ANNAMALAI UNIVERSITY

B.E. (FOUR YEAR) DEGREE PROGRAMME
FIRST YEAR – SEMESTER PATTERN
(Choice Based Credit System) (Full–Time)
(2017-2018)
REGULATIONS AND SYLLABUS
REGULATIONS

1. Condition for Admission

Candidates for admission to the first year of the four year B.E. Degree programmes shall be required to have passed the final examination of the plus 2 Higher Secondary Course with Mathematics, Physics and Chemistry as subjects of study and candidates who have passed the Higher Secondary Examination through vocational stream under Engineering, conducted by the Board of Secondary Education, Government of Tamilnadu or an examination of any other authority accepted by the Syndicate of this University as equivalent thereto. They shall satisfy the conditions regarding qualifying marks, age and physical fitness as may be prescribed by the Syndicate of the Annamalai University from time to time.

Candidates who have passed the Diploma course in Engineering of the State Board of Technical Education, Tamil Nadu (listed in Annexure-1) will be eligible for admission to the second year of the four year degree programme in B.E. under the lateral entry scheme provided they satisfy other conditions.

2. Branches of Study in B.E.

Branch I - Civil Engineering
Branch II - Civil and Structural Engineering
Branch III - Mechanical Engineering
Branch IV - Mechanical Engineering (Manufacturing)
Branch V - Electrical and Electronics Engineering
Branch VI - Electronics and Instrumentation Engineering
Branch VII - Chemical Engineering
Branch VIII - Computer Science and Engineering
Branch IX - Information Technology
Branch X - Electronics and Communication Engineering

3. Courses of study

The courses of study and the respective syllabi are given separately.

4. Scheme of Examinations

The scheme of Examinations is given separately.

5. Choice Based Credit System (CBCS)

The curriculum includes six components namely Humanities/Social Sciences/ Management, Basic Sciences, Engineering Sciences, Professional Core, Professional Electives and Open Electives in addition to Seminar & Industrial Training and

Project. Each semester curriculum shall normally have a blend of theory and practical courses. The total credits for the entire degree Programme is 176 (135 for lateral entry students).

6. Eligibility for the Degree

A candidate shall be eligible for the degree of Bachelor of Engineering if the candidate has satisfactorily undergone the prescribed courses of study for a period of four academic years and has passed the prescribed examinations in all the four academic years. For the award of the degree, a student has to

1. Earn a minimum of 176 credits (135 for lateral entry students).
2. Serve in any one of the Co-curricular activities such as
    - National Cadet Corps (NCC)
    - National Service Scheme (NSS)
    - National Sports Organization (NSO) and
    - Youth Red Cross (YRC)

for at least one year. The students enrolled in any one of the co-curricular activities (NCC/NSS/NSO/YRC) will undergo training for about 80 hours and attend a camp of about seven days. The training shall include classes on hygiene and health awareness and also training in first-aid. While the training activities will normally be during weekends, the camp will normally be during vacation period.

(or)

Enroll as a student member of a recognized professional society such as

- Student Chapters of Institution of Engineers (India)
- Student Chapters of other Professional bodies like ICI, ISA, IIChE

7. Assignment of Credits for Courses

Each course is normally assigned one credit per hour of lecture / tutorial per week and one credit for two hours or part thereof for laboratory or practical or drawing per week.

8. Duration of the programme

A student is normally expected to complete the B.E. programme in four years but in any case not more than eight years from the time of admission.

9. Registration for courses

A newly admitted student will automatically be registered for all the courses prescribed for the first, second and third semesters without any option.

Every other student shall enroll for the courses intended to be credited in the succeeding semester in the current semester itself by completing the registration form indicating the list of courses. This registration will be done a week before the last working day of the current semester.

A student is required to earn 176 (135 for lateral entry students) credits in order to be eligible for obtaining the degree. However the student is entitled to enjoy an option to earn either more or less than the total number of credits prescribed in the curriculum of a particular semester on the following guidelines:

The slow learners may be allowed to withdraw certain courses with the approval by Head of the Department and those courses may be completed by them in the fifth year of study and still they are eligible to be awarded with I Class. A student can withdraw a maximum of 2 courses per semester from IV semester to VII semester and take up those courses in the fifth year of study. However, courses withdrawn during odd semesters (V and VII) must be registered in the odd semester of fifth year and courses withdrawn during even semesters (IV and VI) must be registered in the even semester of fifth year.

The advance learners may be allowed to take up the open elective subjects of eighth semester in sixth and seventh semesters one in each to enable them to pursue industrial training / project work in the entire eighth semester period provided they should register those courses in the fifth semester itself. Such students should meet the teachers offering those elective courses themselves for clarifications. No specific slots will be allotted in the time table for such courses.

10. Seminar / Industrial Training

The student has to present a seminar on the chosen topic. However, the student can select a topic duly approved by the Seminar Coordinator and the Head of the Department concerned. The student who has presented the seminar has to submit a report and appear for viva-voce examination at the end of the semester.

11. Project Work

The student typically registers for project at the end of seventh semester and completes it at the end of the eighth semester along with the courses prescribed for study in the eighth semester. However a student who has registered and successfully completed the courses of eighth semester by acquiring additional credits in the earlier semesters can attempt to spend his / her period of study in an industry and complete his / her project work, submit the project report and appear for viva-voce examination at the end of eighth semester.

12. Industrial Training (Value added courses)

One credit courses shall be offered by a Department with the prior approval from the Dean, Faculty of Engineering and Technology. For one credit course, a relevant potential topic may be selected by a committee consisting of Head of the department concerned and the Board of Studies member from the Department and a senior faculty member from the department concerned. An expert from industry familiar with the topic chosen may be accordingly invited to handle classes for the students. The details of the syllabus, time table and the name of the industrial expert may be sent by the above committee to the Dean for approval. The credits earned through the one credit courses shall be over and above the total credit requirement prescribed in the curriculum for the award of the degree. Students can take a maximum of two one credit courses (one each in VI and VII semesters). They shall be allowed to take one credit courses offered in other Departments with the permission of Head of the Department offering the course. A separate mark sheet shall be issued for one credit courses.

13. Electives

The elective courses fall under two categories: Professional Electives and Open Electives. The Professional Elective courses are offered in the concerned branch of specialization and a student can choose the Professional Elective courses with the approval of the Head of the Department concerned. Apart from the various Professional elective courses, a student can choose the open electives from any specialization offered in any Department in the Faculty of Engineering & Technology during the entire period of study, with the approval of the Head of the Department and the Head of the Department offering the course.

Further, the student can also credit not more than two courses offered through the SWAYAM Portal of UGC with the approval of the Head of the Department concerned. These courses will be considered as equivalent of open electives.

14. Assessment

The break-up of continuous assessment and examination marks for theory courses is as follows:

First assessment (Mid-Semester Test-I)	: 10 marks
Second assessment (Mid-Semester Test-II)	: 10 marks
Third Assessment	: 5 marks
End Semester Examination	: 75 marks

The break-up of continuous assessment and examination marks for Practical courses is as follows:

First assessment (Test-I)	: 15 marks
Second assessment (Test-II)	: 15 marks
Maintenance of record book	: 10 marks
End Semester Examination	: 60 marks

The continuous assessment marks for the seminar / industrial training will be 40 and to be assessed by a seminar committee consisting of the Seminar Coordinator and a minimum of two members nominated by the Head of the Department. The continuous assessment marks will be awarded at the end of seminar session. 60 marks are allotted for the seminar / industrial training and viva voce examination conducted based on the seminar / industrial training report at the end of the semester.

The continuous assessment marks for the project work will be 40 and to be assessed by a review committee consisting of the project guide and a minimum of two members nominated by the Head of the Department. One of the committee members will be nominated as the Chairman by the Head of the Department. The Head of the Department may be a member or the Chairman. At least two reviews should be conducted during the semester by the review committee. The student shall make presentation on the progress made before the committee. 60 marks are allotted for the project work and viva voce examination at the end of the semester.

15. Substitute Assessment

A student who has missed, for genuine reasons accepted by the Head of the Department, one or more of the assessments of a course other than the final examination, may take a substitute assessment for any one of the missed assessments. The substitute assessment must be completed before the date of the third meeting of the respective class committees.

A student who wishes to have a substitute assessment for a missed assessment must apply to the Dean / Head of the Department within a week from the date of the missed assessment.

16. Student Counsellors (Mentors)

To help the students in planning their course of study and for general advice on the academic programme, the Dean / Head of the Department will attach a certain number of students to a member of the faculty who shall function as student counsellor for those students throughout their period of study. Such student counsellors shall advise the students, give preliminary approval for the courses to be taken by the students during each semester and obtain the final approval of the Dean / Head of the Department.

17. Class Committee

For all the branches of study during the first two semesters, a common class committee will be constituted by the Dean of the faculty. From among the various teachers teaching the same common course to different classes during each semester of the first year, the Dean shall appoint one of them as course coordinator. The composition of the class committee during first and second semesters will be as follows:

- Course coordinators of all courses.
- All Heads of the Sections, among whom one may be nominated as Chairman by the Dean.
- The Dean may opt to be a member or the Chairman.

For each of the higher semesters, separate class committees will be constituted by the respective Head of the Departments. The composition of the class committees from third to eighth semester will be as follows:

- Teachers of the individual courses.
- A seminar coordinator (for seventh semester only) shall be appointed by the Head of the Department
- A project coordinator (for eighth semester only) shall be appointed by the Head of the Department from among the project supervisors.
- One Professor or Associate Professor, preferably not teaching the concerned class, appointed as Chairman by the Head of the Department.
- The Head of the Department may opt to be a member or the Chairman.

The class committee shall meet three times during the semester. The first meeting will be held within two weeks from the date of class commencement in

which the type of assessment like test, assignment etc. for the third assessment and the dates of completion of the assessments will be decided.

The second meeting will be held within a week after the completion of the first assessment to review the performance and for follow-up action.

The third meeting will be held after all the assessments but before the University semester examinations are completed for all the courses, and at least one week before the commencement of the examinations. During this meeting the assessment on a maximum of 25 marks for theory / 40 marks for seminar / industrial training, practical and project work will be finalized for every student and tabulated and submitted to the Head of the Department (to the Dean in the case of I & II Semester) for approval and transmission to the Controller of Examinations.

18. Attendance requirements

The students with 75% attendance and above are permitted to appear for the University examinations. However, the Vice Chancellor may give a rebate / concession not exceeding 10% in attendance for exceptional cases only on Medical Grounds.

19. Temporary break of study

A student is permitted to go on break of study for a maximum period of one year either as two breaks of one semester each or a single break of one year.

The student applies for break of study, the student shall apply to the Dean in advance, in any case, not later than the last date of the first assessment period. The application duly filled by the student shall be submitted through the Head of the Department. In the case of short term employment/ training/ internship, the application for break of study shall be approved and forwarded by the Head of the department concerned to the Dean.

However, the student must complete the entire programme within the maximum period of eight years.

20. Procedure for withdrawing from the Examinations

A student can withdraw from all the examinations of the semester only once during the entire programme on valid grounds accepted by the University. Such withdrawal from the examinations of a semester will be permitted only if the candidate applies for withdrawal at least 24 hours before the commencement of the last examination. The letter grade 'W' appears in the mark sheet for such candidates.

21. Passing and declaration of examination results

All assessments of all the courses on an absolute marks basis will be considered and passed by the respective results passing boards in accordance with the rules of the University. Thereafter, the Controller of examinations shall convert the marks for each course to the corresponding letter grade as follows, compute the Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA), and prepare the mark sheets.

90 to 100 marks: Grade 'S'

80 to 89 marks: Grade 'A'

70 to 79 marks: Grade 'B'

60 to 69 marks: Grade 'C'

55 to 59 marks: Grade 'D'

50 to 54 marks: Grade 'E'

Less than 50 marks: Grade 'RA'

Withdrawn from the examination: Grade 'W'

A student who obtains less than 30 / 24 marks out of 75 / 60 in the theory / practical examinations respectively or is absent for the examination will be awarded grade RA.

A student who earns a grade of S,A,B,C,D or E for a course is declared to have successfully completed that course. Such a course cannot be repeated by the student.

A student who is detained for lack of attendance must re-register for and repeat the courses in the respective semester.

A student who obtains letter grade RA / W in the mark sheet must reappear for the examination of the courses.

The following grade points are associated with each letter grade for calculating the grade point average and cumulative grade point average.

S - 10; A - 9; B - 8; C - 7; D - 6; E - 5; RA - 0

Courses with grade RA / W are not considered for calculation of grade point average or cumulative grade point average.

A student can apply for re-totaling of one or more of his examination answer papers within a week from the date of issue of mark sheet to the student on payment of the prescribed fee per paper. The application must be made to the Controller of Examinations with the recommendation of the Head of the Department.

After the results are declared, mark sheets will be issued to the students. The mark sheet will contain the list of courses registered during the semester, the grades scored and the grade point average for the semester.

GPA is the sum of the products of the number of credits of a course with the grade point scored in that course, taken over all the courses for the semester, divided by the sum of the number of credits for all courses taken in that semester.

CGPA is similarly calculated considering all the courses taken from the time of admission.

22. Awarding degree

After successful completion of the programme, the degree will be awarded with the following classification based on CGPA.

- For First Class with Distinction, the student must earn a minimum of 176 credits within four years (135 credits within three years for lateral

entry students) for from the time of admission , pass all the courses in the first attempt and obtain a CGPA of 8.25 or above for all the subjects from I Semester to VIII Semester (III Semester to VIII Semester for lateral entry students).

- For First Class, the student must earn a minimum of 176 credits within five years (135 credits within four years for lateral entry students) from the time of admission and obtain a CGPA of 6.75 or above for all the subjects from I Semester to VIII Semester (III Semester to VIII Semester for lateral entry students)..
- For Second Class, the student must earn a minimum of 176 credits within eight years (135 credits within seven years for lateral entry students) from the time of admission.

23. Ranking of Candidates

The candidates who are eligible to get the B.E. degree in the First Class with Distinction will be ranked together on the basis of CGPA for all the subjects of study from I Semester to VIII Semester (III Semester to VIII Semester for lateral entry students).

The Candidates passing with First Class will be ranked next after those with distinction on the basis of CGPA for all the subjects of study from I Semester to VIII Semester (III Semester to VIII Semester for lateral entry students).

The ranking of candidates will be done separately for each branch of study.

24. Transitory Regulations

The University shall have powers to revise or change or amend the regulations, the scheme of examinations, the courses of study and the syllabi from time to time.

Wherever there had been change of syllabi, examinations based on the existing syllabi will be conducted for three consecutive times after implementation of the new syllabi in order to enable the students to clear the arrears. Beyond that the students will have to take up their examinations in equivalent courses, as per the new syllabi, on the recommendations of the Head of the Department concerned.

ANNEXURE - 1

Diploma Programmes Eligible for the B.E (Lateral Entry) Programmes offered in FEAT (from 2017-2018)

Sl. No.	Branches of Study	Eligible Diploma Programme (FT / PT / SW)
1.	**Civil Engineering**	i. Civil Engineering ii. Civil Engineering(Architecture) iii. Environmental Engineering and Pollution Control(Full Time) iv. Architectural Assistantship v. Civil Engineering (Rural Tech.) vi. Civil and Rural Engineering
2.	**Civil and Structural Engineering**	
3.	**Mechanical Engineering**	i. Mechanical Engineering ii. Mechanical and Rural Engineering iii. Mechanical Design and Drafting iv. Production Engineering v. Production Technology vi. Automobile Engineering vii. Automobile Technology viii. Metallurgy ix. Mechatronics Engineering x. Machine Tool Maintenance and Repairs xi. Tool and Die making xii. Tool Engineering xiii. Tool Design xiv. Foundry Technology xv. Refrigeration and Air Conditioning xvi. Agricultural Engineering xvii. Agricultural Technology xviii. Marine Engineering xix. Mechanical Engineering(Production) xx. Mechanical Engineering(Tool &Die) xxi. Mechanical Engineering (Foundry) xxii. Mechanical Engineering(R & A.C.) xxiii. Electronics(Robotics) xxiv. Mining Engineering xxv. Agricultural Engineering and Farm xxvi. Equipment Technology
4.	**Mechanical Engineering (Manufacturing Engineering)**	

Sl. No.	Branches of Study	Eligible Diploma Programme (FT / PT / SW)
5.	**Electrical and Electronics Engineering**	i. Electrical and Electronics Engineering ii. Electronics and Communication Engg. iii. Electronics and Instrumentation Engg iv. Electronics Engineering(Instrumentation) v. Instrument Technology vi. Instrumentation and Control Engineering vii. Electrical Engineering (Instruments and Control) viii. Electrical Engineering ix. Instrumentation Technology x. Electronics (Robotics) xi. Mechatronics Engineering
6.	**Electronics and Instrumentation Engineering**	
7.	**Chemical Engineering**	i. Petrochemical Engineering ii. Chemical Engineering iii. Environmental Engineering and Pollution Control iv. Leather Technology (Footwear) v. Leather Technology vi. Plastic Technology vii. Polymer Technology viii. Sugar Technology ix. Textile Technology x. Chemical Technology xi. Ceramic Technology xii. Petro Chemical Technology xiii. Pulp & Paper Technology xiv. Petroleum Engineering
8.	**Computer Science and Engineering**	i. Electronics and Communication Engineering ii. Computer Technology iii. Computer Science and Engineering iv. Information Technology v. Computer Engineering vi. Computer Networking vii. Electronics(Robotics) viii. Mechatronics Engineering
9.	**Information Technology**	
10.	**Electronics and Communication Engineering**	

FT - Full Time; PT - Part Time; SW – Sandwich.

COURSES AND CREDITS - SUMMARY

Semester	No. of Courses		HS	BS	ES	PC	PE	OE	S&IT	Proj.	Total Credits
	T+P	Total									
I	4+2	**6**	3*	9	5	-	-	-	-	-	19
			1**	3	2						
II	4+4	**8**	4	13	7	-	-	-	-	-	22
			1	5	2						
III	6+2	**8**	3	4	8	8	-	-	-	-	23
			1	1	3	3					
IV	6+2	**8**	-	4	3	16	-	-	-	-	23
				1	1	6					
V	6+3	**9**	-	-	-	17	8	-	-	-	25
						6	3				
VI	6+3	**9**	-	-	-	10	11	3	-	-	24
						4	4	1			
VII	5+3	**8**	3	-	-	5	8	3	1	-	20
			1			2	3	1	1		
VIII	2+1	**3**	-	-	-	-	-	6	-	14	20
								2	-	1	
Total Courses	39+20	**59**	**4**	**10**	**8**	**21**	**10**	**4**	**1**	**1**	**-**
Total Credits		**-**	**13**	**30**	**23**	**56**	**27**	**12**	**1**	**14**	**176**

* - No of Credits ** - No of Courses.

DETAILS OF COURSE CODE

Code (First Two digits)	Details
00	Common course for the faculty
01	Civil Engg. Course
02	Civil and Structural Engg. course
03	Mechanical Engg. Course
04	Mechanical Engg (Manufacturing). Course
05	Electrical and Electronics Engg. Course
06	Electronics and Instrumentation Engg. course
07	Chemical Engg. course
08	Computer Science and Engg. course
09	Information Technology course
10	Electronics and Communication Engg. course
XX	Code of the programme concerned (01 to 10)

Code (3rd and 4th Digits)	Details
HS	Humanities Theory
HP	Humanities Practical
BS	Basic Science Theory
BP	Basic Science Practical
ES	Engineering Science Theory
SP	Engineering Science Practical
PC	Professional Core Theory
CP	Professional Core Practical
PE	Professional Elective Theory
EP	Professional Elective Practical
ST	Seminar / Industrial Training
OE	Open Elective Theory
PV	Project and Viva-voce

5th digit represents the semester and 6th and 7th digits represent the serial number of courses.

B.E. (FOUR YEAR) DEGREE PROGRAMME

CHOICE BASED CREDIT SYSTEM (CBCS)

COURSES OF STUDY AND SCHEME OF EXAMINATIONS

FIRST SEMESTER

Sl. No.	Category	Course Code	Course	L	T	P/D	Exam	CA	Total	Credits
1.	HS-I	00HS101	Technical English	4	-	-	75	25	100	3
2.	BS-I	00BS102	Engineering Mathematics-I	4	-	-	75	25	100	3
3.	BS-II	00BS103	Applied Physics-I	4	-	-	75	25	100	3
4.	BS-III	00BS104	Applied Chemistry-I	4	-	-	75	25	100	3
5.	ES-I Lab	00SP105	Computer Programming Laboratory	-	1	3	60	40	100	3
6.	ES-II Lab	00SP106	Engineering Graphics	-	2	3	60	40	100	4
Total				**16**	**3**	**6**	**420**	**180**	**600**	**19**

SECOND SEMESTER

Sl. No.	Category	Course Code	Course	L	T	P	Exam	CA	Total	Credits
1.	BS-IV	00BS201	Engineering Mathematics-II	4	-	-	75	25	100	3
2.	BS-V	00BS202	Applied Physics-II	4	-	-	75	25	100	3
3.	BS-VI	00BS203	Applied Chemistry-II	4	-	-	75	25	100	3
4.	ES-I	00ES204	Basic Engineering*	4		-	75	25	100	3
5.	HS-II	00HP205	Communication Skills and Language Laboratory	-	2	3	60	40	100	4
6.	BS-I Lab	00BP206	Applied Physics Laboratory	-	-	3	60	40	100	2
7.	BS-II Lab	00BP207	Applied Chemistry Laboratory	-	-	3	60	40	100	2
8.	ES-III Lab	00SP208	Engineering Workshop	-	-	3	60	40	100	2
Total				**16**	**2**	**12**	**540**	**260**	**800**	**22**

* Basic Civil Engg. Subject for Mech., Manuf., EEE, EIE, ECE, CSE & IT .

Basic Electrical Engg. Subject for Civil, Civil and Structural, Mech., Manuf., & Chem. Engg.

Basic Mechanical Engg. Subject for Civil, Civil and Structural, EEE, EIE, ECE, CSE, IT & Chem. Engg.

L-Lecture; T-Tutorial; P-Practical.

Exam-End Semester Examination; CA-Continuous Assessment.

SYLLABUS
FIRST SEMSTER

00HS101	TECHNICAL ENGLISH	L	T	P
		4	0	0

Course Objectives

- English technical communication focuses on developing the proficiency of Engineering students in communicative skills, ensuring them to face the demand of their profession with high command in English.
- At the end of the course, the learners will be able to use English for all purposes of technical communication and come out in "flying colours".

Unit–I : Listening Strategies

This unit makes the students to get exposed to the listening exercises and get registered in their minds the nuances of listening and its importance.

1. Listening process.
2. Types of listening.
3. Barriers to listening.
4. Characteristics of good listeners.
5. Team listening and note making.

Unit–II : Critical Reading and Creative Writing Skills

This unit introduces communication model like courtesy, body language, role play and good presentation in an effective manner, where the students are given an opportunity to observe, analyze, interpret, imagine and implement their ideas too.

Poem : Road not taken – Robert Frost

Ulysses – Alfred Lord Tennyson.

Prose : Of Studies – Francis Bacon

Science – Destroyer or creator – J. Bronowski

Play : Pygmalion – Bernardshaw.

Unit–III : Speaking Skill

Students shall be motivated to speak in English on familiar or unfamiliar topics. It is a platform to train the students to achieve competency in oral expression.

1. Interview Techniques
2. Group discussion
3. Making presentation and Discussing on the presentation.
4. Sample interviews
5. Dialogue writing

Unit–IV : Professional Writing

Students shall be trained to create their own proficiency in writing like – calling for quotation, asking clarification, placing orders and so on.

1. Poster making
2. Letter writing (formal and E-mail)
3. Analytical writing

4. Format of memos.
5. Report Writing

Unit–V : Theoretical writing

The nuances of English grammar may be taught to the students so as to present flawless English both in their oral and written communication

1. Vocabulary – Homonyms, Homophones, Acronyms & Abbreviations, Idioms & Phrases.
2. Single word substitution
3. Concord
4. Tag Questions
5. Active voice and passive voice

Text Book

1) Rizvi and Ashraf, 2006. *"Effective Technical Communication"*. New Delhi. Tata McGraw Hill Publication Company Ltd.

Reference Books

1) Raman, Meenakshi and Sangeetha Sharma, 2004. *"Technical Communication, Principles and Practice"*. New Delhi: OUP.
2) Bailey, Stephen. "*Academic Writing: A Practical Guide for Students*". New York: Rutledge, 2011.
3) Gerson, Sharon, J. and Steven M. Gerson. 2007. "*Technical Writing: Process and Product*". Delhi: Pearson Prentice Hallan, 1980.

Course Outcomes

1) Understand the role of speaking in English and its contribution to their success.
2) Help the students increase the lingual power and word power, and frame suitable structures to use appropriately in different contexts.
3) Initiate the students to adopt different strategies for personal and professional writing.
4) Train the students use diversified rhetorical functions of technical English.

00BS102	ENGINEERING MATHEMATICS – I	L	T	P
		4	0	0

Course Objectives

To acquaint the student with the concepts in

- matrices,
- differential calculus,
- multiple integrals,
- vector calculus, which are most important in connection with practical engineering problems.

Unit–I : Matrices

Characteristic equation – Eigen values and eigen vectors of a real matrix – Properties – Cayley – Hamilton theorem – Orthogonal transformation of a real symmetric matrix to diagonal form – Quadratic form – Reduction of quadratic form to canonical form by orthogonal transformation.

Unit–II : Differential Calculus

Curvature in Cartesian and parametric co – ordinates – Centre and radius of curvature – Circle of curvature – Evolutes – Envelopes.

Unit–III : Differential Calculus: Functions of Several Variables

Jacobians – Taylor's and Maclaurin's series expansions of functions of two variables – Maxima and Minima of functions of two variables – Constrained Maxima and Minima by Lagrange Method.

Unit–IV : Multiple Integrals

Double integration – Cartesian and polar co – ordinates – change of order of integration – area as a double integral – triple integration – Volume as a triple integral.

Unit–V : Laplace Transform

Definition, Transform of elementary functions, Properties, Derivatives and integrals of transforms, Transforms of derivatives, Convolution theorem, Transforms of periodic functions, Inverse Laplace transform, Application to solution of linear ordinary differential equations of second order with constant coefficients.

(In all units, proof of theorems are not included)

Text Books

1) Venkataraman, M.K., Engineering Mathematics, Volumes – I (2008) and II (2009), The National Publishing Company, Chennai.
2) Veerarajan, T., Engineering Mathematics, Second Edition, Tata McGraw Hill Education Private Limited, New Delhi, 2011.

Reference Books

1) Grewal, B.S., Higher Engineering Mathematics, Khanna Publishers, Delhi, 40th Edition, 2007.
2) Erwin Kreysig, Advenced Engineering Mathematics, John Wiley & Sons, 8th Edition, 2002.

Course Outcomes

1) This course equips students to have knowledge and understanding in matrices, differential calculus, multiple integrals and Laplace transforms.
2) Students will be able to solve problems related to above fields in engineering applications.

00BS103	APPLIED PHYSICS – I	L	T	P
		4	0	0

Course Objectives

At the end of the course the students would be exposed to fundamental knowledge in various engineering subjects and applications

- Determine the different modulus of elasticity and viscosity of the less and highly viscous liquids.
- Design of acoustically good buildings.
- Interferometric techniques in metrology, communication and civil engineering.
- Application of quantum physics to optical and electrical phenomena.

- Application of ultrasonics and acoustics.
- Structure identification of engineering materials.
- Applications of Radio isotopes and power reactor systems.

Unit–I : Properties of Matter

Introduction to elasticity – Hook's law – Different modulii of elasticity – Bending of beams – Determination of Young's modulus by Uniform and Nonuniform bending – I – shapegirder – Torsional pendulum – Theory – Experiment and its applications. Introduction to Viscosity – streamline and turbulent flow – Poiseuille's equation – capillary flow method – Stoke's law – terminal velocity – determination of viscosity by Stoke's method.

Unit–II : Sound

Introduction to Acoustics – factors affecting acoustics of buildings and their remedies – absorption coefficient – Sabine's formula for reverberation time.

Introduction to Ultrasonics – production – magnetostriction and piezo electric methods – Detection of Ultrasonic waves (Acoustics grating) – Applications.

Unit–III : Optics

Interference – Air wedge – Michelson's interferometer – Diffraction – Dispersive power of prism and grating – Polarisation – Types of Polarisation – theory of plane, Circularly and elliptically polarized light – photo elasticity – Stress optic law – Effect of a stressed model in plane polariscope – Isoclinic and Isochromatic fringes – photo elastic bench – uses.

Unit–IV : Crystal Physics

Lattice – Unit cell – Bravais lattice – Atomic radius, co – ordination number, Packing factor and their calculations of SC,BCC,FCC and HCP crystal structures – Miller indices – Crystal imperfections (Point defect, Line defect, surface defect and volume defect).

Unit–V : Nuclear Physics

Introduction – General properties of Nucleus – Mass defect, Binding energy, Nuclear models – Liquid drop model and Nuclear shell model – Nuclear detector – G.M counter – Scintillation Counter – Ionisation Chamber – Fission, Fusion, Thermonuclear reaction and Stellar energy – Nuclear reactor – General nuclear reactor – Breeder nuclear reactor.

Text Books

1) Arumugam, M., "Engineering Phyisics", Anuradha Agencies, Kumbakonam, 2000.
2) Gaur, R.K. and Gupta, S.L., "Engineering Physics", DhanpatRai Publishers, New Delhi, 2003.

Reference Books

1) Pillai, S.O., "Solid State Physics", New Age International Publication, New Delhi, Seventh Edition, 2015.
2) Palanisamy, P.K., "Physics for Engineers", Scitech Publication (India) Pvt. Ltd., Chennai, Second Edition, 2005.

3) Mani, P., "Engineering Phyisics", Dhanam Publication, Chennai, 2011.
4) Rajendran, V. and Marikani, A., "Applied Physics for Engineers", Tata McGraw Hill Publishing Company Ltd., New Delhi, 2004.
5) Theraja, B.L., "Modern Physics", Chand & Company Ltd., Edition, 1990.
6) Tayal, D.G., "Nuclear Physics", Himalaya Publishing House, 2007.
7) Ghoshal, S.N., "Nuclear Physics", S. Chand & Company Ltd., 2012.
8) Avadhanulu, M.N. and Kshirsagar, P.G., "A Text Book of Engineering Physics", S. Chand & Company Ltd., 7th Enlarged Revised Ed., 2005.

Course Outcomes

1) The Engineering students can gain the basic knowledge in the field of optics, sound, nuclear physics and crystalline materials etc.
2) It will be useful to apply in engineering applications.

00BS104	APPLIED CHEMISTRY – I	L	T	P
		4	0	0

Course Objectives

To make the student conversant with the

- Water treatment techniques and disinfection methods.
- Working principle of electrochemical cells.
- Sources, refining and various types of fuels.
- Mechanism, classification, applications of lubricants and introduction adhesives.
- Surface chemistry, principle and applications of chromatography.

Unit–I : Water Treatment

Water – Hardness of water – softening of water by ion – exchange process and zeolite process – boiler feed water – specifications – boiler troubles (Sludge and scale formation, priming and foaming, caustic embrittlement and boiler corrosion) – removal of dissolved CO_2, O_2 and acids – internal treatment of boiler feed water (colloidal, carbonate, phosphate, calgon and EDTA conditioning) – disinfection of water – break point chlorination – desalination of brackish water by reverse osmosis method – Determination of total hardness by EDTA method.

Unit–II : Electrochemistrty

Electrochemical cell – EMF – determination of EMF of electrochemical cell – single electrode potential – standard electrode potential – Nernst equation – reference electrodes – standard hydrogen electrode, calomel electrode, glass electrode – electrochemical series – concentration cell.

Unit–III : Fuels and Combustion

Classification of fuels – calorific value – HCV and LCV – Analysis of coal – proximate and ultimate analysis – carbonization of coal (HTC and LTC) – Manufacture of coke – properties of coke – flue gas analysis by Orsat's apparatus. Petroleum – Refining – Synthetic petrol – Fischer – Tropsch and Bergius process – cracking – polymerization process – knocking in petrol and diesel engines – octane number and cetane number – properties of straight run, cracked and polymer gasoline.

Unit–IV : Engineering Materials – I

Lubricants and their functions – Mechanisms of lubrication – classification of lubricants with example – lubricating oils – properties of lubricating oils (viscosity index, flash and fire points, cloud and pour points, oiliness, carbon residue and aniline point) – Solid lubricants – Greases – emulsion lubricants. Adhesives – Definition – adhesive action – development of adhesives strength – physical and chemical factors influencing adhesive action – bonding process of adhesives – adhesives for building and constructions – animal glues, casein glues.

Unit–V : Analytical Technique and Surface Chemsitry

Chromatography – Definition – classifications – partition chromatography and adsorption chromatography.

Surface chemistry – Definition – types of adsorption – characteristics of adsorption – adsorption isotherms – Freundlich's adsorption isotherms and Langmuir's adsorption isotherms – applications of adsorption.

Text Books

1) Sivasankar. B., (2012)., '*Engineering Chemistry'*, Tata McGraw Hill Publishing Company Limited, New Delhi.
2) Sivakumar, R. and Sivakumar, N. (2013). '*Engineering Chemistry'*, Tata McGraw Hill Company Limited, NewDelhi

Reference Books

1) Jain, P.C. and Monica Jain, (2010). '*Engineering Chemistry'*, DhanpatRai & Sons, New Delhi.
2) Dara, S.S. and Umare, S.S., (2014). '*Text book of Engineering Chemistry*,' S. Chand & Co. Ltd., New Delhi.
3) Gopalan, R., Venkappayya, D., and Nagarajan, S., (2008). '*Engineering Chemistry'*, Tata McGraw Hill Publishing Company Limited, New Delhi.

Course Outcomes

At the end of the course, the student will be able to

1) Understand and develop innovative methods to produce soft water for industrial use and potable water at cheaper cost.
2) Understand and apply the concepts of electrochemistry including electroplating.
3) Understand the properties, sources of fuel and the concept of combustion
4) Gain the knowledge about types of lubricants, uses & their mechanisms and to understand the binding process of adhesives, and its application in building and construction.
5) Separate and purify various organic and inorganic compounds using different chromatographic techniques.
6) Understand the concept of surface chemistry and its applications.

00SP105	COMPUTER PROGRAMMING LABORATORY	L	T	P
		0	1	3

Course Objectives

- To enable the students to have a good understanding about the concepts of "C" programming.
- To provide the hands on experience in basic concepts of AUTOCAD to students.

C Programs Based on the Following Concepts

Basic structure of C Programs – Constants – Variables – Data Types – – Keywords – Identifiers – Operators – Expressions – IF, IF – ELSE, Nested IF – ELSE, Switch, WHILE, DO, FOR and GOTO statements – Arrays: one dimensional and two dimensional – Strings – Functions.

AUTOCAD

Introduction – Terminology – Coordinates – Operations – Control keys – Commands – Utility Commands – File Commands – Edit and Inquiry Commands – Display Control Commands – Modes – Layers – Colors – Blocks.

Special Features – Dimensioning – Angular, Diameter and Radius – Hatching – Patterns – Slides – Attributes – Configuring – Plotting – Exercises in AUTOCAD (2D Drawings only).

Text Books

1) E. Balagurusamy, Programming in Ansi C, Tata McGraw Hill Education, (2012). 6th Edition.
2) Cheryl R. Shrock, AutoCAD Pocket Reference, BPB Publications, (2015).

Reference Books

1) Yashavant P. Kanetkar, Let us C, BPB Publications, 14th Edition, (2016).
2) David Byrnes, AutoCAD, 2010. For Dummies, Wiley Publishing Inc., (2010).

Course Outcomes

1) Understand the concepts of C programming.
2) Apply the syntax of conditional and looping statements for writing C programs
3) Use the features of AUTOCAD for 2D drawing.

00SP106	ENGINEERING GRAPHICS	L	T	P
		2	0	3

Course Objectives

- To develop the ability to produce simple engineering drawing and sketches based on current practice.
- To develop the means for communication of ideas, thoughts and design of objects, related to engineering applications, to others though drawing.
- To develop the skills to read manufacturing and construction drawings used in industry.
- To develop a working knowledge of the layout of plant and equipment.
- To develop skills in abstracting information from calculation sheets and schematic diagrams to produce working drawings for manufacturers, installers and fabricators.
- To expose the international standards of technical drawing

Unit–I

Introduction to Engineering Drawing, Use of drafting instruments – Lettering and dimensioning.

Construction of conic sections – Ellipse, Parabola & Hyperbola (Eccentricity Method, Rectangle method, Intersecting arcs method) – Special curves – Simple cycloids and involutes – Tangent and normal at points on the curves only.

Unit–II

Orthographic projections – Projections of Points – Projections of Straight lines (given the projections, to determine the true length and true inclinations).

Unit–III

Projections of Solids like prism, pyramid, cylinder, cone, tetrahedron and octahedron in simple positions.

Auxiliary Projections of prism, pyramid, cylinder, cone when the axis is inclined to one plane only.

Unit–IV

Sections of prism, pyramid, cylinder, cone in simple position – true shape of sections. Intersection of surfaces – cylinder to cylinder and cylinder to cone with axis intersecting at right angles. Development of lateral surfaces of prism, pyramid, cylinder, cone and cut solids.

Unit–V

Isometric Projections of simple solids and combinations. Perspective Projections of simple solids. Conversion of Pictorial view of simple objects into Orthographic views.

Text Books

1) Bhatt, N.D., Engineering Drawing, Charotar Bookstall, Anand – 388001.
2) Venugopal, K., Engineering Drawing and Graphics, New age international (P) Ltd., Publishers, Chennai.

Reference Books

1) Gopalakrishna, K.R.. Engineering Drawing, Vol. I and Vol. II, Subhas Stores, Avenue Road, Bangalore – 560002.
2) Kumar, M.S., Engineering Graphics, DD Publications, Chennai – 6400048.

Course Outcomes

Upon completion of this course, the students will be able to:

1) Construct, read, and understand the Title and Revision Block
2) Usage of common drafting tools to construct engineering drawings enhances
3) Apply dimensions on engineering drawing.
4) Ability of converting sketches to engineered drawings will increase.
5) Developing cognitive and psychomotor skills, visualize images and their dimensions
6) Develop good communication skills and team work.

SECOND SEMESTER

00BS201	ENGINEERING MATHEMATICS – II	L	T	P
		4	0	0

Course Objevtives

- To acquaint the student with the concepts in ordinary differential equations and vector calculus.
- To acquaint the student with the techniques in the theory of analytic functions and complex integration.
- Above topics are most important in connection with practical engineering problems.

Unit–I : Ordinary Differential Equations

Second order linear differential equations with constant coefficients, Second order linear differential equations with variable coefficients (Euler and Legendre's linear equations), Simultaneous first order linear equations with constant coefficients, method of variation of parameters.

Unit–II : Vector Differentiation

Gradient, divergence and curl, directional derivative, unit normal vector, irrotational and solenoidal vector fields, expansion formulae for operators involving ∇.

Unit–III : Vector Integration

Line, surface and volume integrals, Green's theorem in a plane, Gauss divergence theorem, Stoke's theorem – Verification of the above theorems and evaluation of integrals using them.

Unit–IV : Analytic Functions

Functions of a complex variable, Analytic function, the necessary conditions (Cauchy – Riemann equations), sufficient conditions, Properties of analytic functions, harmonic functions, construction of Analytic function by Milne – Thomson method, Conformal mapping: $w = z^2$, $1/z$, e^z, sin z, cos z.

Unit–V : Complex Integration

Statement and application of Cauchy theorem, Cauchy integral formulas, Taylor and Laurent expansion, Singularities – Classification; Residues – Statement and application of Cauchy residue theorem, Contour integration round the unit circle.

(In all units, proof of theorems are not included)

Text Books

1) Venkataraman, M.K., Engineering Mathematics, Volumes I (2008) and II (2009), The National Publishing Company, Chennai.
2) Veerarajan, T., Engineering Mathematics, Second Edition, Tata McGraw Hill Education Private Limited, New Delhi, 2011.

Reference Books

1) Grewal, B.S., Higher Engineering Mathematics, Khanna Publishers, Delhi, 40th Edition, 2007.
2) Erwin Kreysig, Advanced Engineering Mathematics, John Wiley & Sons, 8th Edition, 2002.

Course Outcomes

1) This course equips students to have knowledge and understanding in ordinary differential equations, vector calculus and complex variables.
2) Students will be able to solve problems related to above fields in engineering applications.

00BS202	APPLIED PHYSICS – II	L	T	P
		4	0	0

Course Objectives

At the end of the course the students would be exposed to fundamental knowledge in various materials and applications

- Application of lasers and fiber optics in engineering and technology.
- Astrophysics is the study of physics of the universe. In various objects, such as stars, planets and galaxies.
- To measure positions, brightness, spectra structure of gas clouds, planets, starts, galaxies, globular clusters, quasars etc.
- Physics of modern engineering materials.
- Electromagnetic phenomena and wave propagation
- Applications of nano materials, nano electronics and optoelectronic devices.
- Design of energy sources and applications of solar energy.

Unit–I : Laser and Fiber Optics

Introduction to laser – Einstein co – efficients (A&B) – properties of Laser – Types of laser – CO_2, Nd – YAG and Semiconductor lasers – Applications – Holography – Construction and reconstruction of hologram – Applications.

Fiber optics – Principle and propagation of light in optical fibers – Numerical aperture and acceptance angle – Types of optical fibers (Material, Mode and refractive index) – Applications – Fiber Optic communication system.

Unit–II : Dielectrics and Superconductors

Introduction to Dielectrics – Types of Dielectric materials – Dielectric constant – Determination of Dielectric constant ($\sum r$) by Schering Bridge method – Different types of polarization – Local or Internal field – Clausius – Mosotti Equation – Dielectric Loss – Dielectric breakdown – Dielectric Properties and applications – Superconductivity – Properties – Meissner effect – Type I and Type II superconductors – BCS theory – High temperature Superconductors – Applications.

Unit–III : Nano Materials

Introduction to Nanomaterials – properties – Types of nanomaterials – synthesis of nanomaterials – Top – down approaches – Mechanical grinding, Lithiography – Types of Lithiography – Bottomup approaches – physical vapour deposition method, Sol – gel method. Applications of nanomaterial. Carbon Nanotubes (CNT) – Introduction – Types of Carbon Nanotubes – Synthesis of Carbon Nanotubes – Properties and its application.

Unit–IV : Quantum Mechanics

Heisenberg uncertainty Principle – Wave particle dual nature – De Broglie's matter Waves – wave Velocity and group velocity.

The wave Equation, Schrödinger's Time dependent wave equation, Schrödinger's time independent wave equation – The Wave function and its physical significance – The particle in a box – energy quantization – Eigen values and Eigen functions.

Unit–V : Energy Physics

Introduction to energy source – Energy sources and their availability (Conventional &non – conventional energy sources) – Solar energy – Introduction – Methods of Harvesting Solar energy (Solar cells, Solar battery, Solar heat collectors and Solar water heater) – Wind energy – basic components of a WECS (Wind Energy Conversion System) – Classification of WEC Systems – Advantages and disadvantages of WECS – Biomass – Biomass conversion – Biogas Generation – Classification of Biogas plants.

Text Books

1) Arumugam, M., "Engineering Physics", Anuradha Agencies, 2nd Edition, 1997.
2) Gaur, R.K. and Gupta, S.L., "Engineering Physics", DhanpatRai Publishers, New Delhi, 2003.

Reference Books

1) Rajendran, V., "Engineering Physics", Tata McGraw Hill Publishers, 2009.
2) Rai, G.D., "Non – conventional Energy Sources", Khauna Publications, 1993.
3) Martin Harwit, "Astrophysical Concepts", Springer, 4th Edition, 2006.
4) Dimitri Mihalas. "Stellar Atmospheres", San Francisco, W.H. Freeman & Company, 1978.
5) Wilson, M., Kannangara, K., Smitt, G., Simmons, M. & B. Boguse, "Nanotechnology", Basic Science and Emergine Technology, Raguse Chapman Hall Publications, 2002.
6) Kenneth Klabunde, J., "Nanoscale Materials in Chemistry", A John Eiley & Sons, Inc., Publication, 2001.
7) Mani, P. "Engineering Phyisics", Dhanam Publication, Chennai, 2011.
8) Agarwal, M.P., "Solar Energy", S.Chand & Co., I Edn, New Delhi, 1983.
9) John Twidell & Tony Weir, "Renewable Energy Resources", Taylor & Francis, 2005.
10) Carroll, B.W. & D.A. Ostlie, "An Introduction to Modern Astrophysics", 2nd Edition, 2011.
11) Avadhanulu, M.N. and Kshirsagar, P.G., "A Text Book of Engineering Physics", S. Chand & Company Ltd., 7th Enlarged Revised Ed., 2005.
12) Rai, G.D., *"Solar Energy* Utilization", Volume – 1 & 2, Khanna Publishers, New Delhi.
13) Senthilkumar, G., Engineering Physics, VRB Publishers Pvt. Ltd., Chennai.
14) Ravikrishnan, A., Environmental Science and Engineering, Hitech Publishing Company Pvt. Ltd.,
15) Rai, G.D., "Non – Conventional Energy Sources", Khanna Publishers.
16) Senthilnathan, S., Gnanapoongothai, T., Oudayakumar, K., Jayavarthanan, T., "Material Science", SSMP Publications.

Course Outcomes

1) The student will have the theoretical knowledge in this field of laser, dielectrics, Nano technique, energy physics etc.
2) It will be very useful to the students to apply in different field of engineering.

00BS203	APPLIED CHEMISTRY – II	L	T	P
		4	0	0

Course Objectives

To make the students to understand the

- Types of polymers and polymerization processes.
- Phase rule with different kinds of systems.
- Different types of corrosion and their mechanism.
- Working principle and applications of primary and secondary batteries.
- Engineering materials such as refractories and abrasives.

Unit–I : Polymers

High polymers: plastics – Thermoplastics and thermosetting resins. Addition polymerization and condensation polymerization – compounding of plastics – Moulding methods – Compression, injection and blow moulding – Important engineering plastics – polyethylene, PVC, Teflon, Polystyrenes, Nylon 6,6, Bakelite, Polyurethane – Rubber – natural rubber – vulcanization of rubber – Synthetic rubber – buna – S, butyl rubber, neoprene and polyurethane foams.

Unit–II : Phase Rule

Phase rule – statements and explanation of the terms involved – condensed phase rule – construction of phase diagram – water system – sulphur system – phase rule for two component alloy systems – thermal analysis – eutectic system – Lead – Silver system – simple eutectic formation – Zinc – Magnesium alloy system.

Unit–III : Corrosion and Prevention

Corrosion: Dry and wet corrosion – Pilling – Bedworth rule – mechanism of wet corrosion – types of wet corrosion – galvanic corrosion – differential aeration corrosion – factors affecting corrosions. Corrosion control methods – design and material selection – cathodic protections – sacrificial anode and impressed current method – corrosion inhibitors – protective coatings – surface preparations – Galvanizations, Tinning – electroplating – anodizing, phosphate coating, hot dipping.

Unit–IV : Energy Storage Devices

Types of battery – commercial voltaic cell – primary battery – secondary storage cell – lead – acid cell, nickel – cadmium cell, lithium battery – fuel cells – hydrogen – oxygen fuel cell – photovoltaic cell – principle, working and applications.

Unit–V : Engineering Materials – II

Refractories – classification (acidic, basic and neutral refractories) – properties (refractoriness, refractoriness under load, dimentional stability, porosity, thermal spalling) – fire clay bricks, alumina bricks and zirconia bricks. Abrasives – Moh's scale of hardness – natural abrasive (diamond, corundum, emery, garnets and quartz) – synthetic abrasives – silicon carbide, boron carbide and their uses.

Text Books

1) Sivasankar, B., (2012). *'Engineering Chemistry'*, Tata McGraw Hill Publishing Company Limited, New Delhi.
2) Sivakumar, R. and Sivakumar, N., (2013). *'Engineering Chemistry'*, Tata McGraw Hill Company Limited, New Delhi.

Reference Books

1) Jain, P.C. and Monica Jain, (2010). *'Engineering Chemistry'*, DhanpatRai & Sons, New Delhi.
2) Dara, S.S. and Umare, S.S., (2014). *'Text book of Engineering Chemistry'*, S. Chand & Co. Ltd., New Delhi.
3) Gopalan, R., Venkappayya, D. and Nagarajan, S., (2008). *'Engineering Chemistry'*, Tata McGraw Hill Publishing Company Limited, New Delhi.
4) Gowariker, V.R., Viswanathan, N.V. and Jayadev Sreedhar, (2006). *'Polymer Science'*, New Age International P (Ltd.,), Chennai. (Unit I)
5) Puri, B.R., Sharma, L.R. & Pathania, M.S., (2013). *'Principles of Physical Chemistry'*, Vishal Publishing Company, New Delhi. (Unit II)

Course Outcomes

At the end of the course, the student will be able to

1) Understand the synthesis and applications of various types of polymers and moulding processes.
2) Understand the concept of phase rule and its applications, which is applicable in alloy preparation.
3) Understand the concept of corrosion and to apply the knowledge in the protection of different metals from corrosion.
4) Gain the knowledge about various energy storage devices, especially solar energy.
5) Have the knowledge of converting solar energy into most needy electrical energy efficiently and economically to reduce the environmental pollution.
6) Gain knowledge on classification, synthesis and applications of abrasives and refractories.

00ES204	BASIC ENGINEERING (CIVIL)	L	T	P
		2	0	0

Course Objectives

- To inculcate a knowledge on essentials of Civil Engineering
- To expose the students on the role, significance and contributions of Civil Engineering in satisfying societal needs
- To illustrate the concepts of various construction techniques

Module I

Introduction to Civil Engineering – various disciplines of Civil Engineering, relevance of Civil Engineering in the overall infrastructural development of the country. Introduction to various building materials – Stone, Bricks, Steel, Cement, Concrete, Timber – its characteristics, types and uses. Various types of buildings as per nbc; Selection of suitable site for buildings, Components of a residential

building – its functions, Orientation of a building, simple definitions – plinth area / built up area, floor area / carpet area – floor space index.

Module II

Surveying – Principles and objectives of surveying; Types, Classifications of surveying, measurement of areas and distances – chain – compass: Introduction to Leveling, Total station, Remote sensing – fundamental principles and applications.

Building construction – foundations; Bearing capacity of soil, functions of foundations, Types – Shallow and Deep. Brick masonry – Header, Stretcher, Flemish and English Bond. Columns, Lintels, Roofs – functions, types, roofing materials, Floors – functions, types, flooring materials. Decorative finishes – plastering, interior design

Module III

Bridges – necessity – selection of site – components of a bridge: Dams – types – selection site – forces acting on a dam – Roads – uses – classification of roads – components of a road; Railways – basic components of permanent way – water supply – per capita requirement – sources – need for conservation of water – rain water harvesting – basic water treatment – Sewage and its disposal – basic definitions – Septic tank – components and functions.

Text Books

1) Ramesh Babu, V., A Text Book of Basic Civil Engineering, Anuradha Agencies, Kumbakonam, 1995.
2) Palanichamy, M.S., Basic Civil Engineering, Tata McGraw Hill Publishing Company Ltd, 2000.

Reference books

1) Ramamrutham, V., Basic Civil Engineering, DhanpatRai Publishing Co.(P) Ltd., 1999.
2) Natarajan, K.V., Basic Civil Engineering, Dhanalakshmi Publications, Chennai, 2005.
3) Satheesh Gopi, Basic Civil Engineering, Pearson Publications, 2010.

Course Outcomes

1) Understand the basic knowledge on civil engineering materials.
2) Develops the skill to satisfy the social needs.
3) Describe the suitable method of construction technique.

00ES204	BASIC ENGINEERING (ELECTRICAL)	L	T	P
		2	0	0

Course Objectives

- PO1: To impart the basic principles of generation of electrical energy.
- PO2: To explain the operation of electrical machines and various measuring instruments.
- PO3: To understand the basic concepts of circuit analysis.
- PO4: To provide an overview of the principles, operation and application of semiconductor devices like diodes, BJT, FET and a basic knowledge of fundamentals of Communication Systems.

Module I

Sources of Electrical energy – Generation of electrical energy – working principles of DC generators and alternators – Advantages of electrical energy over other forms of Energy.

Operating principle of DC motors – Types of DC motors – Characteristics and uses of DC motors. Working principles of Single and Three phase transformers. Operating Principle of three phase and single phase induction motors – types and uses of induction motors.

Working principles of MC and MI voltmeters and Ammeters, Dynamo meter type wattmeter, Induction type energy meter and Multimeter – types of wiring – requirements for house wiring – typical layout for a small house – earthing.

Module II

DC Circuits: Definition of current, voltage, power and energy – DC voltage and current sources – resistance, types of resistors, series and parallel connections of resistors, current and voltage division – loop method of analysis of simple circuits.

AC Circuits: Sinusoidal signals – average, r.m.s values – inductance, capacitance and their V – I relationships. Analysis of simple single phase series circuits – power and power factor – phasor diagrams – Introductions to three phase AC circuits.

Module III

Basic Electronics: Principle and characteristics, uses of PN junction Diode, Zenerdiode, BJT, FET, UJT, Thyristors, – Operating principle of Half wave, Full wave and Bridge rectifiers.

Digital Electronics and Principles of Communication Systems: Symbol, truth table and functions of basic logic gates, universal gates, Half adder, Full adder. Communication systems – Microwave, Satellite, Fibreoptic and ISDN (block diagram description only).

Text Books

1) Nagrath, I.J., 2007. Elements of Electrical Engineering, 2nd Edition, 14th reprint, Tata McGraw Hill Publishing Co. Limited, New Delhi.

Reference Books

1) Gupta, B.R., 2002. *Principles of Electrical Engineering*, S. Chand & Co, New Delhi.
2) Theraja, B.L. & Theraja, A.K., 2000. *Electrical Technology, Vol. I, II, and IV*, S. Chand and Co., New Delhi.
3) Floyd & Jain, 2009. *Digital Fundamentals*, 8th Edition, Person Education.
4) Anok Singh, 2006. *Principles of Communication Engineering*, 6th Reprint, S. Chand & Company Ltd., Ram Nagar, New Delhi.

Course Outcomes

After the completion of the course, the student should be able to

1) CO1: Provide comprehensive idea about simple circuit analysis, working principles of machines and common measuring instruments.

2) CO2: Analyze the behavior of any dc and ac circuits.
3) CO3: Characterize semiconductor devices that include diodes, BJT and digital functions.
4) CO4: Understand fundamental principles of communication systems.

00ES204	BASIC ENGINEERING (MECHANICAL)	L	T	P
		2	0	0

Course Objectives

- To familiarize the students the functioning of different types of Boilers, the mountings and accessories.
- To provide basic knowledge about the use of various machine tools and the basic principles of welding, brazing and soldering.
- To illustrate the concepts of various metal forming operations and metal joining techniques.

Module I

Boilers: Classification – Description and working of Simple vertical boiler, Cochran boiler, Babcock and Wilcox boiler – Description and working of boiler mountings: water level indicator, Pressure gauge, Dead weight and Spring loaded Safety value, Fusible plug, Feed check value, Steam stop value and Blow – off cock – Description and working of boiler accessories: Economiser and Super heater.

Module II

Prime Movers: Steam turbines: Principles and working of Impulse and Reaction turbines – Comparison. Gas turbines: Principles and working of Open cycle and Closed cycle gas turbines. Internal Combustion Engines: Classification – principal parts – comparison of two strike and four stroke engines – working principle of petrol and diesel engines.

Module III

Machine Tools: Description of parts and operations performed – Lathe, Shaper and Drilling machine.

Metal Forming: Hot working versus cold working; Hand forging – Principle and operations; Rolling – Principle, rolling mill configurations; Extrusion – Direct versus indirect extrusion.

Metal Joining: Gas welding – principle, Oxy – acetylene welding – equipment, types of flames, advantages and disadvantages – Arc welding – principle, advantages and disadvantages – Brazing – Torch brazing, dip brazing, furnace brazing, resistance brazing – Soldering – Comparison of brazing and soldering.

Text Books

1) Prabhu, T.J., Jaiganesh, V. and Jebaraj, S., Basic Mechanical Engineering, Scitech Publications Pvt. Ltd., Chennai, 2000.
2) Venugopal and Prabhuraj, T.J., Basic Mechanical Engineering, ARS Publishers, Sirkali, 1996.

Reference Books

1) Hajra Choudhury, S.K., Nirjhar Roy, Hajra Choudhury, A.K., Elements of Workshop Technology, (Vol 1 and Vol II), Media Promoters Pvt. Ltd. (2008).

2) Rao, P.N., Manufacturing Technology: Foundry, Forming and Welding, Vol 1, McGraw Hill Education, (2013).
3) Steven R. Schmid, Serope Kalpakjian, Manufacturing Processes for Engineering Materials (English) 5th Edition, Pearson India, (2009).

Course Outcomes

1) Understand the construction and working principles of boiler operations.
2) Distinguish between steam turbines and gas turbines.
3) Select suitable manufacturing methods to produce a new component.

00HS205	COMMUNICATION SKILLS AND LANGUAGE LABORATORY	L	T	P
		0	2	3

Course Objectives

- The Language Lab focuses on the production and practices of sounds of language
- The Language Lab familiarizes the students with the use of English in everyday situations and contexts.

Theoretical Session (Internal Assessment only)

1) English sound pattern
2) Sounds of English
3) Pronunciation
4) Stress and Intonation
5) Situational Dialogues/ Role play
6) Oral presentations – Prepared or Extempore
7) 'Just a Minute' sessions (JAM)
8) Describing Objects /situations/ people
9) Debate
10) Giving Directions

Practical Session

- To make the students recognize the sounds of English through Audio Visual Aids
- To enable the students speak fluently without fear
- To develop their communicative skill with individual practice through the prescribed package
- The Globarena Package consists of the following exercises
    1. Reading comprehension
    2. Listening comprehension
    3. Vocabulary exercises
    4. Phonetics
    5. Role Play in dialogues
    6. Auto Speak

Minimum Requirement

The English Language Lab shall have two parts:

The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language Globarena software for self – study by learners and Library with Books to improve their proficiency in English.

Suggested Software

1) Globarena Package for communicative English.
2) Cambridge Advanced Learner's English Dictionary.

Books to be procured for English Language Lab Library:

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. Edn.
4) 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.
5) A Text Book of English Phonetics for Indian Students by T. Balasubramanian (Macmillan)
6) English Skills for Technical Students, WBSCTE with British Council, OL.

Distribution and Weightage of Marks

English Language Laboratory Practical Paper:

1) The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2) For the Language lab sessions, there shall be a continuous evaluation during the year for 40 sessional marks and 60 year – end Examination marks. The year – end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

Course Outcomes

1) 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.
2) Train the students to use language effectively to face interviews, group discussions, and public speaking.
3) Initiate the students into greater use of the computer in resume preparation, report writing, format – making, etc.

00BP206	APPLIED PHYSICS LABORATORY	L	T	P
		0	0	3

Course Objectives

The ability to offer students a variety of research opportunities

- To determine the radius of curvature of the plano convex lens and the wavelength of the sodium light by measuring the diameter of Newton's rings.
- We can use a spectrometer to measure this angle of deviation.
- To measure the modulus of elastic material by torsional pendulum and bending of a beam.

- To determine the resistivity of a given steel and brass wire.
- To find the velocity of ultrasonic waves in a liquid.
- Less viscosity of the liquid by poiseuille's method.

List of Experiments (Any Ten)

1) Non-Uniform Bending – Determination of Young's modulus of the given scale or beam.
2) Newton's rings – Determination of Radius of curvature of the given Plano convex lens.
3) Viscosity – Determination of co – efficient of Viscosity of a highly viscous liquid by Stoke's method.
4) Spectrometer – Dispersive power of a given prism.
5) Torsional Pendulum – Determination of Moment of Inertia of the metallic disc and
6) Rigidity Modulus of the material of a wire.
7) Field along the axis of a coil – Determination of horizontal earth magnetic flux density.
8) Air wedge – Determination of thickness of a given thin wire and paper.
9) Viscosity – Determination of co – efficient of Viscosity of a less viscous liquid by Capillary flow method.
10) Uniform bending – Determination of Young's modulus of the given scale or beam.
11) Spectrometer – Determination of wavelength of the prominent spectral lines using Grating.
12) Semiconductor diode laser – Determination of wavelength of Laser source using Grating.
13) Band gap determination of a Semiconductor.

Course Outcomes

This course

1) To determine resistivity of a given steel and brass wire.
2) To find the velocity of ultrasonic waves in a liquid.
3) To measure the thickness of a thin materials.
4) To determine the band gap of a given semiconductor.
5) Diffraction patterns can be formed by light passing through a series of fine lines.
6) Applications of opto electronic devices.

00BP207	APPLIED CHEMISTRY LABORATORY	L	T	P
		0	0	3

Course Objectives

- To appreciate the practical significance of acidimetry, alkalimetry and permanganometry.
- To analyse quantitatively the amount of a substance present in a given sample.
- To assess the composition of an alloy.
- To test the water quality standards.

LIST OF EXPERIMENTS

1) Estimation of Potassium hydroxide.
2) Estimation of Acetic acid in vinegar.
3) Estimation of Temporary hardness of water sample.
4) Estimation of Total hardness of water sample.
5) Estimate separate amount of sodium carbonate and sodium hydroxide in a mixture.
6) Estimation of Ferrous sulphate.
7) Estimation of Mohr's salt.
8) Estimation of ferrous iron.
9) Estimation of Oxalic acid.
10) Determination of available free chlorine in a water sample.
11) Estimation of copper in brass by iodometry.
12) Estimation of iron by dichrometry.
13) Estimation of nickel in an alloy.

Course Outcomes

At the end of the course, the student will be able to

1) Gain knowledge in the quantitative chemical analysis of water quality related parameters, acid – base, red – ox and iodometry titrations.

00SP208	ENGINEERING WORKSHOP	L	T	P
		0	0	3

Course Objectives

- To provide the students simple hands – on – experience in the basic aspects of production engineering in fitting, carpentry and sheet metal.

Workshop Practice in the Shops

Carpentry: Use of hand tools – exercises in planning and making joints namely, half lap joint, dovetail joint, mortising and tenoning.

Fitting: Use of bench tools, vice, hammers, chisels, files, hacksaw, centre punch, twist drill, taps and dies – Simple exercises in making T joint and dovetail joints.

Sheet Metal Work: Use of hand tools – Simple exercises in making objects like cone, funnel, tray, cylinder.

Smithy: Demonstration of hand forging and drop forging.

Course Outcomes

This course

1) Use basic tools of fitting, carpentry and sheet metal fabrication.
2) Experience in the fabrication of simple carpentry joints.
3) Develop skill to make simple fitting joints.
4) Train to make simple shapes of sheet material.
5) Distinguish hand forging and drop forging operation.