ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY AND SCIENCES (AUTONOMOUS)
NAAC WITH 'A' GRADE

Affiliated to Andhra University

Academic Regulations Curriculum

&

Syllabi (First Year I & II Sem)

DEPARTMENT OF CIVIL ENGINEERING

ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY AND SCIENCES

(AUTONOMOUS)

INSTITUTE VISION

To emerge as a world class technical institution

INSTITUTE MISSION

To impart holistic technical education by providing

- *The state of the art infrastructure*
- *Exceptional technical and teaching expertise*
- *Best of human value*

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.

Foreword

ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY AND SCIENCES (ANITS) was founded by Anil Neerukonda Educational Society (ANES) in the fond memory of Anil Neerukonda, son of Dr. B R Prasad Neerukonda.

Its humble journey started in 2001 with an intake of 220 students into four undergraduate B.Tech programmes. Within 14 years of its establishment, the institute registered phenomenal growth and is accredited by NAAC with 'A' and by NBA for the second time. It is permanently affiliated to Andhra University and has achieved autonomous status in 2015. Further, the institute has been currently ranked as 4th among the private engineering colleges in Andhra Pradesh by APSCHE. It has been recognised as "Centre for Excellence" by Infosys and is accorded by Andhra University as "Centre for Research".

Today, the institute offers seven B.Tech. programmes and four M.Tech. programmes with an annual total intake about 1100 students. The institute offers amenities like separate hostels for boys and girls, indoor and outdoor games, transport covering all the major locations of Visakhapatnam and medical aid provided by Anil Neerukonda hospital and NRI Institute of Medical Sciences, another educational institution of ANES.

Apart from the State-of-the-Art laboratories, well established teaching methodology and implementation of the best practices, the wonderful co-ordination of the Management, Faculty and Parents has so far played a crucial role in shaping the future of the ANITIANS and has been the talisman of the Institute's phenomenal growth.

The success stories of our champions at several qualifying exams for the higher studies like GRE, TOEFL, CAT and GATE, the impressive track record of the placements with highest known packages in MNCs like Google, Oracle, Infosys, TCS and so on are the sweetest fruits of our efforts.

PRAGNANAM BRAHMA, the motto of ANITS, is truly practiced by all the members of ANITS family, a direct effort to serve the society, nation and the mankind as well.

Hearty welcome to ANITS family.

Prof. T.V. Hanumantha Rao

PRINCIPAL

Achievements & Highlights

- ✓ Autonomous since May 2015
- ✓ NAAC with 'A' Grade
- ✓ Accredited and reaccredited by NBA, New Delhi
- ✓ UGC recognition under 2(f) and 12(B)
- ✓ Permanent affiliation to Andhra University, Visakhapatnam
- ✓ Among top 3 most preferred colleges in A.P.
- ✓ "AAA" rating accorded by "Careers Digest 360"
- ✓ Recognized as a Research Centre by Andhra University
- ✓ Selected as Skill Development Centre (SDC) by Govt. of A.P.
- ✓ First institute to be accorded "Centre for Excellence" by Infosys
- ✓ Ranked 3rd among the Promising Private Engineering Colleges for excellence as per Competition Success Review (CSR) magazine in the year 2016
- ✓ Recognized as "Silver Partner" of Keane India (Chennai) for the year 2007-2008
- ✓ Collaborated with "Mission (R&D)" funded by Wipro
- ✓ "On Campus Training" by IBM for the students
- ✓ Collaboration with Unisys Global Solutions India (Bangalore) for internship
- ✓ Highest package offer around 2 crores including perks – highest offer in South India
- ✓ 8 lacs to 10 lacs packages –for majority ANITIANS

Contents

Department Profile

The Department **Civil Engineering,** established in 2011, offers B.Tech. programme in Civil Engineering of four years duration with an annual intake of 60 students and M.Tech Program in Soil Mechanics Specialization. The Department is headed by Prof.B.N.D. Narasinga Rao, having 25 years of teaching and consultancy experience. The Department is supported by such distinguished faculty members as Prof. A. Rama Mohana Rao and Dr.V.Venkateswara Rao (Both former Professors of Andhra University) and other qualified and experienced faculty members apart from skilled technicians and non-teaching staff. The Department has well equipped laboratories, spacious class rooms, computer center, seminar hall, etc. Dr.B.N.D.Narasinga Rao, The head of the department, has authored a text book on Soil Mechanics & Foundation Engineering published by Willey India. Detailed profile of the Department is available at Institute's website: www.anits.edu.in.

The Department hosts Institution of Engineers (India) ANITS Civil Engineering Students chapter which organizes guest lectures, student seminars, industrial visits, workshops and symposia etc. The ASCE Students chapter was inaugurated by Prof.G.L.SivaKumar Babu, IISc, Bangalore, in the year 2016. Guest lectures were organized by the chapter with Sri.Kasi Visvesvara Rao, Chief Engineer, CRDA, Sri.A K Mehra, Chief Engineer, Visakhapatnam Port Trust, Er.B.Jayarami Reddy, Chief Engineer, Joint Director, MES,M.T.Raju, Superintending Engineer, Water Resources Circle, prof.M.R.Madhav, Professor emeritus JNTUH, prof.A.Sreerama Rao, former Principal, JNTUK, Dr.K.Rama Rao, PDF Consultant, National University of Singapore, Dr.D.Saradhibabu, Head, R&D, Alliance Concrete, Singapore, Prof.B.V.S Viswanadham, IIT, Bombay etc. Industrial visits are organized to such places as Jhanjhavathi Reservoir, Thotapalli Project, Water treatment plant, and Waste water treatment plant, Narava etc. The Department has 1000 volumes of text books, all ASCE Journals, 129 e-books etc.

The Department stands first in the Results every year among all the affiliated colleges of Andhra University. The students of the Civil Engineering have proved their mettle by winning First and Second Prizes in Technical Paper Presentation, Model Presentation contests at reputed Institutions including VIT Vellore, GMRIT, GVP, etc. Students of the department were selected by Infosys, MuSigma, Capgemini India, IBM, CADeploy, Tech Mahindra, Nagarjuna Constructions etc. through campus placements, Tech Mahindra, Nagarjuna Constructions etc. through campus placements. A few students pursue their higher studies at reputed institutions such as IIT Guwhati, IIT Kharagpur, IIIT Hyderabad, NICMAR Pune, etc.

The Department was awarded UGC Minor Research Project of Rs.3.1Lakhs grant in the year 2017. The Department also offers Consultancy Services in Material testing and Geotechnical Investigations.The recent consultancy work handled was Geotechnical Investigations for the GVMC-Jindal UWM Collaborative Waste to Energy Plant at Kapuluppada. Some of the other events organized by the IEI students chapter are Vinirmithi-19-A National level students technical symposium. The recent events include A three-day workshop on STAAD Pro was organised in associaion

with Datapro, A one day workshop on Geotechnical problems and practices which had eminent resource person from both industry and academia such as Sri A.K Mehera, Chief Engineer, Visakhapatnam Port Trust Sri Rishi Jaiswal, Scientist-D, DRDO, Dr. V. Venkateswara Rao, Professor (Retd) Andhra University Dr. C.N.V Satyanarayana Reddy, Professor, Civil Engineering, Andhra University and Dr. B.N.D Narasinga Rao, Professor & Head of Department, Civil Engineering ANITS (A) also A Two day workshop on E Tabs was organised in association with Datapro.

DEPARTMENT OF CIVIL ENGINEERING

VISION OF THE DEPARTMENT

- To emerge as a leading Civil Engineering Department globally

MISSION OF THE DEPARTMENT

- Empower our students with contemporary and industry relevant skills in Civil Engineering using outstanding technical and teaching expertise and best of infrastructure
- Nurture holistic development of our students inculcating universal human values and life skills for serving the society as leaders of their profession

PROGRAM OUTCOMES (POs)

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

PO 2 **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences

PO 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.

PO 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.

PO 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

PO 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

PO 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

PO 8 **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice

PO 9 **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 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.

PO 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

PO 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. Write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Program Educational Objectives (PEOs)

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

PEO1: Successfully practice Civil Engineering in construction industry, public sector and entrepreneurship, ensuring a prosperous professional career.

PEO2: Pursue higher education and Research for professional development contributing to the advancement of civil engineering through lifelong learning

PEO3: Demonstrate leadership abilities actively contributing to societal needs with a focus on sustainable development and human values.

Program Specific Outcomes (PSOs)

1) Plan and develop safe, economical and sustainable buildings and other structures based on applicable professional standards, codes and ethics.
2) Analyze and solve stability problems in soils for design of foundations and earth structures and plan and design highway, railway and other transportation systems based on applicable safety standards, codes and ethics
3) Plan and develop irrigation and water supply systems and analyze and solve problems due to pollution of air, water and land leading to a nourished, richer and healthy society.

ACADEMIC REGULATIONS

ACADEMIC REGULATIONS FOR B.TECH PROGRAMME UNDER AUTONOMOUS STATUS

(W.E.F. THE ADMITTED BATCH OF 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 consists 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 lateral student takes all the credits, then the best 137 credits are considered to determine the final CGPA

Criteria for achieving the minimum credits:

- **Mandatory courses**

  All courses mentioned in the programme excluding open electives, professional electives and MOOCS come under mandatory courses.

- **Open Elective- A course offered by any department other than home department**

  The student has to choose one open elective out of the open electives offered by other departments during third year first semester or Final year first semester.

  Professional Electives

The student has to register for at least (n-1) no. of professional electives (n = no. of professional electives offered by the department during the programme) as per his choice as provided in the curriculum. However, he can register for all the professional electives offeredby the department.

❖ **MOOCs- Massive Open Online Courses**

The student is required to register for one MOOCs course any time during second year first semester to fourth year second semester. However, its grade will be accorded at the end of fourth year second semester along with the fourth year second semester courses of the programme.

For the award of the degree, the student has to secure a minimum pass grade or above in all the mandatory courses, registered open elective, registered professional electives. However, the degree will still be awarded even if the student fails / opts out of MOOCs.

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 for assignments, 5 marks for projects/ case studies /quiz/tests and 5 marks 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 the 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 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 'P' grade.

A candidate shall be declared to have passed 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 'C' 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 (P) irrespective of the score he gets over and above pass mark in the re-examination 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 Bonafede 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 for 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 re-examination fee.

(D) Industrial Training:

The industrial training is assessed internally for 100 marks by an internal evaluation committee 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 supplementary 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 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 absence. Certificates submitted afterwards shall not be entertained. Condonation fee as fixed by the college for those who put in attendance between 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 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 an undertaking/a 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 evaluationtakentogether.

- Further, a candidate has to secure a minimum of 40 % in theory examination (excluding sessional marks) and a minimum of 50 % (excluding sessional marks) in the Practical Examination / Project / Field Work / Viva Voce / Industrial Training in Semester –End / Year – End Examination and 50% aggregate to pass.
- 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 fulfills 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 fulfills 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.
- A candidate can avail the betterment chances during the validity of all courses.

XI. Award of Grades:

The absolute grading system is adopted as follows:

S.No	Range of marks %	Grade	Grade Points	
1	> 90 ≤ 100	O	10	Out Standing
2	> 80 ≤ 90	A+	9	Excellent
3	> 70 ≤ 80	A	8	Very Good
4	> 60 ≤ 70	B+	7	Good
5	> 55 ≤ 60	B	6	Above Average
6	≥ 50 ≤ 55	C	5	Average
7	≥ 40 < 50	P	4	Pass
8	< 40	F	0	Fail
9			0	Ab (Absent)

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

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:

Credits of a course x Grade points awarded for a course) SGPA = (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	7.0 or more*
2	First Class	6.0 or more but less than 7.0
3	Second Class/Pass	5.0 or more but less than 6.0

***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 fulfills 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 forthe 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

CURRICULUM

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	BS	3	1	-	4	40	60	100	3
CIV116	Engineering Physics Lab	BS	-	-	3	3	50	50	100	2
CIV117	Programming with C Lab	ES	2	-	3	5	50	50	100	3
CIV118	Workshop	ES	-	-	3	3	50	50	100	2
CIV AC1	NCC/NSS/Sports	AC	-	-	3	3	-	-	-	-
Total			15	4	15	34	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	NCC/NSS/Sports	AC	-	-	3	3	-	-	-	-
Total			14	5	9	28	360	340	700	**18**

ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES (AUTONOMOUS)

DEPARTMENT OF CIVIL ENGINEERING

B.TECH. 4 YEAR DEGREE COURSE STRUCTURE

B.TECH. II Year – I Semester

Code	*Subject*	*Cat.*	*Periods*				*Sessional Marks*	*End Exam Marks*	*Total Marks*	*Credits*
			L	*T*	*P*	**Total**				
CIV211	Engineering Mathematics-III	BS	3	1	-	4	40	60	100	3
CIV212	Building Technology	PC	3	1	-	4	40	60	100	3
CIV213	Engineering Geology	PC	3	-	1	4	40	60	100	3
CIV214	Engineering Mechanics	ES	3	1	-	4	40	60	100	3
CIV215	Surveying– I	PC	3	1	-	4	40	60	100	3
CIV216	Strength of Materials	PC	3	1	-	4	40	60	100	3
CIV217	Surveying Field Work-I	PC	-	-	3	3	50	50	100	2
CIV218	Strength of Materials Lab	PC	-	-	3	3	50	50	100	2
Total			18	5	7	30	340	460	800	**22**

B.TECH. II Year - II Semester

Code	*Subject*	*Cat.*	*Periods*				*Sessional Marks*	*End Exam Marks*	*Total Marks*	*Credits*
			L	*T*	*P*	**Total**				
CIV221	Concrete Technology	PC	3	-	-	3	40	60	100	3
CIV222	Environmental Engineering-I	PC	3	1	-	4	40	60	100	3
CIV223	Fluid Mechanics-I	PC	4	1	-	5	40	60	100	4
CIV224	Surveying – II	PC	3	1	-	4	40	60	100	3
CIV225	Structural Analysis – I	PC	4	1	-	5	40	60	100	4
CIV226	Building Planning & Drawing	PC	1	-	3	4	40	60	100	3
CIV227	Concrete Technology Lab	PC	-	-	3	3	50	50	100	2
CIV228	Fluid Mechanics Lab-I	PC	-	-	3	3	50	50	100	2
CIV229	Surveying Field Work –II	PC	-	-	3	3	50	50	100	2
CIV2210	Technical Seminar *	PC	-	-	2	2	-	-	-	-
Total			18	4	14	36	390	510	900	**26**

**To be evaluated continuously through II year -II semester and III year –I semester and results reported with III year –I semester*

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

B.TECH. 4 YEAR DEGREE COURSE STRUCTURE

B.TECH. III Year - I Semester

Code	*Subject*	*Cat.*	*Periods*				*Sessional Marks*	*End Exam Marks*	*Total Marks*	*Credits*
			L	*T*	*P*	**Total**				
CIV311	Open Elective-I[#]	OE	3	1	-	4	40	60	100	3
CIV312	Environmental Engineering-II	PC	3	1	-	4	40	60	100	3
CIV313	Reinforced Concrete Structures-I	PC	4	1	-	5	40	60	100	4
CIV314	Structural Analysis – II	PC	3	1	-	4	40	60	100	3
CIV315	Fluid Mechanics-II	PC	4	1	-	5	40	60	100	4
CIV316	Geotechnical Engineering – I	PC	3	1	-	4	40	60	100	3
CIV317	Geotechnical Engineering Lab-I	PC	-	-	3	3	50	50	100	2
CIV318	Environmental Engineering Lab	PC	-	-	3	3	50	50	100	2
CIV319	Fluid Mechanics Lab-II	PC	-	-	3	3	50	50	100	2
CIV3110	Quantitative & Verbal Aptitude -I	HS	4	-		4	100	-	100	2
CIV3111	Technical Seminar *	PC	-	-	2	2	50	-	50	2
Total			24	6	11	41	540	510	1050	**30**

B.TECH. III Year - II Semester

Code	*Subject*	*Cat.*	*Periods*				*Sessional Marks*	*End Exam Marks*	*Total Marks*	*Credits*
			L	*T*	*P*	**Total**				
CIV321	Reinforced Concrete Structures-II	PC	3	1	-	4	40	60	100	3
CIV322	Estimation & Costing	PC	3	1	-	4	40	60	100	3
CIV323	Geotechnical Engineering – II	PC	3	1	-	4	40	60	100	3
CIV324	Transportation Engineering-I	PC	3	1	-	4	40	60	100	3
CIV325	Water Resources Engineering – I	PC	3	1	-	4	40	60	100	3
CIV326	Professional Elective – I	PE	3	-	-	3	40	60	100	3
CIV327	Geotechnical Engineering Lab-II	PC	-	-	3	3	50	50	100	2
CIV328	Computer Applications in Civil Engineering Lab-I	PC	-	-	3	3	50	50	100	2
CIV329	Quantitative & Verbal Aptitude – II	HS	4	-		4	100	-	100	2
CIV3210	Soft Skills Lab	HS	-	-	3	3	100	-	100	2
CIV3211	Industrial Training**	PC	-	-	-	-	-	-	-	-
Total			22	5	9	36	540	460	1000	**26**

 # Student should take minimum ONE Open Elective from either III year I semester or IV year I semester

** To be evaluated continuously through II year -II semester and III year –I semester and results reported with III year –I semester*

****** *To be conducted after III year-II semester and evaluated in IV year-I semester*

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

B.TECH. 4 YEAR DEGREE COURSE STRUCTURE

B.TECH. IV Year - I Semester

Code	*Subject*	*Cat.*	*Periods*				*Sessional Marks*	*End Exam Marks*	*Total Marks*	*Credits*
			L	*T*	*P*	**Total**				
CIV411	Open Elective-II#	OE	3	1	-	4	40	60	100	3
CIV412	Professional Elective – II	PE	3	-	-	3	40	60	100	3
CIV413	Project Planning & Management	PC	3	1	-	4	40	60	100	3
CIV414	Steel Structures	PC	3	1	-	4	40	60	100	3
CIV415	Water Resources Engineering - II	PC	3	1	-	4	40	60	100	3
CIV416	Transportation Engineering-II	PC	3	-	-	3	40	60	100	3
CIV417	Computer Applications in Civil Engineering Lab-II	PC	-	-	3	3	50	50	100	2
CIV418	Transportation Engineering Lab	PC	-	-	3	3	50	50	100	2
CIV419	Project work-I	PC	-	-	6	6	60	-	60	3
CIV4110	Industrial Training**	PC	-	-	-	-	50	-	50	2
Total			18	4	12	34	450	460	910	**27**

B.TECH. IV Year – II Semester

Code	*Subject*	*Cat.*	*Periods*				*Sessional Marks*	*End Exam Marks*	*Total Marks*	*Credits*
			L	*T*	*P*	**Total**				
CIV421	Professional Elective – III	PE	3	-	-	3	40	60	100	3
CIV422	Professional Elective – IV	PE	3	-	-	3	40	60	100	3
CIV423	Engineering Economics & Finance	HS	2	1	-	3	40	60	100	2
CIV424	Irrigation Structures Design & Drawing	PC	1		3	4	50	-	50	2
CIV425	Comprehensive Viva Voce	PC	-	-	3	3	50	-	50	2
CIV426	Project Work –II	PC	-	-	8	8	60	80	140	8
CIV427	MOOC##	ES	-	-	-	-	-	-	-	2
	Total		9	1	14	24	280	260	540	**22**

 # Student should take MINIMUM ONE Open Elective during either III year I semester or IV year I semester

*** To be conducted after III year-II semester and evaluated in IV year-I semester*

Massive Open Online Course: Method of evaluation will be decided by a Departmental Committee constituted for this purpose and students are graded accordingly

I Year I Semester

ENGLISH

(Common for All Branches of Engineering)

CIV 111 **Credits : 3**

Instruction : 3 Lecture & 1 Tutorial / week Sessional Marks : 40

End Exam : 3 Hours End Exam Marks : 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:

1. Analyse the structure of the phrases, clauses and sentences
2. Apply his enriched vocabulary to give better shape to his communication skills.
3. Effectively use different formats of business correspondence.
4. Use idiomatic expressions and foreign phrases in his communication.
5. Use correct structures to write sentences.

Mapping of course outcomes with program outcomes

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

SYLLABUS

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, and 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, KatsonBooks.
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.

ENGINEERING MATHEMATICS – I

(Common for All Branches of Engineering)

CIV 112 **Credits : 3**

Instruction : 3 Lecture & 1 Tutorial / week Sessional Marks : 40

End Exam : 3 Hours End Exam Marks : 60

COURSE OBJECTIVES :

- To impart knowledge in basic concepts of functions of several variables and their applications like maxima & minima
- To enable the students to study the concepts of Fourier series
- To enable the students to study the concepts of three dimensional figures like sphere, cone cylinder and conicoid.
- To equip the students with the knowledge of multiple integrals and their applications.
- To introduce the concepts of improper integrals like beta, gamma & error functions.

COURSE OUTCOMES:

1. Familiarize with functions of several variables
2. Apply Fourier series in solving boundary value problems
3. Apply the concept of three dimensional analytical geometry
4. Use mathematical tools needed in evaluating multiple integral and their usage.
5. Use the concepts of improper integrals, Gamma, Beta and Error functions which are needed in Engineering applications

Mapping of course outcomes with program outcomes

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

SYLLABUS

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

ENGINEERING PHYSICS

(Common for All Branches of Engineering)

CIV 113 **Credits : 3**

Instruction : 3 Lecture & 1 Tutorial / week Sessional Marks : 40

End Exam : 3 Hours End Exam Marks : 60

Course Objectives

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

Course Outcomes

1. Understand the fundamental concepts of thermodynamics.
2. Familiar with the fundamentals of electromagnetic induction and ultrasonics.
3. Aware of the basic concepts of optics like interference, diffraction, polarization and its various applications.
4. Understand the working principle and applications of lasers and fiber optics.
5. Learn fundamentals of modern physics and its importance in modern technology

Mapping of course outcomes with program outcomes

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

SYLLABUS

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 □ , 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

ENGINEERING DRAWING

(Common for All Branches of Engineering)

CIV 114 **Credits : 3**

Instruction : 1 Lecture & 3 Tutorial / week Sessional Marks : 40

End Exam : 3 Hours End Exam Marks : 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:

1. Draw various engineering curves and understand the basic geometrical constructions.
2. Prepare orthographic projections of points and lines
3. Produce orthographic projections of plane surfaces
4. Draw orthographic projections of solids in various orientations.
5. Prepare isometric projections and understand basics of Computer Aided Drafting.

Mapping of course outcomes with program outcomes

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

SYLLABUS

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

ENVIRONMENTAL SCIENCES

(Common for All Branches of Engineering)

CIV 115 **Credits : 3**

Instruction : 3 Lecture & 1 Tutorial / week Sessional Marks : 40

End Exam : 3 Hours End Exam Marks : 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

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

1. Identify the characteristics of various natural resources and can implement the conservation practices
2. Realize the importance of Ecosystem and Biodiversity for maintaining ecological balance
3. Classify, analyse various pollutants and can develop methods for solving problems related to environment
4. Design and evaluate strategies and methods for sustainable development of environmental systems and for the remediation or restoration of degraded environments
5. Get awareness on various environmental laws and regulations applicable to global issues and play a role in solving social problems

Mapping of course outcomes with program outcomes

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

SYLLABUS

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 ECOSYSTEM & BIO DIVERSITY 10 Periods

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 ENVIRONMETAL 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 Moment, Kolleru Lake, Flourosis, Silent valley project, Narmada Bacho Andolan, Ralegeon siddhi, Tehri dam, Madhura refinery and Tajmahal

Prescribed Book

1. 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.

ENGINEERING PHYSICS LAB

(Common for All Branches of Engineering)

CIV 116 **Credits : 2**

Instruction : 3 Practical / week Sessional Marks : 50

End Exam : 3 Hours End Exam Marks : 50

Course Objectives

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

Course Outcomes

1. Design and conduct experiments as well as to analyse and interpret data.
2. Apply experimental skills to determine the physical quantities related to Heat, Electromagnetism and Optics

Mapping of course outcomes with program outcomes

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

SYLLABUS

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 –Photoelctric 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.

PROGRAMMING WITH C LAB

(Common for All Branches of Engineering)

CIV 117 **Credits : 3**

Instruction : 3 Practical & 1 Tutorial / week Sessional Marks : 50

End Exam : 3 Hours End Exam Marks : 50

Course Objectives:

1) Understand the program development steps using compilers.
2) Strengthen the problem solving skills using programming techniques.
3) Design programs using various control structures.
4) Develop programs using structures, unions and files

Course Outcomes:

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

1. Gain a working knowledge on programming
2. 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).
3. Exhibit the ability to formulate a program that correctly implements the algorithm.
4. Demonstrate the effective use the programming environment used in the course.

Mapping of course outcomes with program outcomes

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

SYLLABUS

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) $a^2 + b^2$ + 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: $\cos(x)= 1- x^2/2! + x^4/4! – x^6/6! + \ldots$
   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

WORKSHOP

(Common for All Branches of Engineering)

CIV 118 **Credits : 2**

Instruction : 3 Practical / week Sessional Marks : 50

End Exam : 3 Hours End Exam Marks : 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:

1. Make different carpentry joints
2. Make simple fitting jobs
3. Make simple jobs like funnel, elbow etc. using sheet metal
4. Understand and build circuits for different types of applications like stair case wiring, series and parallel connections.

Mapping of course outcomes with program outcomes

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

SYLLABUS

LIST OF EXPERIMENTS

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

Trades:

Carpentry	1. Cross Lap Joint 2. Dovetail Joint 3. Mortise and Tennon Joint 4. Briddle Joint
Fitting	1. V Fit 2. Square Fit 3. Half Round Fit 4. Dovetail Fit
House Wiring	1. Parallel / Series Connection of three bulbs 2. Stair Case wiring

	3. Florescent Lamp Fitting
	4. Measurement of Earth Resistance
Tin Smithy	1. Taper Tray
	2. Square Box without lid
	3. Elbow
	4. 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

ENGINEERING MATHEMATICS-II

(Common for All Branches of Engineering)

CIV 121 **Credits : 3**

Instruction : 3 Lecture & 1 Tutorial / week Sessional Marks : 40

End Exam : 3 Hours End Exam Marks : 60

PURPOSE

1. To impart knowledge in basic concepts of solving linear system of equations.
2. To enable the students to study the Eigen values and Eigen vectors of matrix.
3. To introduce the concepts of ordinary differential equations and their applications to engineers.
4. To enable the students to solve any higher order differential equations and to solve differential equations related to simple electric circuits, Newton's law of cooling.
5. To introduce the students to Laplace Transforms and their applications.

INSTRUCTIONAL OBJECTIVES

1. Solve linear system equations using of matrix algebra techniques
2. Determine the Eigen values and vectors of a matrix
3. Apply different techniques in solving differential equations that model engineering problem
4. Use the application of Differential equations like simple electric circuits, Newton's law of cooling and to solve any higher order linear ordinary differential equation with constant coefficients
5. Solve linear differential equations and Network analysis using Laplace transforms

Mapping of course outcomes with program outcomes

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

SYLLABUS

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 tansforms- 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.

ENGINEERING CHEMISTRY

(Common for All Branches of Engineering)

CIV 122 **Credits : 3**

Instruction : 3 Lecture & 1 Tutorial / week Sessional Marks : 40

End Exam : 3 Hours End Exam Marks : 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

1. Identify the problems associated with raw water in various applications and can adopt suitable technologies for domestic and industrial feed waters
2. Identify & generalize the properties of semiconducting materials and can select suitable semiconducting & various ceramic materials for specific applications.
3. Classify and analyze the conventional energy sources and design of suitable batteries/cells for different engineering applications.
4. Select and design of suitable materials to prevent corrosion and protect various parts from corrosion.
5. Implement the green chemistry principles, concept of tribology, unique properties of nano &composite materials in designing of suitable methods and materials to meet the Technological challenges.
6. Solve scientific problems related to various engineering fields.

Mapping of course outcomes with program outcomes

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

SYLLABUS

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_2fuel 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, 15 th 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.Bandopadhayay, new age international publishers.
5. Green solvents for organic synthesis by V.K. Ahluvalia, Narosa publications.

PROFESSIONAL ETHICS AND HUMAN VALUES

(Common for All Branches of Engineering)

CIV 123 **Credits: 2**

Instruction: 2 Lecture & 1 Tutorial / week Sessional Marks: 100

End Exam: 3 Hours End Exam Marks: -

Course Objective

1. To understand moral values and their significance.
2. To draw inspiration for imbibing moral values
3. To understand professional ethics and obligations
4. To know the code of ethics of relevant Professional societies

Course Outcomes

1. Understand the right code of conduct from Human values
2. Draw Inspiration from great personalities and assess his/her role as a proactive member of the society
3. Understand basics of professional ethics and its implementation for harmony with nature
4. Able to practice professional ethics and solve moral dilemmas and issues
5. Understand and implement code of ethics of relevant professional societies and solve global issues.

Mapping of course outcomes with program outcomes

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

SYLLABUS

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. Srivasthva, 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

Engineering Ethics (including human Values), M. Govindrajran, S Natrajan & V.S. Senthi Kumar, Eastern Economy Edition, Prentice hall of India Ltd

MATHEMATICS FOR CIVIL ENGINEERS

(Common for All Branches of Engineering)

CIV 124 **Credits : 3**

Instruction : 3 Lecture & 1 Tutorial / week Sessional Marks : 40

End Exam : 3 Hours End Exam Marks : 60

PURPOSE

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

INSTRUCTIONAL OBJECTIVES

1. Impart knowledge in basic concepts on complex variables and analytical functions.
2. Enable the students to concepts of complex integration and their applications.
3. Impart knowledge in basic concepts of Numerical techniques and Numerical Integration and their applications.
4. Enable the student to solve ordinary differential equations by numerical techniques.
5. Impart knowledge in basic concepts on probability and distributions.

Mapping of course outcomes with program outcomes

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

SYLLABUS

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 Number (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. Probabiltiy, 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.

CIVIL ENGINEERING MATERIALS

CIV 125 **Credits : 3**
Instruction : 3 Lecture & 1 Tutorial / week Sessional Marks : 40
End Exam : 3 Hours End Exam Marks : 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

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

Mapping of course outcomes with program outcomes:

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

SYLLABUS

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 distempering; 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), Buliding 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

ENGINEERING CHEMISTRY LAB

(Common for All Branches of Engineering)

CIV 126 **Credits: 2**
Instruction: 3 Practical / week Sessional Marks: 50
End Exam: 3 Hours End Exam Marks: 50

Course Objectives

1. To provide clear idea over quantitative chemical analysis.
2. To improve skills in analyzing samples through titration procedures
3. To familiarize with Instrumental methods of analysis for more accuracy
4. To introduce various methods of analyzing the ore samples.

Course Outcomes

1. Apply experimental skills in quantitative chemical analysis of water quality parameters, substances and ores.
2. Select and use a suitable instrumental technique for the quantitative estimation and analyse the data obtained

Mapping of course outcomes with program outcomes

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

SYLLABUS

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 patrician coefficient of iodine distributed between Water and Carbon tetra chloride.

DEMONSTRATION

1. Estimation of amount of dissolved oxygen (D.O) present in the given water sample.
2. 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, 9^{th} edition by S.S. Dara, S. Chand& Company ltd.

LANGUAGE LAB

(Common for All Branches of Engineering)

CIV 127 **Credits: 2**

Instruction: 3 Practical / week Sessional Marks: 50

End Exam: 3 Hours End Exam Marks: 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 GRE, TOEFL, GMAT etc.

Course Outcomes

1. Handle CBT (Computer Based Tests) of the qualifying examinations.
2. Receive, interpret, remember and evaluate information by practicing effective listening skills.
3. Speak English with neutralized accent.
4. Narrate, describe and report incidents and situations using appropriate terminology.

Mapping of course outcomes with program outcomes

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

SYLLABUS

I CALL (Computer Aided Language Learning)

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

II CSL (Communication Skills Lab)

1. 'Just A Minute' Sessions (JAM).
2. Describing Objects / Situations / People.
3. Video talks
4. Situational Dialogues / Role Play.
5. Oral Presentations- Prepared and Extempore.

Suggested Software

1. Cambridge Advanced Learners' English Dictionary with CD.
2. English Phonetics and Phonology – 2 CDs set
3. English Mastery – Alania ABC
4. Telephoning English
5. Cambridge Grammar of English (Ronald Carter and Michael McCarthy) CD
6. English Grammar in Use -Cambridge University Press
7. 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.