineering physics, R K Gaur, S L Gupta, Dhanpat Rai Publications
7. Engineering Physics, D.K.Bhattacharya and Poonam Tandon, Oxford University Press

CIV114 ENGINEERING DRAWING
(Common for All Branches of Engineering)

L	T	P	C	Sessional marks	End Exam marks
1	0	3	3	40	60

Course Objectives:

1. Increase ability to communicate with people and learn to sketch and take field dimensions.
2. To make the student familiar to the drawing practices and convection
3. To familiarize the student about various engineering curves used in industry
4. To enable the student draft simple engineering components and analyze different views of components.
5. Learn basic Auto CAD skills.

Course Outcomes:

- a) Student's ability to perform basic sketching techniques will improve.
- b) Student's will be able to draw orthographic projections and sections
- c) Student's ability to use architectural and engineering scales will increase.
- d) Student's ability to produce engineering drawing will improve.
- e) Student's ability to convert sketches to engineered drawing will increase.
- f) Student's will develop good communication skills and team work.
- g) Student's will become familiar with Auto CAD two dimensional drawings.

UNIT – I

Introduction to Engineering Drawing & basics of geometrical construction.
construction of conic sections-Construction of cycloidal curves, involutes & spirals.

UNIT –II

Orthographic projections – projections of points – projections of straight lines

UNIT – III

Projections of planes – perpendicular planes – oblique planes

UNIT – IV

Projection of solids – Prisms – Cylinder– Pyramids & cones

UNIT – V

Isometric projections – Plane solids, Combination of solids

Demonstration & Practice: Computer aided drafting of lines, planes solids and Dimensioning.

Text Books:

1. Engineering Drawing by N. D. Bhatt

References:

1. Engineering Drawing by K. L. Narayana & P. Kanniah
2. Engineering Graphics with Auto CAD – R. B. Choudary
3. Computer Aided Engineering Drawing By Trymbaka Murty

CIV115 ENVIRONMENTAL SCIENCES

(Common for All Branches of Engineering)

L	T	P	C	Sessional marks	End Exam marks
3	1	0	3	40	60

Course Objectives

- 1) To gain knowledge on the importance of environment and ecosystems.
- 2) To acquire knowledge with respect to biodiversity, its threats and its conservation and appreciate the concept of interdependence.
- 3) To acquire knowledge about environmental pollution- sources, effects and control measures of environmental pollution
- 4) To understand the treatment of wastewater and solid waste management.
- 5) To be aware of the national and international concern for environment for protecting the environment

Course Outcomes

- a) Understand the natural environment and its relationships with human activities.
- b) Characterize and analyze human impacts on the environment.
- c) Integrate facts, concepts, and methods from multiple disciplines and apply to environmental problems
- d) Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environments

UNIT I

INTRODUCTION TO ENVIRONMENT AND NATURAL RESOURCES 10 Periods

Introduction: Definition, Multidisciplinary nature, Scope and Importance of Environmental Sciences- R & D in environment, green advocacy, green marketing, green media and environment consultancy. Need for public awareness.

Natural Resources: Forest resources-use and overexploitation, deforestation, Big Dams effects on forests and tribal people. Water resources-sources, use and over utilization of surface and ground water, conflicts over water, dams-benefits and problems. Food resources-environmental impact of modern agriculture-fertilizer and pesticides. Land resources-land degradation- landslides, soil erosion and desertification. Energy resources- renewable and non-renewable energy resources and use of alternate-energy sources.

UNIT- II

10 Periods

ECOSYSTEM & BIO DIVERSITY

Ecosystem: Concept of an ecosystem-structure and function of an ecosystem Food chains, food webs and ecological pyramids, Energy flow in an ecosystem, Ecosystem regulation, Ecological succession. Types, characteristic features, structure and function of forest, grass land, desert and aquatic ecosystems.

Biodiversity-definition, types, India as a Mega diversity Nation, Values of biodiversity, Hot spots of

biodiversity, Threats to biodiversity-habitat loss, poaching, human-wildlife conflicts, Endangered and endemic species, Conservation of biodiversity.

UNIT -III

ENVIRONMENTAL POLLUTION AND WASTE MANAGEMENT 10 Periods

Sources, effects and control measures of Air pollution, Noise Pollution, Soil Pollution, Marine pollution, Thermal pollution, Radio Active Pollution. Water Pollution (Sources, Effects, Control measures, DO, BOD, COD, sewage treatment), Green house effect, Ozone depletion, Acid rain – causes and adverse effects.

Solid waste management: Sources and effects of municipal waste, bio-medical waste, Industrial waste, e-waste, Process of waste management-composting, sanitary landfills, incineration.

UNIT- IV

SOCIAL ISSUES AND ENVIRONMENT 8 Periods

Social Issues and the Environment: From unsustainable to sustainable development, Environmental Impact Assessment, Water conservation, Rain water harvesting, water shed management. Resettlement and rehabilitation of people, Environmental ethics.

Urbanization, Industrialization, Transportation, Human population and the environment-population growth, role of information technology in environment and human health.

UNIT- V

LEGISLATIONS, CONVENTIONS & CASE STUDIES 10 Periods

Environmental protection act-Air (prevention and control of pollution) act, Water (prevention and control of pollution) act, Wildlife protection act, Forest conservation act.

International Conventions: Stockholm Conference, Brundtland Commission, Rio declaration, Vienna Convention, Kyoto protocol, Johannesburg Summit.

Case Studies: Chipko Movement, Kolleru Lake, Fluorosis, Silent valley project, Narmada Bacho Andolan, Ralegaon siddhi, Tehri dam, Madhura refinery and Tajmahal

Prescribed Book

Principles of Environmental Studies by Anubha Kaushik & C.P.Kaushik, New Age International Publications.

Reference Books

1. B.K. Sharma, "Environmental chemistry" Goel publishing house, Meerut, 2001.
2. G. S. Sodhi, Fundamental concepts of environmental chemistry, Narosa publishing house, New Delhi
3. S .S.Dara, " A text book of environmental chemistry and pollution control, S.Chand and Company Ltd, New Delhi, 2002.

CIV116 ENGINEERING PHYSICS LAB

(Common for All Branches of Engineering)

L	T	P	C	Sessional marks	End Exam marks
0	0	3	2	50	50

Course Objectives

- 1) To enable the students to acquire skill, technique and utilization of the Instruments

Course Outcomes

- a) Ability to design and conduct experiments as well as to analyze and interpret data.
- b) Ability to identify, solve and apply fundamental physics principles to solve engineering problems

List of experiment (any eight to ten experiments have to be completed)

- 1) Determination of coefficient of thermal conductivity of a bad conductor- Lee's method.
- 2) Determination of radius of curvature of a convex lens - Newton's rings.
- 3) Determination of wavelengths of spectral lines in mercury spectrum-using diffraction grating in normal incidence position.
- 4) Determination of Cauchy's constants of the material of the prism using spectrometer.
- 5) Determination of thickness of a thin paper by forming parallel interference fringes-Wedge method.
- 6) Study of variation of magnetic field along the axis of a current carrying circular coil – Stewart and Gee's apparatus
- 7) Calibration of a low-range voltmeter using potentiometer.
- 8) Verification of laws of resistance and determination of specific resistance of wire by using Carey- Foster's bridge.
- 9) Determination of refractive indices o-ray and e-ray in quartz crystal (double refraction)
- 10) Determination of the frequency of an electrically maintained tuning fork - Melde's experiment.
- 11) Determination of Rydberg constant using hydrogen discharge tube.
- 12) Characteristics of photo cell and determination of Planck's constant –Photoelectric effect.
- 13) Determination of e/m of an electron by Thomson's method
- 14) Determination of band gap of semiconductor.

Prescribed Book

1. Physics Laboratory Manual Prepared by Department of Physics ANITS

Reference books

1. Practical physics by D.P Siva Ramaiah and V. Krishna Murthy Maruti book Depot
2. Comprehensive practical Physics by A.R Vegi Vegi Publishers Pvt.Ltd.

CIV117 PROGRAMMING WITH C LAB

(Common for All Branches of Engineering)

L	T	P	C	Sessional marks	End Exam marks
0	1	3	3	50	50

Course Objectives:

- 1) Understand the program development steps using compilers.
- 2) To strengthen the problem solving skills using programming techniques.
- 3) To design programs using various control structures.
- 4) To be able develop programs using structures, unions and files.

Course Outcomes:

- a) The student shall gain a working knowledge on programming.
- b) The student will learn and use the fundamentals of a programming language (such as language-defined data types (int, float, char, double), control constructs (sequence, selection, repetition), program modules (including functions, modules, methods)).
- c) The student shall exhibit the ability to formulate a program that correctly implements the algorithm.
- d) The student shall be able to demonstrate the effective use the programming environment used in the course.

Recommended Systems/ Software Requirements:

- Intel based desktop PC
- GCC compiler for Linux /Visual C++ compiler for Windows Environment

List of Experiments:

1. Write a C program for any three of the following
 - (i) To accept the distance between two cities and convert the distance in meters, feet, inches and centimeters. (Note: Input distance in Kilometers).
 - (ii) To accept the marks obtained by a student in five different subjects, calculate the total marks and percentage obtained by the student (The maximum marks for each subject is 100).
 - (iii) To accept a 3-digit number and calculate the sum of its digits.
 - (iv) To accept quantity, product code, unit price of five products and calculate the total price for each product and the SUBTOTAL, TAX, TOTAL and print the details in the following format

Qty	Product code	Unit Price	Total Price
xx	1	400.00	xxxx.xx

xx	2	20.00	xxxx.xx
xx	3	200.00	xxxx.xx
xx	4	100.00	xxxx.xx
xx	5	200.00	xxxx.xx
SUB TOTAL			xxxx.xx
TAX			xxxx.xx
TOTAL			xxxx.xx

v) To evaluate the following expression

a) $(ax + by) / (ax - by)$

b) $a^2 + b^2 + \text{squareroot}(2ab)$

2. Write a C program for any three of the following

i) To find the maximum and minimum of three numbers.

ii) For the above experiment in 1-ii) find and display the grade of the student as prescribed below:

Percentage	Grade
>90	A
>80 and <=90	B
>70 and <=80	C
>60 and <=70	D
>=50 and <=60	E
< 50	F

iii) To find the roots of a quadratic equation.

iv) To find the area of a triangle when

a) Sides are given

b) Base and height are given

c) Co-ordinates are given

v) To accept an alphabet and convert into its opposite case.

(Do not use library functions)

3. Write a C program for any four of the following

i) To print prime numbers between the specified range (eg. 100 to 200)

ii) To generate Pascal triangle format

iii) To compute cosine series: $\cos(x) = 1 - x^2/2! + x^4/4! - x^6/6! + \dots$

iv) To check whether number is palindrome or not.

v) To print set of Armstrong numbers in a specified range. (eg. 100 to 200)

vi) To convert the numbers from the following

a) Binary to decimal

b) Decimal to binary

4. Write a C program to perform the following operations in a given array of 'n' numbers

i) Sum of all the numbers

ii) Minimum and maximum in the array

- iii) Searching an element
 - iv) To generate random real numbers in the range of 10 to 20 and sort them.
5. Write a C Program to perform the following on the matrices
 - i) Transpose of a matrix and check the symmetry
 - ii) Trace and norm of a matrix
 - iii) Addition of matrices
 - iv) Multiplication of two matrices
 6. Write a C program to perform any two of the following operations on strings (not using library functions)
 - i) To check whether the given string is palindrome or not.
 - ii) To find the length of the string
 - iii) To concatenate two strings.
 - iv) To check whether the given substring exists in a text and display the frequency.
 7.
 - i) Write a C program to create a structure for a student with the details name, roll no five subject marks, total marks, percentage and sort the records according to the percentage.
 - ii) Write a C program to add two complex numbers using structures.
 - iii) Write a C program to illustrate difference between union and structure.
 8.
 - i) Write a program to calculate the sum of an array using pointers.
 - ii) Write a program to search a name in a given list of names using pointers
 9. Write a C program using functions
 - i) To illustrate call by value and call by reference
 - ii) To accept a string and character and pass them as parameters to a function, the function shall replace the character in the string with any other specific character and return the modified string.
 - iii) To pass the employee record as a structure to the function. The function shall compute the gross salary (include DA and HRA Calculation), take the savings as input and compute the tax payable as per the prescribed table.

Gross Salary	Tax (%)
Less than 2 Lakhs	NIL
2 Lakhs to 5 Lakhs	10
5 Lakh to 10 Lakh	20
10 Lakhs to 50 Lakhs	30
Above 50 lakhs	50

Note: The employee record shall contain employee name, employee id, hire date, basic salary, DA, HRA.

10. Write a C program for any one program for the following to illustrate recursion
 - i) Factorial of a number
 - ii) GCD and LCM of two numbers

iii) Fibonacci series

11. Write a C program to perform any three of the following on files

- i) To count the number of alphabets, numbers, words, lines in a given file.
- ii) To merge two files into third auxiliary file and display the content.
- iii) To print every even position character in a given file.
- iv) To separate alphabets and integers into two files from the given source file.

12. Write a C program to update the record of a person in a file by accepting person ID.

Hint:

- 1. Create the file with few records.
- 2. The fields in a record
 - a. Name of the person
 - b. Identity(ID) of the person
 - c. Age
 - d. Gender
 - e. Occupation
 - f. Salary

CIV118 WORKSHOP

L	T	P	C	Sessional marks	End Exam marks
0	0	3	2	50	50

Course Objective:

1. To provide training and hands on experience to the students on basic Engineering related skills like carpentry, fitting, house wiring and tin smithy.

Course Outcomes:

The students will be able to:

- a) Make simple carpentry and fitting works
- b) Understand and do different types of wiring for practical requirements
- c) Develop cross-sections of models for tin smithy and make them.
- d) It also helps in understanding of relevant skills required by the engineer working in engineering industries and workshops.

LIST OF EXPERIMENTS

Minimum of three exercises have to be conducted from each trade.

Trades:

Carpentry	<ol style="list-style-type: none">1. Cross Lap Joint2. Dovetail Joint3. Mortise and Tennon Joint4. Bridle Joint
Fitting	<ol style="list-style-type: none">1. V Fit2. Square Fit3. Half Round Fit4. Dovetail Fit
House Wiring	<ol style="list-style-type: none">1. Parallel / Series Connection of three bulbs2. Stair Case wiring3. Florescent Lamp Fitting4. Measurement of Earth Resistance
Tin Smithy	<ol style="list-style-type: none">1. Taper Tray2. Square Box without lid3. Elbow4. Funnel

B.TECH (CIVIL ENGINEERING)
Autonomous Regulations 2015
(Effective for the B.Tech. students admitted into first year from the academic year 2015-16)
DETAILED SYLLABUS

I Year II Semester

CIV121 ENGINEERING MATHEMATICS-II
(Common for All Branches of Engineering)

L	T	P	C	Sessional marks	End Exam marks
3	1	0	3	40	60

PURPOSE

1. To impart analytical ability in solving mathematical problems as applied to the respective branches of Engineering

INSTRUCTIONAL OBJECTIVES

- a) To apply advanced matrix knowledge to Engineering problems.
- b) To familiarize with the applications of differential equations.
- c) To equip themselves familiar with Laplace transform

UNIT-I: Linear Algebra:

(11 Periods)

Rank of matrix-Elementary Transformation of a matrix- Gauss Jordan Method of finding the inverse – Normal form of the matrix- PAQ form – Consistency of linear system of equations – System of homogeneous and non- homogeneous equations .

UNIT-II :

(12 Periods)

Linear transformations – Orthogonal transformations- Vectors (Linearly Independent & Dependent) , Eigen values , Eigen Vectors, Properties of Eigen values – Cayley Hamilton theorem (without proof). Reduction to diagonal form – Reduction of Quadratic form to canonical form – Nature of quadratic form,.

UNIT-III : Differential Equations of first order and its Applications: (10 Periods)

First order Linear differential equations , Bernoulli's equations , Exact Differential Equations –Equations reducible to exact Equations - Orthogonal trajectories – Simple Electric circuits- Newton law of cooling.

UNIT – IV : Higher order Linear Differential Equations : (10 Periods)

Definitions – Rules for finding the complementary function, rules for finding the particular integral, method of variation of parameters, equations reducible to linear equations with constant coefficient - Cauchy's homogeneous linear equation ,Legendre's linear equation.

UNIT-V: Laplace Transforms: (17 Periods)

Introduction – definitions- Transforms of elementary functions - Properties of Laplace transforms- Transforms of Periodic functions –Transforms of Derivatives – Transforms of

Integrals- Multiplication by t^n - division by t -Evaluation of integrals by Laplace transforms. Inverse Laplace transforms – Other methods of finding inverse transforms (Excluding Residue method) Convolution theorem – Application's to Differential Equations – Unit Step function- Unit Impulsive functions.

Text Book Prescribed :

1. Dr. B.S. Grewal, Higher Engineering Mathematics, 43rd edition, Khanna Publishers, New Dehli.

Reference books:

1. N.P. Bali, Dr . Ashok Saxena, Dr.N.Ch.S. Narayana, A Text book on Engineering Mathematics Laxmi pub.(p)Ltd. New Dehli.
2. H.K.Dass, Advanced Engineering Mathematics, S.chand and company ltd
3. Dr.M.K. Venkataraman, Higher Engineering Mathematics National Pub.Co.Madras.
4. Erwin kreyszig. Advanced Engineering Mathematics, John Wiley and sons ,Newyork.

CIV122 ENGINEERING CHEMISTRY

(Common for All Branches of Engineering)

L	T	P	C	Sessional marks	End Exam marks
3	1	0	3	40	60

Course Objectives

1. To provide knowledge on problems associated with impure water and various water treatment technologies
2. To know the importance of semiconducting materials and preparation techniques
3. To provide basic knowledge on conventional energy resources, developments in batteries and fuel cells
4. To understand the corrosion of metals, various methods to prevent and control of corrosion
5. To create awareness on advanced concepts like nano materials, green chemistry and eco-friendly technologies for future development

Course Outcomes

- a) Able to adopt suitable technologies for domestic and industrial water
- b) Ability to identify & generalize the properties of semi conducting materials used in various engineering fields
- c) Able to design suitable batteries for different applications.
- d) Able to select and design of suitable material to prevent corrosion and protecting metals from corrosion.
- e) Able to develop green technologies for industrial processes.
- f) Helps in solving scientific problems related to various engineering works

UNIT I

10 Periods

Water Chemistry: Impurities in water, Hardness of water - units and calcium carbonate equivalents, -estimation of hardness (EDTA method) - disadvantages of hard water, boiler troubles- Scale& Sludge formation - prevention- Internal treatment - (Phosphate, Carbonate and Calgon conditioning) - Caustic embrittlement

Water treatment techniques: Softening of water -lime-soda process -numerical problems on LS process-Zeolite, -ion exchange methods, Desalination of water – Reverse osmosis and Eelectrodialysis, Municipal water treatment - Screening, sedimentation, coagulation, Sterilization-Chlorination-Break Point chlorination.

UNIT-II

10 Periods

Solid State Chemistry: Classification of Solids, Band theory of solids. Chemistry of Semiconductors – Intrinsic, extrinsic, compound and defect semiconductors, Organic semiconductors, Purification and preparation of Semiconductor by zone refining – Single crystal growth(Czochralski method) – epitaxial growth. Liquid crystals, LCD, LED and OLED.

Ceramic Materials: Cement-Manufacture of Portland cement - Setting and hardening of cement - Cement concrete - RCC, Refractories - Classification - properties, Ceramics and its Engineering applications.

UNIT – III

10 Periods

Thermal Energy: Fuel –types of fuels -Calorific value and its determination (Bomb calorimeter method) Coal- Ranking of coal - analysis (proximate and ultimate) – COKE – Manufacture (Otto Hoffmann's process). Petroleum – refining of Crude oil; Synthetic petrol – Fisher - Tropsch and Bergius methods, knocking in Petrol and Diesel engine – Octane number - Cetane number, LPG and CNG.

Chemical Energy: Electrode potential, electro chemical series – Reference electrodes – SHE, Calomel electrode – Galvanic cells – primary cells (Dry cell) secondary cells (Lead acid, Ni-Cd, Li ion batteries) H_2-O_2 fuel cells.

Solar Energy: Construction and Working of Photovoltaic cell

UNIT IV

8 Periods

Corrosion Chemistry: Origin and theories of corrosion – Types of corrosion -Galvanic corrosion, concentration cell corrosion, pitting corrosion, stress corrosion, inter granular corrosion; Factors affecting corrosion – Corrosion

Prevention & Control of Corrosion: Cathodic protection; Corrosion inhibitors; Protective coatings – Galvanization & Tinning –Anodized coatings - paints & special paints

UNIT V

10 Periods

Nanochemistry: Introduction, growth of nanoparticles (Sol-gel process), Fullerenes and Carbon nanotubes

Green chemistry: Principles of Green chemistry, Alternative Solvents used in green synthesis.

Lubricants: Concept of Tribology -Mechanism of lubrication- Blended oils - properties of lubricating oils -Viscosity Index -Fire & Flash Point -Cloud & Pour Point -Aniline point.

High Polymers & Composites- Basic concepts of Polymers, Effect of polymer structure on properties. Plastics-Thermoplastic and Thermosetting resins, Composites -types- Fiber Reinforced Plastics -Particulate composites -Layer composites, engineering applications of composites.

Text Book

1. Engineering Chemistry, 16th edition, P.C. Jain and M. Jain - DhanapathiRai& Sons, Delhi

Reference books

1. A text book of Engineering Chemistry, 15th edition, S.S. Dara , S. Chand& Co. New Delhi
2. Engineering Chemistry, O.G.Palanna, Tata Mcgraw Hill Education pvt ltd, New Delhi.
3. Engineering Chemistry, B.K. Sharma - Krishna Prakashan, Meerut
4. Nanomaterials by A.K.Bandopadhyay, new age international publishers.
5. Green solvents for organic synthesis by V.K. Ahluvalia, Narosa publications.

CIV123 MATHEMATICS FOR CIVIL ENGINEERS

L	T	P	C	Sessional marks	End Exam marks
3	1	0	3	40	60

PURPOSE

1. To impart analytical ability in solving mathematical problems as applied to the respective branches of Engineering

INSTRUCTIONAL OBJECTIVES

- a) To understand the concepts on fundamental theorems and complex variables.
- b) To familiarize with the applications of complex integration.
- c) To equip themselves familiar with Numerical techniques and Numerical Integration.

UNIT – I : Mean Value theorems & Complex Variables (14 Periods)

Fundamental theorems: Rolle's Mean value Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem – (all theorems without proof but with geometrical interpretations).

Complex Functions: Introduction, limit of a complex function, derivative of complex function, Cauchy-Riemann equations, Analytic function, Harmonic functions, Applications to flow problems.

[4.3(1, 2, 3), 20.1, 20.2, 20.3, 20.4, 20.5, 20.6]

UNIT – II : Complex Integration (10 Periods)

Complex integration: Complex integration, Cauchy's theorem, Cauchy's integral formula, Series of complex terms (Taylor's, Laurent's series), Residues, residue theorem, calculation of residues.

[20.12, 20.13, 20.14, 20.16, 20.17, 20.18, 20.19]

UNIT – III : Numerical Methods (12 Periods)

Numerical solution of equations: Solution of Algebraic and Transcendental Equations, Bisection method, Method of false position, Newton-Raphson Method.

Numerical Integration: Trapezoidal rule, Simpson's 1/3 Rule, Simpson's 3/8 Rule.

[28.2, 28.3, 30.4, 30.6, 30.7, 30.8]

UNIT – IV : Numerical Differentiation (12 Periods)

Numerical solution of Ordinary Differential equations: Picard's Method, Taylor's series method, Euler's Method, Runge-Kutta Method, Predictor-Corrector Methods, Milne's Method.

[32.2, 32.3, 32.4, 32.7, 32.8, 32.9]

UNIT – V: Probability & Distributions

(12 Periods)

Probability and Distributions: Basic terminology, probability and set notations, addition law of probability, independent events, Multiplication law of probability, Baye's theorem, Random variables, Discrete probability distribution, continuous probability distribution, Expectation, Mean ,Median, Mode and Variance using Probability density function, Binomial distribution, Poisson distribution, Normal Distribution.
[26.2, 26.3, 26.4, 26.5, 26.6, 26.7, 26.8, 26.9, 26.10, 26.14, 26.15, 26.16]

Text Book:

1. Dr. B.S. Grewal, Higher Engineering Mathematics, 43rd edition, Khanna Publishers, New Dehli.

Reference books:

1. N.P. Bali, Dr . Ashok Saxena, Dr.N.Ch.S. Narayana, A Text book on Engineering Mathematics Laxmi pub.(p)Ltd. New Dehli.
2. Erwin kreyszig. Advanced Engineering Mathematics, John Wiley and sons ,Newyork.
3. Probabilitiy, Statistics & Random process by T.Veerajan, Tata McGraw-Hill Educations.
4. Greenberg M D, "Advanced Engineering Mathematics", 2nd Edition, Pearson Education, Singapore, Indian Print, 2003.

CIV124 CIVIL ENGINEERING MATERIALS

(For B.Tech. I Year II Semester Civil Engineering)

L	T	P	C	Sessional marks	End Exam marks
3	1	0	3	40	60

Course Objectives:

- 1) To know the characteristics of good building materials such as bricks, stone, timber, metals, plastics, geosynthetics, paints, varnishes, distempers etc.
- 2) To understand the procedure to conduct required tests to determine the suitability of the material for the given application
- 3) To study the engineering materials available in the region of Visakhapatnam, Andhra Pradesh and India

Course Outcomes:

At the end of the course, the student will have

- a) the ability to identify good building materials such as bricks, stone, timber, metals, plastics, geosynthetics, paints, varnishes, distempers etc. based on their characteristics
- b) the ability to conduct required tests to determine the suitability of the material for the given application
- c) the Knowledge of the engineering materials available in the region of Visakhapatnam, Andhra Pradesh and India

Unit I

Introduction: Classification of Building materials, uses

Bricks & Other Clay Products:

Clay Bricks- Ingredients of good brick earth; Harmful substances, Additives; Manufacture of bricks (IS:2117); Characteristics of good bricks; Classification of bricks; defects of bricks; Tests on bricks: compressive strength, water absorption, Efflorescence (IS:3495); Uses of bricks; Special bricks: Fire bricks, Heavy duty bricks, perforated bricks, Facing bricks, Lining bricks, Paving bricks, Hollow bricks, Sewer bricks, Soling bricks; Fly ash bricks; Special brick shapes.

Other Clay Products: Tiles- Characteristics of good tiles; Types of common tiles; Classification and properties of Flooring tiles (IS:1478) and Roofing tiles (IS:654); Terracing tiles (IS:2690); Mangalore tiles, Country tiles, Hollow clay tiles. Terra-cotta; Earthenware, stoneware, porcelain; Glazing; Refractories

Unit II

Stones: Quarrying & dressing of stones; Characteristics of good building stones, Common building stones, Uses in Civil Engineering

Timber: Characteristics of good timber; defects in timber, Decay of timber, Seasoning and preservation, properties, tests; uses of timber; Commercial forms of timber products in Civil Engineering; Indian timber trees.

Unit III

Metals: Ferrous metals: Properties & uses of different types of iron; non-ferrous metals: Aluminium & Lead, properties, uses in civil engineering

Glass: Classification & Commercial forms of glasses, uses in civil engineering

Miscellaneous Materials: Asbestos- Properties; uses; Gypsum- Gypsum boards; Gypsum plaster; Rubber – Properties & uses

Unit IV

Plastics: Types of plastics, properties, uses in civil engineering, Fibre glass Reinforced plastics, Properties & Applications.

Geosynthetics: Introduction, Functions and their Applications-tests on geo-textiles, geogrids; geo-membranes and geo-composites;

Unit V

Paints, Varnishes and Distempers : Paints: Characteristics of good paint; PVCN; Ingredients of oil-borne paint; Types of paints; Defects in painting; Varnishes: Characteristics of good varnish; Ingredients; Types; process of varnishing; Distempers: Properties & ingredients; Process of distemping; Wall Paper; White wash; Colour wash.

Case study on Engineering materials commonly used in Visakhapatnam, Andhra Pradesh and India

Text Books

1. Rangwala, Engineering Materials, 41st Edition : 2014, Charotar Publishing House Pvt. Ltd.

References

1. S.K.Duggal, Building Materials, New Age International Publishers
2. D.N. Ghose, Materials of construction, Tata-McGraw-Hill Publishing Company Limited.
3. P. C. Varghese (2005), Building Materials, Prentice Hall
4. M. Gambhir, Neha Jamwal (2011), Building Materials: Products, Properties and Systems, Tata McGraw Hill Publishers.
5. R.C. Smith, Materials of construction, McGraw-Hill Company, New York.
6. Relevant Indian Standards

CIV125 PROFESSIONAL ETHICS AND HUMAN VALUES

(Common for All Branches of Engineering)

L	T	P	C	Sessional marks	End Exam marks
2	1	0	2	100	-

Course Objective

- (i) To understand moral values and their significance.
- (ii) To draw inspiration for imbibing moral values
- (iii) To understand professional ethics and obligations
- (iv) To know the code of ethics of relevant Professional societies

Course Outcomes

- a) Able to think in right direction and do well for the society.
- b) Able to solve moral dilemmas and issues
- c) Implement Code of ethics of relevant Professional societies

UNIT-I Introduction

Philosophical basis for human values- Human values as enshrined in the Gita, Bible and khoran; Religion- Values propounded in various religions- Need for Religious harmony

UNIT-II Human Values: Inspiration

Inspiration for human values- Mahatma Gandhi, Dr.Sarvepalli Radha Krishnan, Swami Vivekananda, Rabindranath Tagore, Mother Theresa- Benefits of Human values- Harmony between Self-interest and human values

UNIT-III Basics of Professional Ethics

Ethical Human Conduct – based on acceptance of basic human values; Humanistic Constitution and universal human order – skills, sincerity and fidelity; Scope and characteristics of people-friendly and eco-friendly production system, Technologies and management systems.

UNIT-IV: Professional Ethics in practice

Profession and Professionalism – Professional Accountability, Roles of a professional, Ethics and image of profession; Engineering Profession and Ethics - Technology and society, Ethical obligations of Engineering professionals, Roles of Engineers in industry, society, nation and the world; Professional Responsibilities – Collegiality, Loyalty, Confidentiality, Conflict of Interest, Whistle Blowing

UNIT – V Indian Constitution, values and Global Issues

Indian Constitution: Fundamental Rights and duties, Freedom, Equality, Fraternity, Justice, Directive principles of state policy. Multinational corporations - Environmental ethics - computer ethics - weapons development - engineers as managers-consulting engineers-engineers as expert witnesses and advisors -moral leadership.

UNIT – V Code of Ethics

Sample code of Ethics by Professional Societies such as ASME, ASCE, IEEE, IETE, Institution of Engineers (India), Indian Institute of Materials Management etc.

Text Books:

1. Professional Ethics, R. Subramanian, Oxford University Press.
2. Course Material of the faculty

Reference Books:

1. Ethics in Engineering by Mike Martin and Roland Schinzinger, 3rd edition, McGraw Hill. New York (2012).
2. Human values, A.N. Tripathy, 2003, New Age International Publishers
3. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.
4. Professional Ethics & Human Values: S.B. Srivastha, SciTech Publications (India) Pvt. Ltd. New Delhi.
5. Professional Ethics & Human Values: Prof. D.R. Kiran, TATA Mc Graw Hill Education.
6. Foundations of Ethics for Scientists & Engineers, E.G. Seebauer & Robert, L BERRY, 2000, Oxford University Press
7. Engineering Ethics (including human Values), M. Govindrajran, S Natrajan & V.S. Senthil Kumar, Eastern Economy Edition, Prentice hall of India Ltd

CIV126 ENGINEERING CHEMISTRY LAB

(Common for All Branches of Engineering)

L	T	P	C	Sessional marks	End Exam marks
0	0	3	2	50	50

Course Objectives

- 1) To enable the students to understand the basic concepts involved in quantitative analysis
- 2) To improve skills in analyzing samples through titration procedures
- 3) To know about methods of analyzing the ore samples
- 4) To get an idea over instrumental methods of analysis for more accuracy

Course Outcomes

- a) The student able to identify suitable methods for analyzing samples
- b) Able to analyze different types of water samples to test for quality
- c) Able to use different types of instruments in estimating composition of materials in sample related to soil and water

List of Experiments

1. Preparation of standard solution
2. Estimation of sodium carbonate present in soda ash.
3. Estimation of amount of calcium present in the Portland cement by titrimetrically.
4. Estimation of amount of Copper present in the Copper ore by Iodometrically.
5. Determination of total Hardness present in the given water sample.
6. Estimation of amount of Zinc by titrating with EDTA.
7. Determine the strength of acid by titrating with strong base using pH meter.
8. Estimate the individual strength of acids present in the acid mixture by titrating with strong base using conductivity meter.
9. Estimate the amount of Mohr's salt present in the given solution by titrating with potassium dichromate using potentiometer.
10. Determination of viscosity of the given liquid by Ostwald viscometer.
11. Determination of rate constant of acid catalyzed hydrolysis of ester.
12. Determination of partition coefficient of iodine distributed between Water and Carbon tetra chloride.

DEMONSTRATION

13. Estimation of amount of dissolved oxygen (D.O) present in the given water sample.
14. Synthesize the Phenol-Formaldehyde resin in the laboratory.

Prescribed Books

1. Laboratory manual on Engineering chemistry, third edition by S.K. Bhasin and SudhaRani, DhanpatRai Publishing Company.

Reference Books

1. Experiments and calculations in Engineering chemistry, 9th edition by S.S. Dara, S. Chand & Company Ltd.

CIV127 LANGUAGE LAB

(Common for All Branches of Engineering)

L	T	P	C	Sessional marks	End Exam marks
0	0	3	2	50	50

COURSE OBJECTIVES

1. To expose the students to a variety of self-instructional, learner-friendly modes of language learning.
2. To facilitate computer-aided multi-media instruction enabling individualized and independent language learning.
3. To improve the fluency in spoken English and neutralize mother tongue influence
4. To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking.
5. To train them to use English language effectively at interviews, group discussions, presentations.
6. To initiate them into greater use of the computer in resume preparation, report writing, format-making etc.
7. To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required facility to face computer-based competitive exams such as GRE, TOEFL, GMAT etc.

Course Outcomes

- a) Handle CBT (Computer Based Tests) of the qualifying examinations.
- b) Receive, interpret, remember and evaluate information by practicing effective listening skills.
- c) Speak English with neutralized accent.
- d) Participate and use English language effectively in GDs and can make Presentations with appropriate body language.
- e) Narrate, describe and report incidents and situations using appropriate terminology.

I CALL (Computer Aided Language Learning)

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Short and long Reading comprehension exercises (listening skills)
4. Telephoning Skills.

II CSL (Communication Skills Lab)

5. 'Just A Minute' Sessions (JAM).
6. Describing Objects / Situations / People.
7. Video talks
8. Situational Dialogues / Role Play.
9. Oral Presentations- Prepared and Extempore.

Suggested Software

- Cambridge Advanced Learners' English Dictionary with CD.
- English Phonetics and Phonology – 2 CDs set
- English Mastery – Alania ABC
- Telephoning English
- Cambridge Grammar of English (Ronald Carter and Michael McCarthy) CD
- English Grammar in Use -Cambridge University Press
- Communication Skills – Oxford U P (Sanjay Kumar and Pushpa Latha)

Reference Books:

Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems)

1. Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.
2. English Pronouncing Dictionary Daniel Jones Current Edition with CD.
3. Spoken English- R. K. Bansal and J. B. Harrison, Orient Longman 2006 Ed.
4. English Language Communication : A Reader cum Lab Manual Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai
5. Speaking English Effectively by Krishna Mohan & NP Singh (Macmillan)
6. A Practical Course in English Pronunciation, (with two Audio cassettes) by J. Sethi, Kamlesh Sadanand& D.V. Jindal, Prentice-Hall of India Pvt. Ltd., New Delhi.
7. A text book of English Phonetics for Indian Students by T. Balasubramanian (Macmillan).
8. English Skills for Technical Students, WBSCTE with British Council, OL
9. A Practical Course in Effective English Speaking Skills. J.K. Gangal. PHI.