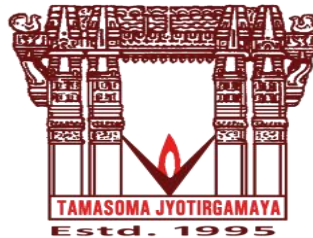


**ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS**

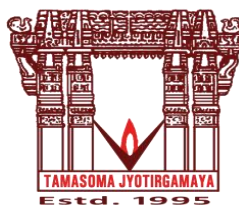
Mechanical Engineering

B.TECH. FIRST YEAR DEGREE COURSE
(Applicable for the batches admitted from 2011-2012)



**VNR VIGNANA JYOTHI
INSTITUTE OF ENGINEERING & TECHNOLOGY
(AFFILIATED TO JNTUH)
An Autonomous Institute under JNTUH**

***Bachupally, Nizampet (S.O), Hyderabad – 500090
Andhra Pradesh, India***



**VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY
HYDERABAD**

An Autonomous Institute under JNTUH
ACADEMIC REGULATIONS 2011 FOR B.TECH. DEGREE COURSE
(Applicable for Students admitted from the academic year 2011-2012)

1. Courses of study

The following courses of study are offered at present for specialization for the B. Tech. Course:

Branch Code	Branch
01	Civil Engineering.
02	Electrical and Electronics Engineering
03	Mechanical Engineering
04	Electronics and Communication Engineering
05	Computer Science and Engineering.
10	Electronics & Instrumentation Engineering
12	Information Technology
24	Automobile Engineering

1.1 Eligibility Criteria for Admission

The eligibility criteria for admission into engineering programmes shall be as mentioned below:

- The candidate shall be an Indian National.
- The candidate should have completed 16 years of age as on 31st December of the academic year for which the admissions are being conducted.
- The Candidate should have passed the qualifying examination (10+2) or equivalent as on the date of admission.
- Seats in each programme in the Institution are classified into **Category A** and **Category B** as per the G.Os.

1.1.1 Category – A Seats:

- These seats will be filled through counseling as per the rank at the Common Entrance Test (EAMCET) conducted by the State Government and State Government GOs as per other admission criteria laid down in the G.Os.

1.1.2 Category - B Seats

These seats will be filled by the institute as per the G.Os. Issued by State Government from time to time.

1.1.3 Category: Lateral Entry

- The candidates shall be admitted into the Third semester, based on the rank secured by the candidate at Engineering Common Entrance Test (ECET(FDH)) by the Convener, ECET.

2. Distribution and Weightage of Marks

- The performance of a student in each semester shall be evaluated subject –wise with a **maximum of 100 marks for theory and 75 marks for practical subjects**. In addition, an Industry oriented mini-project, Seminar, Comprehensive viva-voce, and Project Work shall be evaluated for **50, 50, 50 and 200 marks** respectively.

- For theory subjects the distribution shall be **30 marks for Internal Evaluation and 70 marks for the End-Examination**.

For theory subjects, Two mid examinations will be conducted in each semester as per the academic calendar. Each mid examination is evaluated for 25 marks. First mid examination should be conducted for 1 – 2 ½ Units of syllabus and the second mid examination shall be conducted for 2 ½ - 5 Units of syllabus. The mid descriptive type exam paper consists of Section-A and Section-B.

Section-A[compulsory] consists of 5 short answer questions and each carries one mark.

Section-B consists of 5 questions out of which 4 are to be answered and each question carries 5 marks. The time duration of each mid examination is 90 minutes.

Two assignments are to be given to students covering the syllabus of first mid and second Mid examinations and are evaluated for 5 marks each. .

The first assignment shall be submitted before first mid examinations and second Assignment should be submitted before second mid examination.

At the end of the semester Internal Marks Maximum 30 for the respective subjects are allotted as follows:

- 25 marks for the better of the two mid term examinations
- 5 marks of the average of the two assignment marks

- For practical subjects there shall be a continuous evaluation during the semester for **25 sessional marks and 50 marks for end examination**. Out of the 25 marks for internal, **day-to-day work in the laboratory shall be evaluated for 10 marks**, and 10 marks for internal examination (two internal practical examinations will be conducted and the better of the two examinations will be taken into account) and 5 marks for laboratory record.

NOTE: A student who is absent for any assignment/Mid term examination for any reason what so ever shall be deemed to have secured 'zero' marks in the test/examination and no makeup test/examination shall be conducted.

- For the subjects having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing, Production Drawing Practice, and Estimation etc., the distribution shall be **30 marks for internal evaluation (15 marks for day-to-day work and 15 marks for internal tests** (the better of the two examinations will be taken into account) **and 70 marks for end examination**. There shall be **two internal tests** in a semester.

- There shall be an **industry-oriented mini-Project**, in collaboration with an industry of their specialization, to be taken up during the vacation after III year II Semester examination. The **mini project shall be evaluated during the IV year I Semester**. The industry oriented mini project shall be submitted in report form and should be presented before a committee, which shall be evaluated for **50 marks**. The committee consists of Head of the Department, the supervisor of mini project and a senior faculty member of the department. There shall be **no internal assessment for industry oriented mini project**.

- vi. There shall be a **seminar presentation in IV year II Semester**. For the seminar, the student shall collect the information on a specialized topic other than the project topic and prepare a technical report, showing his understanding of the topic, and submit to the department, which shall be evaluated by a Departmental committee consisting of the Head of the department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for **50 marks**. There shall be **no external examination for seminar**.
- vii. There shall be a **Comprehensive Viva-Voce in IV year II semester**. The Comprehensive Viva-Voce will be conducted by a Committee consisting of the Head of the Department and three Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the student's understanding in various subjects studied during the B.Tech. course of study. The Comprehensive Viva-Voce is evaluated **for 50 marks** by the Committee. There will be **no internal assessment for the Comprehensive viva-voce**.
- viii. The Project work shall be started by the student in the beginning of the IV year I Semester. Out of a total of **200 marks** for the project work, **60 marks shall be for Internal Evaluation** and **140 marks for the Semester end Examination**. The Semester end Examination (viva-voce) shall be conducted by a committee comprising of an external examiner, Head of the Department and the project supervisor. The evaluation of project work shall be conducted at the end of the IV year II Semester. **The Internal Evaluation shall be on the basis of three seminars conducted during the IV year II semester for 30 marks by the committee consisting of Head of the Department, project supervisor and senior faculty member of the Department and for 30 marks by the supervisor of the project.**

3. Semester end Examination

(a) Theory Courses

Each course is evaluated for 70 marks. Examination is of 3 hours duration.

Question paper contains two sections [Section-A and Section-B]

Section-A: Carries 30 marks [Five questions of one mark each, five questions of two marks each and another five questions of three marks each] which is compulsory.

Section-B: carries 40 marks consisting of six essay type questions out of which four questions to be answered, each carrying 10 marks.

(b) Practical Courses

Each lab course is evaluated for 50 marks. The examination shall be conducted by the laboratory teacher and another senior teacher concerned with the subject of the same/other department/Industry. The external examiner may be appointed by the Chief Superintendent in consultation with HOD as and when required.

(c) Supplementary Examinations

Supplementary examinations will be conducted along with regular semester end examinations.

(during even semester regular examinations, supplementary examinations of odd semester and during odd semester regular examinations, supplementary examinations of even semester will be conducted)

4. Attendance Requirements

- i. A student shall be eligible to appear for the Semester end examinations if he acquires a **minimum of 75% of attendance in aggregate of all the subjects** for semester / year.
- ii. Condonation of shortage of attendance in aggregate **up to 10% (65% and above and below 75%)** in a semester may be granted by **Institute Academic Committee**,
- iii. A student will not be permitted to write the end examination and hence not promoted to the next semester unless he satisfies the attendance requirement of the present semester, as applicable. They may seek re-admission for that semester when offered next.

- iv. Shortage of Attendance **below 65% in aggregate** shall in **NO case be condoned**.
- v. Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that semester.
- vi. A stipulated fee shall be payable towards condonation of shortage of attendance.

5. Minimum Academic Requirements:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item No.4.

- i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical design or drawing subject or project, if he secures **not less than 35% (25 out of 70 marks) of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together**.
- ii. A student shall be **promoted from II to III year** only if he fulfils the academic requirement of **37 credits from Two regular and one supplementary examinations of I year I semester and One Regular & One Supplementary exam of I year II semester, and one regular examination of II year I semester** irrespective of whether the candidate takes the examination or not.
- iii. A student shall be **promoted from III year to IV year** only if he fulfils the academic requirements of total **62 credits from the following examinations**, whether the candidate takes the examinations or not.
 - Three regular and Two supplementary examinations of I B Tech I Semester.
 - Two regular and two Supplementary examinations for I B Tech II Semester
 - Two regular and one supplementary examinations up to the end of II year I Semester.
 - One regular and one supplementary examinations of II year II semester.
 - One regular examination of III year I semester.
- iv. A student shall register and put up minimum academic requirement in all 200 credits and earn the 200 credits. Marks obtained in all 200 credits shall be considered for the calculation of percentage of marks.
- iv. Students who fail to earn 200 credits as indicated in the course structure **within eight academic years** from the year of their admission shall **forfeit their seat** in B.Tech. course and their **admission shall stand get cancelled**.

6.Course pattern

- i. The entire course of study is of four academic years. **All the I, II, III & IV years are of semester pattern**.
- ii. A student eligible to appear for the end examination in a subject, but absent or has failed in the end examination may reappear for that subject at the supplementary examination whenever conducted.
- iii. When a student is detained due to shortage of attendance in any semester, he may be re-admitted into that semester when it is offered next, **with the academic regulations of the batch into which he gets readmitted**.
- iv. When a student is detained due to lack of credits in any year, he may be eligible to be promoted or for promotion into the next year after fulfillment of the academic requirements, **with the academic regulations of the batch into which he gets admitted**

7. Award of B.Tech. Degree and Class

A student will be declared eligible for the award of the B. Tech. Degree if he/she fulfils the following academic regulations:

- i. Pursued a course of study for not less than four academic years and not more than eight academic years.
- ii. Registered for 200 credits and secured 200 credits.

NOTE: Students, who fail to fulfill all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech. course.

- iii After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree he shall be placed in one of the following four classes:

Class Awarded	% of marks to be secured	From the aggregate marks secured for the 200 Credits.
First Class with Distinction	70% and above	
First Class	Below 70% but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	
Fail	Below 40%	

(The marks in internal evaluation and end examination shall be shown separately in the marks memorandum)

8. Withholding of Results

If the student has not paid dues to College, or if any case of indiscipline is pending against him, the result of the candidate may be withheld and he will not be allowed to go into the next higher Semester. The award or issue of the Degree may also be withheld in such cases.

9. Transitory Regulations

Students who have discontinued or have been detained for want of attendance or any other academic requirements, may be considered for readmission as and when they become eligible. They have to take up Equivalent subjects, as substitute subject in place of repetition of subjects as decided by the Institute Academic Committee.

10. Minimum Instruction Days

The minimum instruction days for each semester shall be **90 clear instruction days**.

11. There shall be **no branch transfers** after the completion of admission process.

12. **The decision of the Institute Academic Committee will be final in respect of equivalent subjects for those students who are transferred from other colleges. The procedure for permitting students to transfer from other colleges will be decided by the principal / Institute Academic Committee keeping the Government Rules concerned in view.**

13. General

- i. Where the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".
- ii. The academic regulations should be read as a whole for the purpose of any interpretation.
- iii. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.
- iv. In the case of any discrepancy/ambiguity/doubt arises in the above rules and regulations, the decision of the Principal shall be final.
- v. The College may change or amend any or all of the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students concerned with effect from the dates notified by the College.

14. Academic Regulations for B.Tech. (Lateral Entry Scheme)

(Applicable for students admitted from the academic year 2012-2013)

- (i) A student shall register for all 150 credits and earn all the 150 credits. Marks obtained in all 150 credits shall be considered for the calculation of the class.
- (ii) A student who fails to earn 150 credits as indicated in the course structure within **six** academic years from the year of their admission shall forfeit their seat in B.Tech. programme and their admission stands cancelled.
- (iii) The same attendance regulations are adopted as that of B.Tech. Four year degree course.
- (iv) A student shall be promoted from third year to fourth year only on fulfilling the academic requirements of securing 37 credits from the following examinations.
 - a. Two regular and one supplementary examination of II year I semester
 - b. One regular and one supplementary examination of II year II semester
 - c. One regular examination of III year I semester.

Irrespective of whether the candidate appears the Semester-End examination or not as per the normal course of study and in case of getting detained for want of credits the student may make up the credits through supplementary exams of the above exams before the date of commencement of class work for IV year I semester.

(v) Award of B.Tech. Degree and Class:

After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree he shall be placed in one of the following four classes:

Class Awarded	% of marks to be secured	From the aggregate marks secured for the 150 Credits. (i.e., II year to IV year)
First Class with Distinction	70% and above	
First Class	Below 70% but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	
Fail	Below 40%	

(The marks in internal evaluation and end examination shall be shown separately in the marks memorandum)

- (vi) All other regulations as applicable to B.Tech. four year degree course will hold good for B.Tech. (Lateral Entry Scheme).

VNR Vignana Jyothi Institute of Engineering & Technology

B. Tech. MECHANICAL ENGINEERING

I YEAR I SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R11MTH1101	Mathematics - I	3	1	3
R11PHY1101	Engineering Physics - I	3	0	3
R11CHE1102	Chemistry of Engineering Materials	3	0	3
R11CSE1101	Computer Programming	3	0	3
R11MED1101	Engineering Mechanics-I	4	1	4
R11EEE1130	Elements of Engineering	3	0	3
R11MED1102	Engineering Graphics-I	2	3	2
R11CSE1201	Computer Programming Lab	0	3	2
R11EPC1201	Engg. Physics & Chemistry Lab	0	3	2
Total		21	11	25

I YEAR II SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R11MTH1102	Mathematics – II	3	1	3
R11PHY1102	Engineering Physics-II	3	0	3
R11CHE1101	Engineering Chemistry	3	0	3
R11HAS1101	English	3	0	3
R11CSE1102	Data Structures	3	0	3
R11MED1103	Engineering Mechanics-II	4	1	4
R11MED1104	Engineering Graphics-II	2	3	2
R11MED1201	Engineering Workshop	0	3	2
R11HAS1203	English Language & Communication Skills Lab	0	3	2
Total		21	11	25

* T/P/D: Tutorial/Practical/Drawing Practice

VNR Vignana Jyothi Institute of Engineering & Technology

B. Tech. MECHANICAL ENGINEERING

II YEAR I SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R11MTH1103	Mathematics - III	3	1	3
R11MED1106	Mechanics of Solids	4	1	4
R11MED1107	Thermodynamics	4	1	4
R11MED1108	Metallurgy and Material Science	3	0	3
R11EEE1132	Basic Electrical Engineering	3	0	3
R11MED1109	Machine Drawing	0	6	4
R11MED1203	Metallurgy and Mechanics of Solids Lab	0	3	2
R11EEE1203	Electrical Technology and Electric Circuits Lab	0	3	2
Total		17	15	25

II YEAR II SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R11MED1110	Kinematics of Machines	4	1	4
R11MED1111	Fluid Mechanics and TurboMachinery	4	1	4
R11MED1112	Applied Thermodynamics	4	1	4
R11MED1113	Production Technology	3	0	3
R11ECE1134	Basic Electronics	3	0	3
R11MED1114	CAD Using C	3	0	3
R11MED1204	Production Technology Lab/ "CAD Using C" Lab	0	3	2
R11MED1205	Fluid Mechanics and TurboMachinery Lab	0	3	2
Total		21	9	25

* T/P/D: Tutorial/Practical/Drawing Practice

VNR Vignana Jyothi Institute of Engineering & Technology

B. TECH MECHANICAL ENGINEERING

III YEAR I SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R11MED1115	Dynamics of Machinery	4	1	4
R11MED1116	Mechanical Engineering Design - I	4	1	4
R11MTH1104	Numerical Analysis & Linear Programming	3	1	3
R11MED1117	Machine Tools	3	0	3
R11MED1118	Metrology & Instrumentation	3	0	3
R11CED1109	Environmental Studies	3	0	3
R11MED1206	Machine Tools/ Applied Thermodynamics Lab - I	0	3	2
R11MED1207	Metrology & Instrumentation Lab	0	5	3
Total		20	11	25

III YEAR II SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R11MED1119	Mechanical Engineering Design-II	4	1	4
R11MED1120	Finite Element Method	4	1	4
R11MED1121	Refrigeration & Air Conditioning	4	1	4
R11MED1122	Heat & Mass Transfer	4	1	4
R11HAS1102	Business Economics and Financial Analysis	3	0	3
R11MED1208	CAD/CAM Lab	0	3	2
R11MED1209	Heat & Mass Transfer Lab	0	3	2
R11HAS1204	Advanced English Communication Lab	0	3	2
Total		19	13	25

* T/P/D: Tutorial/Practical/Drawing Practice

VNR Vignana Jyothi Institute of Engineering & Technology

B. Tech. MECHANICAL ENGINEERING

IV YEAR I SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R11HAS1103	Management Science	3	0	3
R11MED1124	Elective - I Composite Materials	4	0	4
R11AME1125	Automation in Manufacturing			
R11MED1126	Gas Dynamics			
R11MED1127	Advanced Mechanism Design			
R11EIE1127	Fundamentals of Biomedical Instrumentation			
R11MED1128	CNC Technology			
R11MED1129	Elective – II Mechanical Vibrations	4	0	4
R11MED1130	Plant Layout & Material Handling			
R11MED1131	Computational Fluid Dynamics			
R11EIE1123	Advanced Instrumentation and Control Systems			
R11MED1132	Industrial Management			
R11MED1133	Theory of Metal Cutting			
R11MED1134	Elective – III Fracture Mechanics	4	0	4
R11MED1135	Robotics			
R11MED1136	Unconventional Machining Processes			
R11MED1137	Power Plant Engineering			
R11MED1138	Advanced Machine Design			
R11MED1139	Mechatronics			
R11MED1155	Elective – IV Advanced Mechanics of Solids	4	0	4
R11MED1141	Metal Forming			
R11MED1142	Tribology			
R11MED1144	Renewable Energy Sources: Solar Energy			
R11MED1145	Industrial Engineering			
R11AME1113	Automobile Engineering			
R11MED1210	Applied Thermodynamics Lab - II	0	3	2
R11MED1211	Automation Systems Design Lab	0	3	2
R11MED1301	Industry Oriented Mini – Project	0	8	2
Total		19	14	25

* Major Project initiated in I.Sem and Evaluated in II.Sem

* T/P/D: Tutorial/Practical/Drawing Practice

VNR Vignana Jyothi Institute of Engineering & Technology

B. Tech. MECHANICAL ENGINEERING

IV YEAR II SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R11MED1123	Computer Integrated Manufacturing	3	0	3
R11MED1155	Elective – V NanoTechnology	3	0	3
R11MED1147	Maintenance and Safety Engineering			
R11MED1148	Principles of Entrepreneurship			
R11MED1149	Interactive Computer Graphics			
R11MED1150	Operations Research			
R11MED1151	Tool Design			
R11MED1152	Elective – VI BioMechanics & BioMaterials	3	0	3
R11MED1153	Precision Engineering			
R11MED1154	Production Planning & Control			
R11MED1140	Jet Propulsion & Rocket Engineering			
R11MED1143	Statistical Quality Control & TQM			
R11MED1156	Cryogenic Engineering			
R11MED1302	Seminar	0	3	2
R11MED1303	Comprehensive Viva	0	0	2
R11MED1304	Major Project	6	12	12
Total		15	15	25

* T/P/D: Tutorial/Practical/Drawing Practice

VNR Vignana Jyothi Institute of Engineering & Technology

I Year B.Tech ME & AE – I sem

L	T/P/D	C
3	1	3

(R11MTH1101) MATHEMATICS – I

ADVANCED CALCULUS

UNIT-I

Elementary Analysis:-

Sequences – Series - Convergence and Divergence - Ratio test - Comparison test - Integral test - Cauchy's root test - Raabe's test(Statements only) - Absolute and Conditional Convergence, Rolle's theorem - Lagrange's Mean Value Theorem - Cauchy's Mean Value Theorem-Generalized Mean Value Theorem (Taylor's Theorem)-(Statements only).

UNIT-II

Functions of Several Variables

Functions of several variables – Functional dependence – Jacobian – Maxima and Minima of functions of two variables with constraints or without constraints
Radius of Curvature, Centre and Circle of Curvature – Evolutes and Envelopes.

UNIT-III

Improper Integrals and Special functions

Improper Integrals -- Beta, Gamma and Error functions - properties and simple applications.

UNIT-IV

Curve Tracing, Applications of Integration and Multiple integrals

Curve tracing – Cartesian, polar and parametric curves. Applications of integration to lengths, volumes and surface areas in Cartesian and polar coordinates.

Multiple integrals- double and triple integrals-change of variables-change of order of integration.

UNIT-V

Vector Differentiation and Vector Operators, Vector Integration and Vector Integral Theorems

Vector calculus: Gradient-curl-divergence and their related properties of sums- products-Laplacian and second order operators. Vector integration-line integral-work done-potential function-area-surface and volume integrals. Vector integral theorems: Green's theorem- Stokes and Gauss divergence theorem. Verification of Green's, Stokes and Gauss theorems (Without proofs)..

TEXT BOOKS

1. Walter Rudin: "Elementary Analysis", Mc-Graw-Hill Book co., NY
2. Tom M. Apostol : "CALCULUS", Volume1 and Volume2, 2nd Edition, John Wiley & Sons
3. Murray.R.Spiegel:" Schaum's Outline's Of Vector Analysis", 2nd Edition, Tata McGraw Hill.

REFERENCE

1. Erwin Kreyszig : "Advanced Engineering Mathematics", 8th Edition, John Wiley and Sons.
2. Thomas and Finney: "Calculus and Analytic Geometry", 9th edition, Pearson Publication.

VNR Vignana Jyothi Institute of Engineering & Technology

I Year B.Tech ME & AE – I sem

L	T/P/D	C
3	0	3

(R11PHY1101) ENGINEERING PHYSICS-I

UNIT –I

INTERFERENCE AND DIFFRACTION: Superposition principle, resultant amplitude, coherence, methods to obtain coherent sources, interference, Young's double slit experiment, interference in thin films by reflection, Newton's rings Experiment, Distinguish between Fraunhofer and Fresnel diffraction, diffraction at single slit (Qualitative and Quantitative(Phasors approach)), double slit, circular aperture, and multiple slits (grating)(Qualitative Approach). Resolution of spectral lines, Rayleigh criterion, resolving power of grating and telescope.

UNIT - II

POLARIZATION: Polarization phenomenon, Brewster's Law and Malus law, examples, types of polarization, double refraction, Nicol prism, Quarter and Half wave plates

LASERS: Characteristics of Lasers – Spontaneous and Stimulated Emission of radiation, meta stable state, population inversion, lasing action, Einstein's coefficients and relation between them — Ruby Laser – Helium-Neon Laser – Carbon dioxide laser - Semiconductor Laser – Applications of lasers.

UNIT - III

FIBER OPTICS: Principle of optical fiber – Acceptance angle and acceptance cone – Numerical aperture – - Types of fibers and refractive index profiles – Qualitative analysis of attenuation in optical fibers –Application of optical fibers.

CRYSTAL STRUCTURES: Space lattice – Unit cell – Lattice parameter – Crystal systems – Bravais lattices Atomic radius – Co-ordination number - Structures and Packing fractions of Simple Cubic – Body Centered Cubic – Face Centered Cubic crystals – Hexagonal closed packed crystals - Structures of diamond, NaCl.

UNIT - IV

DIRECTIONS, PLANES AND X-RD: Miller Indices for Crystal planes and directions – Inter planar spacing of orthogonal crystal systems –Diffraction of X-rays by crystal planes and Bragg's law– Laue method – Powder method – Applications of X-ray diffraction

BONDING IN SOLIDS: Force and energy between two approaching atoms, primary and secondary bonds, binding energy and cohesive energy, Madelung constant, cohesive energy and Madelung constant for NaCl crystal.

DEFECTS IN SOLIDS: Imperfections in crystals – Point defects (Vacancies, Interstitial and Impurities) Schottky and Frenkel defects – (with mathematical treatment)- Line imperfections – Edge and Screw dislocation – Burger vector – Surface defects and volume defects (Qualitative Treatment).

UNIT - V

SURFACE PHYSICS: Surface Electronic structure(work function, thermionic emission, surface states, tangential surface transport), Electron Microscope, Scanning Tunneling Microscope.

SCIENCE & TECHNOLOGY OF NANOMATERIALS:Origin of nanotechnology – (Basic principles of Nanoscience & Technology) surface to volume ratio, quantum confinement – Fabrication of nano materials Bottom up fabrication: sol-gel & combustion methods – Top down fabrication: CVD& PVD methods– Characterization (XRD & TEM) - Applications of nanotechnology.

TEXT BOOKS:

- (1) Introduction to Solid State Physics by Charles Kittel : John Wiley & Sons
- (2) Physics vol.2, by Halliday, Resnick and Krane; John Wiley & Sons
- (3) Applied Physics by P.K.Mittal, IK International Publishing House (P) Ltd.
- (4) Optics by Ghatak and Thyagarajan, Tata Mc Graw

REFERENCE BOOKS:

- (1) Engineering Physics by R.K.Gaur and S.L.Gupta; Dhanpat Rai and Sons
- (2) Solid State Physics by S.O.Pillai
- (3) Engineering Physics by M Chandra Shekar and P. Appala Naidu, VGS Book links.
- (4) Solid State Physics by A.J.Dekker; Macmillan Publishers India Ltd.
- (5) Solid State Physics by N.W.Ashcroft & N.David Merwin. Thomson Learning
- (6) Engineering Physics by G Sahashra Buddhhe; University Press
- (7) Elements of Solid State Physics by J.P.Srivatsva, PHI Publishers
- (8) Introduction to Optical Communication by G. Keiser
- (9) Fundamentals of Molecular Spectroscopy by Banwell, Tata McGraw Hill

VNR Vignana Jyothi Institute of Engineering & Technology

I Year B.Tech ME & AE – I sem

L	T/P/D	C
3	0	3

(R11CHE1102) Chemistry of Engineering Materials

UNIT I: Energy sources:

Fuels, classification – (solid, liquid, gaseous). Calorific value of fuel –HCV, LCV. Solid fuels – coal – analysis – proximate and ultimate analysis and their significance. Determination of calorific value by Bomb Calorimeter. Liquid fuels – petroleum, refining of petroleum, cracking, knocking, synthetic petrol – Bergius and Fischer- Tropsch's process; Gaseous fuels – natural gas, LPG, CNG: composition and uses. Biodiesel: properties and significance, analysis of flue gas by Orsat's method. Combustion – problems, determination of calorific value by Junker's gas calorimeter.

UNIT II: Cement:

Types of cement, Chemical constituents and composition of Portland cement, methods of manufacture of Portland cement - Wet and Dry processes, Properties of cement: Setting & Hardening of cement (reactions), testing of cement, decay of cement, cement concrete - RCC.

UNIT III: Engineering materials:

III a) Abrasives: Introduction, types of abrasives, working of abrasives, classification and chemical composition of abrasives, and their applications.

III b) Adhesives: Introduction, Criteria of a good adhesive, classification of adhesives and their applications, advantages and disadvantages of adhesives.

UNIT IV: Refractories & Ceramics:

Refractories: Definition, Classification with examples, Characteristics of a good refractory, causes for the failure of a refractory material, properties of refractories: refractoriness, RUL test, chemical inertness, Dimensional stability, Thermal expansion & contraction, Thermal conductivity, porosity, electrical conductivity, heat capacity, permeability, thermal spalling, texture.

Ceramics: Introduction, classification- glazed ceramics, and applications of ceramics.

UNIT V: Lubricants:

Lubricants: Criteria of a good lubricant, classification of lubricants-lubricating oils, greases or semisolid lubricants, solid lubricants, mechanism of lubrication-fluid film lubrication, boundary lubrication, extreme pressure lubrication, properties of lubricants - Viscosity, Cloud point, pour point, flash & fire point, mechanical stability, saponification number, neutralization number, aniline point, oiliness and carbon residue.

TEXT BOOKS

1. Text book of Engineering Chemistry by Y.Bharathi Kumari, Jyotsna Cherukuri, VGS Book Links, Vijayawada.
2. Engineering Chemistry by P.C.Jain & Monica Jain, Dhanpatrai Publishing Company.

REFERENCES

1. Text book of Engineering Chemistry by Balram Pani, Galgotia Publications Pvt.Ltd.
2. Text book of Engineering Chemistry by S.S. Dhara & Mukkanti, S.Chand & Co. New Delhi.
3. Text book of Engineering Chemistry by C.P.Murthy, C.V.Agrawal, A.Naidu, B.S.Publications,Hyderabad.
4. Text book of Engineering Chemistry by R.Gopalan,D.Venkappayya,Sulochana Nagarajan, Vikas Publishers.

VNR VIJET

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I Year B.Tech ME & AE – I sem

L	T/P/D	C
3	0	3

(R11CSE1101) COMPUTER PROGRAMMING

UNIT - I

Introduction to Computers – Computer Systems, Computing Environments (DOS/Linux), Computer languages, Linux commands , creating and running programs, Software Development Methods, Algorithms, Pseudo code, flow charts, applying the software development method.

UNIT - II

Introduction to C Language – History, Simple C Programme, Identifiers, Basic data types, Variables, Constants, type qualifiers, Input / Output, Operators. Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Bit wise operators, Statements, Simple C Programming examples.

Selection Statements – if and switch statements, Repetition statements – while, for, do-while statements, Loop examples, other statements related to looping – break, continue, go to, C Programming examples.

UNIT - III

Designing Structured Programs, Functions- basics, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, recursive functions, example C programs.

Arrays – Basic concepts, one-dimensional arrays, two – dimensional arrays, multidimensional arrays, arrays to functions, C program examples.

Strings – Basic concepts, String Input / Output functions, arrays of strings, string handling functions, strings to functions, C programme examples.

UNIT - IV

Derived types – Structures – Basic concepts, nested structures, arrays of structures, structures and functions, unions, typedef, bit fields, enumerated types, C programming examples.

Pointers – Basic concepts, pointers and functions, pointers and strings, pointers and arrays, pointers and structures, self referential structures , example C programs.

UNIT - V

File I/O – Basic concepts, text files and binary files, file input / output operations, file status functions (error handling), C program examples.

Preprocessor Directives, Dynamic Memory Allocation, Command-Line Arguments.

TEXT BOOKS:

1. C programming A Problem-Solving Approach by Behrouz A.Forouzan,E.V.Prasad,Richard F.Gilberg
2. The C Programming Language by Brian W. Kernighan, Dennis M. Ritchie

REFERENCES:

1. Let Us C Yashavant kanetkar BPB
2. C How to Program Paul Deitel and Harvey Deitel , PH
3. Absolute beginner's guide to C, Greg M. Perry, Edition 2,Publisher: Sams Pub., 1994

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I Year B.Tech ME & AE – I sem

L	T/P/D	C
4	1	4

(R11MED1101) ENGINEERING MECHANICS - I

UNIT - I

Concurrent Forces in a Plane

Principles of statics, Composition and resolution of forces, Equilibrium of concurrent forces in a plane, Method of projections, Equilibrium of three forces in a plane, Method of Moments, Friction.

UNIT - II

Parallel Forces in a Plane

Two parallel forces; General case of parallel forces in a plane; Center of parallel forces and center of gravity; Centroids of composite Plane figures and curves; Distributed force in a plane.

UNIT - III

General Case of Forces in a Plane

Composition of forces in a plane; Equilibrium of Forces in a plane; Plane trusses: Method of Joints; Plane trusses: Method of sections; Plane frames: Method of members; The funicular polygon; Maxwell Diagrams; Distributed force in a Plane; Flexible Suspension Cables.

UNIT - IV

Force Systems in Space

Concurrent forces in space: Method of projections; Concurrent forces in space: Method of moments; Couples in space; Parallel forces in space; Center of parallel forces and center of gravity; General case of forces in space.

UNIT - V

Moments of Inertia of a Plane figure

Moment of Inertia of a plane figure with respect to an axis in its plane; Moment of Inertia of a plane figure with respect to an axis perpendicular to the plane of the figure; Parallel-axis theorem; Product of Inertia and Principal axes; Principal axes and Principal moments of Inertia.

Moments of Inertia of Material Bodies

Moments of Inertia of a rigid body; Moment of Inertia of a lamina; Moment of Inertia of three – dimensional bodies; Product of inertia and principal axes; Change of direction of axes of inertia.

Text Book

ENGINEERING MECHANICS by S.Timoshenko and D.H.Young, *McGraw-Hill Book Company*

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I Year B.Tech ME & AE – I sem

L	T/P/D	C
3	0	3

(R11EEE1130) Elements of Engineering

Elements of Civil Engineering

UNIT-I

Construction and Facilities

Introduction: Impact of Infrastructural development on the economy of a country, role of civil engineers, importance of planning, scheduling in construction management

Surveying: Linear measurements, elevation measurements, areas, volumes, and modern tools of surveying like total station, GPS, and GIS.

Construction Materials: Importance of civil engineering materials like stones, bricks, cement, timber, reinforcing steel, paints, glass in construction

Soils and foundations: Types of soils, SBC of soils, suitable foundations for structures like buildings, bridges and towers.

Roads and Highways: Camber, stopping sight distance, overtaking sight distance, BOT projects.

Planning of buildings: Building byelaws and regulations, planning of residential and commercial facilities like institutes, hospitals, shopping malls and theatres

Dams and Reservoir: Water requirements and its conservation, hydraulic structures of storage and water conveyance systems

Elements of Electrical Engineering

UNIT-II

Electrical Power Systems

Electrical power generation concept-A.C Generator-principle; Steam Power Plant (thermal power plant); Hydel Power Plant (layouts only); Efficiency- Transformer-principle-need-types; Fuse - Substation-simple problems

UNIT-III

Utilization of Electrical Energy

Electrical heating-advantages-resistance heating-Illumination-definitions-laws of illumination-working of Incandescent lamp and Fluorescent lamps-Electric Welding-Electric Traction-Block diagram-Simplified speed-time curve-Energy meter (Principle only)

Elements of Mechanical Engineering

UNIT-IV

Power (Energy) Systems

Block diagram of a power system; sources of energy; conventional, non-conventional and renewable energy, application, resource availability; power produced, torque, speed, and efficiency; Materials used in turbine shafts, blades, nozzles; diagnostics and condition monitoring, commercial feasibility of power systems.

(Turbine)

UNIT-V

Transport Vehicles (Surface & Air)

Road Vehicles – Power plant in vehicles, transmission, steering, chassis, body, wheels and axles

Rail vehicles - Distinction of rail vehicles from road vehicles

Air vehicles - Aeroplane and its parts

Space vehicles - Rockets, 2 stage, 3 stage and 4 stage rockets, solid and liquid fuels

Sea Vehicles – Power plant, transmission, steering, hull

Text Books:

1. Electrical Engineering fundamentals by Vincent Deltora, Prentice hall of India, 2nd edition
2. Art & Science of Utilization of Electrical Energy by H.Partap Dhanpat Rai & Co
3. Non-conventional Sources of Energy Systems by G.D. Roy
4. Automotive Mechanics by William Crouse & David Anglin.

Reference Books:

1. Utilization of Electrical Energy by G.C.Garg
2. Electrical Power Systems – Soni, Guptha, Batnagar
3. Generation and Utilization of Electrical Energy by C.L Wadhwa

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I Year B.Tech ME & AE – I sem

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2	3	2

(R11MED1102) ENGINEERING GRAPHICS – I

UNIT- I

INTRODUCTION TO AutoCAD:

INTRODUCTION TO ENGINEERING DRAWING:

Principles of engineering graphics and their significance - Drawing instruments and their uses - conventions in drawing-lettering – BIS Convention, Different types of scales, scale of chords.

UNIT – II

CURVES USED IN ENGINEERING PRACTICE & THEIR CONSTRUCTION:

Ellipse, parabola, hyperbola & rectangular hyperbola-cycloid, epicycloids, hypocycloid – involutes.

UNIT- III

ORTHOGRAPHIC PROJECTION:

Points & straight lines inclined to both planes, true lengths & traces.

UNIT- IV

PROJECTION OF PLANES:

Projection of regular planes inclined to both planes - auxiliary projections.

UNIT- V

PROJECTION OF SOLIDS:

Projection of regular solids-inclined to both planes - auxiliary projections.

TEXT BOOKS :

1. Elementary Engineering drawings By N.D.Bhatt.
2. Engineering drawing and graphics-Narayana & Kannaiah.
3. Engineering graphics for degree-K.C.John

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I Year B.Tech ME & AE – I sem

L	T/P/D	C
0	3	2

(R11EPC1201) Engg. Physics & Chemistry Lab

ENGINEERING PHYSICS LABORATORY

Any Eight Experiments from the following:

1. Dispersive Power of the material of a Prism using Spectrometer
2. Diffraction Grating (both with Laser and non-laser source)
3. Single Slit with laser light
4. Newton's Rings
5. Finding thickness of a thin wire or sheet by forming a wedged shaped film
6. Energy gap of a semiconductor material
7. Torsional Pendulum Expt. to determine the rigidity modulus of material of a wire
8. Melde's experiment
9. Sonometer Experiment
10. Numerical Aperture and Acceptance angle of an optical fiber cable
11. Stewart Gee's experiment
12. Characteristics of LED.
13. Photo cell/ Solar Cell

Book: Essential Practical Lab Manual of Physics: by P.Raghavendra Rao

ENGINEERING CHEMISTRY: LIST OF EXPERIMENTS

1. Titrmetry

a) Estimation of hardness of water by EDTA method.

2. Instrumental methods

(i) Conductometry

a) Conductometric titration of strong acid Vs Strong base

(ii) Colorimetry

a) Estimation of copper by colorimetric method

(iii) Potentiometry

a) Titration of strong acid Vs Strong base by potentiometry

3. Physical properties

a) Determination of viscosity of sample oil by Redwood viscometer.

4. Preparation of organic compounds

a) Preparation of aspirin or Thiokol rubber

TEXT BOOKS:

1. Laboratory Manual on Engineering Chemistry by S.K.Bhasin and Sudha Rani, Dhanpat Rai Publishing Company.
2. Laboratory Manual on Engineering Chemistry by Y.Bharathi Kumari, Jyotsna Cherukuri, VGS Book Links, Vijayawada

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L	T/P/D	C
0	3	2

(R11CSE1201) COMPUTER PROGRAMMING LABORATORY

Week 1

1. WAP that reads three different integers from the keyboard and prints – sum, average, product, smallest, largest of the numbers.
2. WAP that reads two integers and prints – difference, quotient and remainder
3. WAP that reads two integers and determines whether the first is a multiple of the other

Week 2

1. Write a C program to find the sum of individual digits of a positive integer.
2. Write a program to generate Fibonacci sequence (1, 1, 2, 3, 5, 8,....)
3. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Week 3

1. Write a C program to calculate the following Sum:
 $Sum = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$
2. Write a C program to find the roots of a quadratic equation.

Week 4

1. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use Switch Statement)
2. Write a C program to generate Pascal's triangle.
3. Write a C program to construct a pyramids of numbers

Week 5

- 1 WAP to print a given number [0-1000] in words. For example, 123 as One Hundred and Twenty Three
- 2 WAP to check whether a given number is an Armstrong, Palindrome, Perfect, Prime, or a Fibonacci prime Number
- 3 Write a C program to find both the largest and smallest number in a list of integers

Week 6

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

Week 7

1. Write a C program to calculate
 - i) Minimum and maximum of an 1-d array
 - ii) Sorting and Searching of 1-D array
 - iii) Addition and Multiplication of Two Matrices

Week 8

1. Programs on String handling functions-Copying, reverse, substring, concatenation.
2. Programs on structure and unions.

Week 9**Midterm exam****Week 10**

Programs using pointers- pointer basic operations, pointers and functions

Week 11

Program on pointers and structures, Pointers and arrays, pointers and strings.

Week 12

Implementation of file operations and error handling.

Week 13

Implementation of Dynamic memory allocation

Week 14

Programs using command line arguments.

Week 15

Implementation of preprocessor directives

Week 16**Internal Lab Exam**

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I Year B.Tech ME & AE – II sem

L	T/P/D	C
3	1	3

(R11MTH1102) MATHEMATICS – II

LINEAR ALGEBRA AND ORDINARY DIFFERENTIAL EQUATIONS

LINEAR ALGEBRA

UNIT- I

Solution of linear systems, Eigen Values & Eigen Vectors

Matrices and linear systems of equations: Elementary row transformations- Rank- Echelon form, Normal form - Solution of linear systems - Direct methods- LU decomposition- LU decomposition from Gauss elimination- solution of Tri-diagonal systems- solution of linear systems. Linear dependence and independence of vector Eigen values, Eigen vectors, properties, Cayley - Hamilton theorem - Inverse and powers of a matrix by Cayley - Hamilton theorem - Diagonalization of a matrix, calculation of powers of a matrix - Modal and spectral matrices

UNIT- II

Linear Transformations

Real matrices: Symmetric, skew - symmetric, orthogonal linear transformation - orthogonal transformation Complex Matrices: Hermitian, Skew - Hermitian and unitary matrices. Eigen values and Eigen vectors of complex matrices and their properties. Quadratic forms - Reduction of quadratic form to canonical form, Rank, positive, negative definite, semi definite, index, signature, Sylvester law, Singular value decomposition

ORDINARY DIFFERENTIAL EQUATIONS

UNIT- III

Ordinary Differential Equations of First Order and First Degree:-

Differential equations of first order and first degree: linear, Bernoulli and exact, Applications to Newton's law of cooling, law of natural growth and decay, orthogonal trajectories, Applications to basic circuits

UNIT- IV

Linear Differential Equations of Second and Higher Order

Differential equations of higher order, homogeneous, non-homogenous linear differential equations of second order and higher order with constant coefficients with RHS of the type $e^{\alpha x}$, $\sin(ax)$, $\cos(ax)$, polynomials in x , $x e^{\alpha x}$, $X V(x)$, method of variation of parameters. Applications to bending of beams-

Mechanical systems, Simple harmonic motion.

UNIT V

Linear Differential Equations and Qualitative methods.

Cauchy's linear differential equation, Legendre's differential equations. Simultaneous linear differential equation. The Phase Plane, Phase portraits and direction fields. Critical points and stability

TEXT BOOKS:

1. David C Lay: "Linear Algebra & Its Applications", Pearson Publication.
2. George F. Simmons : "Differential Equations with Applications and Historical Notes", 2nd Edition, Tata McGraw Hill.
3. Dennis G. Zill: "Differential Equations"
4. Dennis G. Zill, Warren S. Wright: "Advanced Engineering Mathematics", 4th edition, Jones & Bartlett Learning.

REFERENCES

1. Erwin Kreyszig : "Advanced Engineering Mathematics" , 8th Edition, John Wiley and Sons
- 2 . PETER V O'NEIL: " Advance Engineering Mathematics Thomson Brooks/cole
3. William E Boyce, Richard C Diprima: "Elementary Differential Equations and Boundary Value Problems"

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L	T/P/D	C
3	0	3

(R11PHY1102) ENGINEERING PHYSICS-II

UNIT- I

ELEMENTS OF STATISTICAL MECHANICS: Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics (non mathematical treatment) – Photon gas – Planck's law of black body radiation – Deduction of Wein's law and Rayleigh-Jeans law from Plank's law.

PRINCIPLES OF QUANTUM MECHANICS: Waves and particles – De Broglie hypothesis - Matter waves - Davisson and Germer experiment – Heisenberg's uncertainty principle - Schrodinger Wave Equation – Wave function and its Physical Significance - Particle in one dimensional potential box (wave functions, probability densities and energy states).

UNIT - II

FREE ELECTRON FERMI GAS: Energy levels in one dimension, Effect of temperature on the Fermi-Dirac distribution, Free electron gas in three dimensions, electrical conductivity & Ohm's law, Electrical Resistivity of Metals (Qualitative), thermal conductivity of metals.

BAND THEORY OF SOLIDS: Electron in a periodic potential – Bloch Theorem - Kronig-Penney model (non mathematical treatment) – Origin of energy band formation in solids – Classification of materials into conductors, semiconductors & Insulators - Concept of effective mass of an electron.

UNIT- III

SEMICONDUCTOR PHYSICS: Fermi level in Intrinsic and Extrinsic semiconductors - Intrinsic semiconductor and carrier concentration – Extrinsic semiconductor and carrier concentration – Equation of continuity – Direct and indirect band gap semiconductors - Hall effect.

PHYSICS OF SEMICONDUCTOR DEVICES: Formation of p-n junction – open circuit p-n junction – Energy diagram of diode – i/v characteristics of p-n junction diode – p-n diode as a rectifier – Diode equation – LED

UNIT- IV

MAGNETIC PROPERTIES: Permeability, Field intensity, magnetic field induction, Magnetization and Magnetic susceptibility – Origin of magnetic moment, Bohr magneton – Classification of magnetic materials (Dia, Para and Ferro)- Domain theory of ferromagnetism, Hysteresis curve – Soft and Hard magnetic materials – properties of Anti ferro and Ferri magnetic materials – Ferrites and their applications.

UNIT V

SUPERCONDUCTORS: Experimental survey and superconductivity phenomenon, – Meissner effect – Critical fields and Persistent currents, Type I and Type II superconductors - London equations- flux quantization, BCS theory, Josephson effect – High temperature Superconductors, Applications of Superconductors.

DIELECTRIC PROPERTIES: Electric dipole, Dipole moment, Dielectric constant, Electronic, Ionic and Orientation Polarization – Calculation of Polarizabilities – Internal fields – Clausius – Mossotti equation – Piezo and Ferro electricity

TEXT BOOKS:

- (1) Introduction to Solid State Physics by Charles Kittel (Publishers: John Wiley & Sons) for units 2 to 5
- (2) Concepts of Modern physics by Arthur Beiser, McGraw Hill Inc.
- (3) Applied Physics by P.K.Mittal, IK International Publishing House (P) Ltd

References

1. Solid State Physics by S.O.Pillai, New Age Publishers
2. Solid State Physics by A.J.Dekker; Macmillan Publishers India Ltd.
3. Engineering Physics by Dr M Chandra Shekar and Dr P. Appala Naidu, VGS Book links.
4. Solid State Physics by N.W.Ashcroft & N.David Merwin. Thomson Learning
5. Engineering Physics by G Sahashra Buddhe; University Press
6. Elements of Solid State Physics by J.P.Srivatsva, PHI Publishers
7. Engineering Physics by M.R.Srinivasan, New Age Publishers

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I Year B.Tech ME & AE – II sem

L	T/P/D	C
3	0	3

(R11CHE1101) ENGINEERING CHEMISTRY

UNIT- I

Electrochemical cells and Batteries:

Cell representation, Galvanic cells, Single electrode potential, standard electrode potential, Electrochemical series, Nernst equation, Concentration cells. Reference electrodes – (Hydrogen, Calomel, Quinhydrone electrode), Ion Selective Electrodes (Glass Electrode & Fluoride Electrode), Numerical problems.

Batteries: Primary and secondary cells, (lead-Acid cell, Ni-Cd cell, Lithium cells). Applications of batteries. Fuel cells – Hydrogen – Oxygen fuel cells, Advantages of fuel cells. Solar cells: working, principle and applications.

UNIT- II

Corrosion and its control: Introduction, causes and different types of corrosion and effects of corrosion. Theories of corrosion – Chemical, Electrochemical corrosion, corrosion reactions, factors affecting corrosion – Nature of metal – galvanic series, over voltage, purity of metal, nature of oxide film, nature of corrosion product. Nature of environment -effect of temperature, effect of pH, Humidity, effect of oxidant.

Corrosion control methods – cathodic protection, sacrificial anode, impressed current cathode.

Surface coatings – methods of application on metals - hot dipping, galvanizing, tinning, cladding, electroplating -Organic surface coatings – paints constituents and functions.

UNIT- III

Polymers:

III a). Polymers: Introduction, Types of Polymerization, Plastics: Thermoplastic resins & Thermoset resins. Compounding & fabrication of plastics, preparation, properties, engineering applications of: polyethylene, PVC, PS, Teflon, Bakelite, Nylon.

III b). Rubber: Characteristics and uses Rubber –Natural rubber, vulcanization. Elastomers – Buna-s, Butyl rubber, Thiokol rubbers, Fibers – polyester, Fiber reinforced plastics (FRP), applications.

UNIT- IV

Water: Introduction, Hardness: Causes, expression of hardness – units – types of hardness, estimation of temporary & permanent hardness of water, numerical problems. Boiler troubles – Scale & sludge formation, caustic embrittlement, corrosion, priming & foaming Softening of water (Internal & external treatment-Lime soda, Zeolite, Ion exchange process and Numerical problems) Reverse osmosis, Electro dialysis.

UNIT- V

Nano-materials: Introduction, preparation and applications of nanomaterials with special reference to Carbon nano tubes.

Insulators: Classification of insulators, characteristics of thermal & electrical insulators and applications of Superconductors (Nb-Sn alloy, $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$).

TEXT BOOKS

1. Text book of Engineering Chemistry by Y.Bharathi Kumari, Jyotsna Cherukuri, VGS Book Links, Vijayawada.
2. Engineering Chemistry by P.C.Jain & Monica Jain, Dhanpatrai Publishing Company.

REFERENCES

1. Text book of Engineering Chemistry by S.S. Dhara & Mukkanti, S.Chand & Co. New Delhi.
2. Text book of Engineering Chemistry by C.P.Murthy, C.V.Agrawal, A.Naidu, B.S.Publications,Hyderabad.
3. Text book of Engineering Chemistry by R.Gopalan,D.Venkappayya,Sulochana Nagarajan, Vikas Publishers.

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I Year B.Tech ME & AE – II sem

L	T/P/D	C
3	0	3

(R11HAS1101) ENGLISH

Introduction

This is the age of information and communication technologies. Engineers and technical professionals need to convey technical information in English for various purposes.

Besides learning general English as an international language, engineering students need to be equipped with adequate writing ability so that they can communicate technical information clearly on at least a basic level. A good English writing proficiency can be a contributing factor to professional recognition and career prospects. This course teaches those writing strategies that scientists, engineers, and others will need in order to write successfully on the job. It initiates the students into Technical Writing. The purposes of technical writing are to inform and persuade. This program aims to train students in writing clear, concise and effective English.

This Syllabus is therefore, a Pragmatic English Writing Program for engineering students with intermediate proficiency. The program covers a syllabus outline and instructional approaches on basic writing skills with particular reference to technical writing.

Objectives:

- i) To equip the students with all the LSRW skills for advanced writing and speaking.
- ii) To equip the students with basic grammar, infrastructural patterns and grammatical constructions required of in technical writing.
- iii) To acquaint the students with the writing process, beginning with paragraph writing. This would prepare them for academic and workplace writing.
- iv) Equip the students with Oral Communication Skills.

Methodology

A Task-based, process oriented methodology will be used by the teachers to give a practical orientation to the teaching of language. An inductive approach will be used to demonstrate the use of language in context. This should enable the students to internalize the language structures and vocabulary used in context. Students will be exposed to numerous examples and ample practice will be given in the contextual use of language structures.

Syllabus Outline

Unit I : Prose

1. Heaven's Gate by Pico Iyer
2. The Connoisseur by Nergis Dalal

Unit II : Basic Grammar

- | | |
|----------------------------|-------------------------------------|
| i) Common Errors | v) Use of Articles and Prepositions |
| ii) Subject-Verb Agreement | vi) Conjunctions |
| iii) Adverbs | vii) pronoun reference |
| iv) Transitional elements | |

Unit III Reading and Writing Skills

- | | |
|--------------------------|-----------------------------|
| i) Reading Comprehension | vi) Synonyms and Antonyms |
| ii) Paragraph Writing | vii) One Word Substitutes |
| iii) Letter Writing | viii) Prefixes and Suffixes |
| iv) Memo Writing | ix) Idioms and Phrases |
| v) Words often Confused | |

Unit IV : Prose

1. The Cuddalore Experience by Anu George
2. The Odds Against Us by Satyajit Ray

Unit V : Technical Writing Component

- A. Definition of a Technical Term
- B. Description of a Mechanism
- C. Description of a Technical Process
- D. Classification
- E. Cause and Effect
- F. Comparison and Contrast
- G. Analogy

Prescribed Text Books

1. Ashraf Rizvi, **Effective Technical Communication**
2. M. Raman and S. Sharma, **Technical Communication : Principles and Practices**, OUP, 2004. (Indian Edition)

References

1. Gerson Sharon J. and Steven Gerson : Technical Writing Process and Product. 3rd edition, New Jersey: Prentice Hall 1999
2. Blanton, L.L. 1993; Composition Practice, Book 4 ,Second Edition, Heinle & Heinle Publishers, pp. 54
3. Georges, T.M. 1996; A course in Analytical Writing for Science and Technology, <http://www.mspiggy.etl.noaa.gov/write/>
4. Glendinning, E.H. and Glendinning, N. 1995; Oxford English for Electrical and Mechanical Engineering, Oxford University Press, pp.28,68,83
5. Greaney, G.L. 1997; Less is More: Summary Writing and Sentence Structure in the Advanced ESL Classroom, The Internet TESL Journal, Vol.III, No.9 <http://iteslj.org/Techniques/Greaney-Writing.html>
6. Neufeld, J.K. 1987; A Handbook for Technical Communication, Prentice-Hall, Inc. pp.20,65-68
7. Yalden, J. 1987; Principles of Course Design for Language Teaching, Cambridge University Press
8. David F. Beer and David McMurrey, Guide to Writing as an Engineer, 2nd ed., Wiley, 2004, ISBN: 0471430749.
9. Dale Jungk, Applied Writing for Technicians, McGraw-Hill, 2005, ISBN 0-07-828357-4.
10. Diane Hacker, Pocket Style Manual, Bedford/St. Martin's, 2003, ISBN: 0312406843.

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I Year B.Tech ME & AE – II sem

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3	0	3

(R11CSE1102) DATA STRUCTURES

UNIT-1

Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, circular linked list implementation, Double linked list implementation, insertion, deletion and searching operations. Applications of linked lists.

UNIT – 2

Stacks-Operations, array and linked representations of stacks, stack application-infix to postfix conversion, postfix expression evaluation, recursion implementation.

UNIT-3

Queues-operations, array and linked representations. Circular Queue operations, Dequeues, applications of queue.

UNIT-4

Trees – Definitions, Binary tree representation, Binary search tree, binary tree traversals. Graphs – Definitions, Graph representations, Graph traversals.

UNIT-5

Searching and Sorting – Big O Notation , Sorting- selection sort, bubble sort, insertion sort, quick sort, merge sort,
Searching-linear and binary search methods.

TEXT BOOKS:

1. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Data Structures Using C (Paperback) by Aaron M. Tenenbaum

REFERENCES:

1. C& Data structures – P. Padmanabham, Third Edition, B.S. Publications.
2. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI
3. C Programming & Data Structures, E. Balagurusamy, TMH.
4. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press
5. C& Data structures – E V Prasad and N B Venkateswarlu, S. Chand&Co.

VNR Vignana Jyothi Institute of Engineering & Technology

I Year B.Tech ME & AE – II sem

L	T/P/D	C
4	1	4

(R11MED1103) ENGINEERING MECHANICS – II

UNIT - I

Principle of Virtual Work

Equilibrium of ideal systems; Efficiency of simple machines; Stable and unstable equilibrium.

UNIT – II

Rectilinear Translation

Kinematics of rectilinear motion; Principles of dynamics; Differential equation of rectilinear motion; Motion of a particle acted upon by a constant force; Force as a function of time; Force proportional to displacement - Free vibrations; D' Alembert's principle; Momentum and impulse; Work and energy; Ideal systems; Conservation of Energy; Impact.

UNIT – III

Curvilinear Translation

Kinematics of curvilinear motion; Differential equations of curvilinear motion; Motion of a projectile; D'Alembert's principle in curvilinear motion; Moment of momentum; Work and energy in curvilinear motion.

UNIT – IV

Rotation of a Rigid Body about a Fixed Axis

Kinematics of rotation; Equation of motion for a rigid body rotating about a fixed axis; Rotation under the action of a constant moment; Torsional vibration; The compound pendulum; General case of moment proportional to angle of rotation; D' Alembert's principle in rotation; Resultant inertia force in rotation; The principle of angular momentum in rotation; Energy equation for rotating bodies; Gyroscopes.

UNIT – V

Plane Motion of a Rigid Body

Kinematics of plane motion; Instantaneous center; Equations of plane motion; D'Alembert's principle in plane motion; The principle of angular momentum in plane motion; Energy equation for plane motion.

Text Book:

1. ENGINEERING MECHANICS by S.Timoshenko and D.H.Young, *McGraw-Hill Book Company*

VNR Vignana Jyothi Institute of Engineering & Technology

I Year B.Tech ME & AE – II sem

L	T/P/D	C
2	3	2

(R11MED1104) ENGINEERING GRAPHICS - II

UNIT-I

SECTIONS AND SECTIONAL VIEWS:

Sections of right regular solids-prisms, pyramids, cylinders and cones – auxiliary views

DEVELOPMENT OF SURFACES:

Development of surfaces of right regular solids prisms, pyramids, cylinders and cones.

UNIT-II

INTERSECTION OF SOLIDS:

Intersection of prism Vs prism, cylinder Vs prism, cylinder Vs cylinder, & cylinder Vs cone

UNIT-III

ISOMETRIC PROJECTIONS:

Principles of isometric projections, Isometric scale, isometric views, conventions, isometric views of lines, planes, simple and compound solids, isometric views of objects having spherical parts.

UNIT-IV

TRANSFORMATION OF PROJECTIONS:

Conversion of isometric views to orthographic views-conventions and vice versa.

UNIT-V

PERSPECTIVE PROJECTIONS:

Perspective view of points, lines, plane figures and simple solids, vanishing point method & visual ray method

Text books:

1. Elementary engineering drawing -N.D.Bhat.
2. Engineering drawing and graphics - Narayana & Kannaiah.
3. Engineering graphics for degree-K.C.John

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I Year B.Tech ME & AE – II sem

L	T/P/D	C
0	3	2

(R11MED1201) ENGINEERING WORKSHOP

(12 Weeks+4 Weeks)

TRADES FOR EXERCISES

At least two exercises from each trade:

1. Carpentry
2. Tin-Smithy
3. Fitting
4. Welding
5. Electrical Wiring

TRADES FOR DEMONSTRATION & EXPOSURE:

1. Power Tools in Construction, Wood Working, Electrical Engineering and Mechanical Engineering
2. Machine shop

IT Workshop: Computer Hardware: Identification of Parts, Assembling and disassembling
Installation of Operating System : Windows , Linux – Basic Commands

TEXT BOOKS

1. Work shop Manual - P.Kannaiah/ K.L.Narayana, Scitech Publishers.
2. Workshop Manual by Venkat Reddy.
3. Engineering Workshop Practice – V Ramesh Babu, VRB Publishers Pvt. Ltd.
- 4.. IT Essentials PC Hardware and Software Companion Guide Third Edition by Davis Anfinson and Ken Quamme – CISCO Press, Pearson Education.
5. PC Hardware and A+ Handbook – Kate J. Chase PHI (Microsoft)

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I Year B.Tech ME & AE – II sem

L	T/P/D	C
0	3	2

(R11HAS1203)

ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY

The English language Communication Skills Lab aims to provide practice in all the four skills of LSRW, and provide ample practice in listening and speaking skills.

Syllabus for Lab Sessions

Unit 1

Multimedia Lab

1. Phonetics
2. Listening Comprehension
3. Vocabulary Lesson 1

Oral Communication Skills Lab: Self Introduction ; E-mail

Unit 2

Multimedia Lab

1. Grammar ---Nouns and Pronouns; The Present Tense
2. Vocabulary Lesson 2
3. Listening Skills

Oral Communication Skills Lab: Role Play/ Situational Dialogues

Unit 3

Multimedia Lab

1. Telephoning Skills
2. Grammar --- Articles; The Past Tense
3. Vocabulary Lesson 3

Oral Communication Skills Lab: JAM/ Short Talk

Unit 4

Multimedia Lab

1. Grammar ---- Concord; The Future Tense
2. Vocabulary Lesson 4
3. Listening Comprehension

Oral Communication Skills Lab: Information Transfer

Unit 5

Multimedia Lab

1. Grammar --- Adjectives, adverbs, conjunctions
2. Vocabulary -- Lesson 5

Oral Communication Skills Lab : Presentation Skills

Multimedia Lab Requirements

The English Language Lab shall have two parts:

- i) **The Computer aided Language Lab** for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.
- ii) **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo –audio & video system and camcorder etc.

System Requirement (Hardware component):

Computer network with Lan with minimum 60 multimedia systems with the following specifications:

iv) P – IV Processor

- a) Speed – 2.8 GHZ
- b) RAM – 512 MB Minimum
- c) Hard Disk – 80 GB
- v) Headphones of High quality

5. Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

Suggested Software:

- **Clarity Pronunciation Power** – part II
- **Oxford Advanced Learner's Compass**, 7th Edition
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
- **Lingua TOEFL CBT Insider**, by Dreamtech
- **TOEFL & GRE** (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)

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