Faculty of Engineering
Scheme of Instruction and Syllabi of

AEB

BE I - IVth YEAR

OF

FOUR YEAR DEGREE COURSE

IN

CIVIL ENGINEERING

(With effect from the Academic Year 2009-2010)

July 2009
Osmania University
Hyderabad - 500 007.

RULES AND REGULATIONS
FOR THE FOUR YEAR DEGREE COURSE IN ENGINEERING / INFORMATION TECHNOLOGY

(Applicable to students admitted during the
Academic year 2006-07 onwards)

Note: All the rules and regulations, hereinafter specified shall be read as a whole for purpose of interpretation.

PART - I ADMISSION

1. A candidate for admission to the Four Year Degree Course in Engineering must have passed the Intermediate Examination of the Board of Intermediate Examination, Government of Andhra Pradesh with Mathematics, Physics and Chemistry as optional subjects, or any examination recognised by the Osmania University as equivalent thereto.

2. All the eligible applicants for admission into First year shall have to qualify the EAMCET Examination conducted by the Govt. of A.P. The candidates will be admitted strictly in accordance with the merit secured at the Entrance Examination keeping in view the rules in force regarding the reservations of seats of various categories of candidates. Diploma qualified candidates will be considered for admission into the first year if desired on the rank obtained in ECET within the seats allotted to such category.

3. Diploma qualified candidates seeking admission into the Second year under lateral entry scheme shall have to qualify in the ECET examination of the concerned branch.

4. Candidates admitted under Management/NRI quota will be governed by the rules specified by the Govt. of Andhra Pradesh from time to time.

PART - II DURATION AND BRANCHES OF STUDY

1. The duration of the course is four years. The first academic year shall comprise of:

   Instruction.............. 30 Weeks (Minimum)

   Each of the subsequent three academic years shall be divided into two semesters hereinafter referred to as the First semester and Second semester in chronological order. Each semester shall comprise of :

   Instruction.............. 15 Weeks (Minimum)

1

No readmission / admission / promotions can be made after 8 weeks of the commencement of instruction for First year, (Year Wise Scheme), and after 4 weeks from the commencement of instruction of semester in II, III and IV years (Semester Scheme) respectively. In case there are any court cases consequent to which the Convenor of Admissions/Principal is compelled to admit a student after the announced last date of admissions, the admission (seat) of such a student be reserved for the subsequent year on a supernumerary basis.

No make - up/supplementary or any other examinations except the internal tests shall be conducted during the instruction period of the Semester course, except for the IV year II semester course.

2.a) The following courses of study are provided under the Faculty of Engineering.

    i)   Biomedical Engineering
    ii)   Civil Engineering
    iii) Computer Science & Engineering
    iv) Electrical & Electronics Engineering
    v)   Electronics & Communication Engineering
    vi) Instrumentation Engineering
    vii) Mechanical Engineering
    viii) Production Engineering

  b) The Information Technology course is provided under the Faculty of Informatics.

3. Each candidate will be allotted to one of the courses at the time of admission strictly depending on the merit secured at the Entrance Examination and subject to the rules in force regarding reservations of seats.

4.a) Candidates of the Four year degree course who fail to fulfil all the requirements for the award of the degree as specified hereinafter within eight academic years from the time of admission, will forfeit their seat in the course and their admission will stand cancelled.

  b) Diploma candidates admitted to the second year under lateral entry scheme shall fulfill all the requirements for the award of the degree as specified hereinafter within six academic years from the time of admission failing which they will forfeit their seat in the course and their admission will stand cancelled.

PART - III AWARD OF DEGREE

1. The Degree of Bachelor of Engineering will be conferred on a candidate who has pursued a 'Regular Course of Study' for four academic years (three academic years for candidates admitted in II year under lateral entry scheme) as hereinafter prescribed in the scheme of instruction and has passed all the examinations prescribed in the scheme of examination.

2. i) A regular course of study for eligibility to appear at the B.E Examination of any year or semester shall mean putting in attendance of not less than 75% aggregate in lectures, practicals, drawing, workshops, field work, project, seminars extension etc., in subjects listed in the scheme of instruction. The cumulative monthly attendance in each subject and the aggregate attendance shall be displayed on the notice board.

  ii) Attendance at N.C.C. Camps or Inter Collegiate or Inter University or Inter-State or International matches or debates or Educational excursion or such other Inter - University activities as approved by the authorities, involving journeys outside the city in which the college is situated, will not be counted as absence. However, such absence should not exceed (4) weeks of the period of instruction, in a semester.

  iii) In any year/semester of the course if a candidate fails to secure the minimum percentage of attendance, he/she shall not be eligible to appear in the examination of that year/semester and he/she shall have to enroll himself/herself to undergo afresh a 'Regular Course of Study' of the corresponding year/ semester in subsequent academic session, in order to become eligible to appear for the examination.

  iv) The attendance shall be calculated from the date of commencement of the classes as per the almanac communicated by the University.

  v) The candidates of the First Year courses who have put in not less than 40% of attendance, can seek readmission to fulfil the attendance requirement, without appearing for the Entrance Test during subsequent year, and such admissions shall be treated as supernumerary.

  vi) In respect of others who have put in less than 40% attendance in the First year, they have to seek admission afresh going through the Entrance test along with fresh candidates.

3. If a candidate who has pursued a Regular Course of Study of any year/ semester wishes to undergo the same course again, he/ she may be permitted to enroll again as a regular student for the course of the year/ semester, when next offered, depending on the availability of seats,

provided that he/she undertakes to forego his/her attendance secured by him/her for that year/semester previously and provided further that he/she has not pursued a 'Regular Course of Study' in any higher semester. For the award of division, however, he/she shall have the benefit of the higher of the aggregate marks secured in that year/semester.

PART IV - SCHEME OF INSTRUCTION AND EXAMINATION

1. Instruction in the various subjects in each year/semester shall be provided by the college as per the scheme of instruction and syllabus prescribed.

2. The First year of the B.E. Course shall be on the annual examination pattern. The second, third and fourth years shall be on the semester pattern.

3. The distribution of marks of sessionals based on the internal assessment by concerned teacher and that for University Exam shall be as follows:

	Subject	Sessional	Univ. Exam
i)	Each theory subject	25*	75**
ii)	Each practical or drawing subject for which less than (6) periods per week are provided in the scheme of instruction.	25*	50
iii)	Each practical or drawing subject for which (6) Periods per week are provided in the scheme of instruction.	50	100
iv)	Project	50	Excellent/ Very Good/Good/ Satisfactory/ Unsatisfactory

* 5 Marks be alloted for assignments in the subject out of the 25 sessional marks, the rest being based on Internal Tests. There shall be three internal tests for 1st year and 2 internal tests for 2nd year onwards (Semester) each of 20 marks. Average of all three tests should be taken for year wise course and average of two tests should be taken for semester course. For subjects where the sessional marks are 50, the assignment will carry 10 marks weightage and internal tests weightage will of 40 marks.

** The question paper will be of two parts. Part A and Part B. Part A is compulsory and should cover the entire syllabus, and carries 25 marks.

The questions should be of 2 or 3 marks each and 10 questions are to be set. Part B will comprise of seven (7) questions. There has to be one question in each unit of the syllabus and the remaining two questions may be from the total syllabus of all 5 units. However, there should not be more than 2 questions from any unit.

4. The programme of instruction, examination and vacations shall be notified by the Dean, in consultation with University.

5. The medium of instruction and examination shall be English.

Note: To enable the B.E. final year students to complete the course requirements in time, there shall be make - up exams for IV year II semester only, within one month of publication of results of IV year II semester main examinations.

6. The examinations prescribed may be conducted by means of written papers, practicals and oral tests, inspection of certified sessional work in drawing and laboratories and workshop or by means of any combination of these methods as may be deemed necessary.

7. All the general rules for examinations (given under Part VIII Rules 23 to 29) shall be adhered to.

8. A candidate shall be deemed to have fully passed the Examination of any year/ semester, if he/she secures not less than the minimum marks as hereinafter prescribed.

    Minimum Pass Marks in the University Examinations shall be:

Each theory subject	40% of Univ. Exam.
Each Practical subject/project	50% of Univ. Exam
Overall aggregate of Univ. Exam & Sessional marks of a Semester	40%

    There shall however be no minimum for the sessional marks secured by a student in a subject or in all the subjects put together.

18. If a candidate in any year/semester/examination of the course fails to secure the minimum marks in any subjects, then he/she shall have to appear only in the failed subject/s of the semester.

PART V - RULES OF PROMOTION

1. Rules of promotion are as under :

S.No.	Semester / Class	Conditions to be fulfilled for
1.	From BE I year to I Sem of BE II year	a) Regular course of study of BE I year b) Must have passed atleast 50 % of papers prescribed of BE I year. The number of papers a candidate can have as backlos is as under.

No. of papers prescribed for BE I year	No. of backlogs permitted
9	5
10	5
11	6

2. From I Sem. of BE II Yr. to II Sem of BE II year

a) Regular course of study of I Sem. of II Year

3. From BE II year II Sem. to BE III year I Sem.

a) Regular course of study of II Sem to of BE II year.

b) No. of backlogs, if any of BE I & BE II years put together shall not exceed 50% of the total number of papers prescribed for the I & II Semester of BE II year.

No. of papers prescribed for I & II Sem. of BE II year	No. of backlogs permitted in I & II year put together
12	6
13/14	7
15/16	8
17/18	9

4. From I Sem. of BE III Yr. to II Semester of III Year

a) Regular course of study of I Sem. of BE III year

5. From II Sem. of BE III Yr. to I Semester of IV Year

a) Regular course of study of II Sem. of BE III year.

b) No. of backlogs, if any of BE I, BE II & III years put together shall not exceed to 50% of the total number of papers prescribed for the I & II Semester of BE III year.

No. of papers prescribed for I & II Sem. of BE III year	No. of backlogs permitted in BE I, II & III year put together
14	7
15/16	8
17/18	9

6. From I Sem. of BE Yr. II Sem.

Regular course of study of BE IV year I Semester.

PART VI - AWARD OF DIVISION

1. Candidates who have passed all the examinations of the B.E. Degree Course shall be awarded one of the following divisions in accordance with the marks secured by them in all I year and all the I and II semester examinations of II, III and IV years taken together.

I - Division : 60% and above (I Division with Distinction shall be awarded to those who have secured 70% and above and who have passed all subjects in each semester which are reckoned for the award of division. Candidates who have not passed the examinations in first attempt are not eligible for getting Rank Certificate/Gold Medal)

II - Division : 50% and above but less than 60%

Pass Division : 40% and above but less than 50%

The marks secured for the sessional work and at the University Examination in each subject, shall be shown separately in the memorandum of marks.

PART - VII IMPROVEMENT OF DIVISION

1. A candidates who wishes to improve his/her division may do so within one academic year immediately after having passed all the examinations of BE Degree Course by reappearing at not more than two semesters (All subjects pertaining to the semester taken together) examinations. For the award of the division, he / she will have the benefit of the higher of the two aggregates of marks secured in the corresponding semesters).

2. In case of candidates who have secured less than 40% of total aggregate (of I, II, III and IV years) needed for a Pass Division, the candidate can appear for improvement in individual subjects to become eligible for a PASS Division.

PART VIII - GENERAL RULES OF EXAMINATION

1. All examinations of the Osmania University shall be held at such places as it may be decided and at such other centres on such dates as may be notified.

2. Application for permission to appear at every examination shall be made on the prescribed form accompanied by three passport size full face photographs (not profile) which along with the necessary certificates regarding attendance, practical work etc., and the prescribed fee, should be sent to the Controller of Examinations on or before the date fixed for this purpose.

3. When a candidate's application is found in order and he/she is eligible to appear at an examination, the Controller of Examinations, shall furnish him with a Hall Ticket with the photographs attached to it, enabling the candidate to appear in the Examination, and this Hall Ticket shall have to be produced by the candidates before he/she can be admitted to the premises where the Examination is being held or to a part of the said premises as well as to the Examination Hall.

4. A candidate who fails to present himself/herself for the Examination for any reason whatsoever, excepting shortage of attendance or who fails to pass the examinations, shall not be entitled to claim refund of the whole or any part of the examination fee, nor for the reservation of the examination fee for a subsequent examination or examinations.

5. A candidate after he/she been declared successful in the whole examination shall be given certificate setting forth the year of examination, the subjects in which he/she was examined and, the division in which he/she was placed.

6. No candidate shall be allowed to put in attendance for or appear at Examinations for different degrees and different faculties at one and the same time.

7. Students who have appeared once at any examination of the Course, need not put in fresh attendance, if they want to reappear at the corresponding Examination, notwithstanding the fact that new subjects may have been introduced by the University. They will however, have to appear at the examinations according to the scheme of Examination and Syllabus in force.

PART IX - TRANSITORY REGULATIONS

1. Whenever, course or scheme of instruction is changed in a particular year, two more examinations immediately following thereafter, shall be conducted according to the old syllabus/regulations. Candidates not appearing at the examinations or failing in them shall take the examination subsequently according to the changed syllabus/ regulations.

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SCHEME OF INSTRUCTION & EXAMINATION

B.E. Ist Year (Full Time)

Sl. No.	Syllabus Ref. No.	SUBJECT	Scheme of Instruction		Scheme of Examination		
			Periods per Week		Dura-tion in Hrs	Maximum Marks	
			L	D/P		Univ. Exam	Sessi-onals
		THEORY					
1.	EG 101	English	3	-	3	75	25
2.	MT101	Mathematics - I	3	-	3	75	25
3.	MT102	Mathematics - II	3	-	3	75	25
4.	PH 101	Engineering Physics	3	-	3	75	25
5.	CH101	Engineering Chemistry	3	-	3	75	25
6.	CS 101	Programming in 'C' & 'C++'	3	-	3	75	25
7.	CE 101	Engineering Mechanics	3	-	3	75	25
8.	CE 102	Engineering Graphics	-	6	3	100	50
		PRACTICALS					
1.	PH 132	Physics Lab.	-	3	3	50	25
2.	CH132	Chemistry Lab.	-	3	3	50	25
3.	ME131	Workshop Practice	-	3	3	50	25
4.	CS 131	Programming Lab.	-	2	3	50	25
5.	EG 131	English Language Lab.	-	2	-	-	25
		TOTAL	21	19	-	825	350

L : Lectures, D/P : Drawing / Practical

ENGLISH

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT - I

Role and importance of communication; Verbal and non-verbal communication; Effective interpersonal communication; Introducing oneself and and others; Greetings; Expressing thanks, apologies, agreement and disagreement; Small group communication : Drafting and delivering speeches; Presentation of papers and participation in seminar and conferences.

UNIT - II

Paragraph writing; Report writing : Types of reports, Dos and Don'ts in writing technical reports and scinetific papers. Use of graphics, visuals and power point presentations.

UNIT - III

Communication through letters : Dos and Don'ts, Official and personal letters, Resumer writing; Letter of complaint, Letters of enqiry and responses. Writing memos, circulars and notices, Writing minutes of meetings.

UNIT - IV

Remedial English : Common errors, Words often confused, Concord, Tense and aspect, Use of articles and prepositions, Use of dictionary and thesaurus; Vocabulary; Synonyms and antonyms, one-word substitutes, affixes; Idiomatic usage; Comprehension.

UNIT -V

The following four essays are prescribed :*

1. Our Own Civilization, CEM. Joad
2. Andrew Carregie   E.H. Carter
3. The Secret of Work, Swami Vivekananda
4. The Generation Gap, Benjamin Spock

Note : Items of grammar and comprehension prescribed in Unit IV may be taught alongside the teaching of the prose lessons prescribed in Unit V.

Suggested Reading :

1. The Oxford Guide to Writing and Speaking, John Seely, Oxford University Press, 2004.
2. Effective Technical Communication, M. Ashraf Rizvi, Tata McGraw Hill, 2005.
3. Murphy's English Grammar, Raymond Murphy, Cambridge University Press, 2005.
4. ABC of Common Grammatical Errors, Nigel D Turton, Macmillan, 2004.
5* Modern English Prose, Haladhar Panda, Universities Press, 2003

MT 101 WITH EFFECT FROM THE ACADEMIC YEAR 2006-2007

MATHEMATICS - I

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT - I

Matrix Theory : Elementary Row and Column operations on a matrix - Rank of matrix - Solution of system of linear equations - Linear dependence and Independence of vectors - Characteristic equation - Characteristic roots and vectors - Caley - Hamilton Theorem - Reduction to diagnoal form and Normal form - Reduction of a Quadratic form into Canonical form.

UNIT - II

Series : Sequences, Infinite series, Convergence and Divergence, Absolute convergence, Conditional convergence, Comparison test, Ratio test, Cauchy's test, Raabe's test, Alternate series, Binominal series, Exponential series, Logarithmic series.

UNIT - III

Differential Calculus : Rolle's theorem, Mean value theorems, Taylor's series, Expansion of functions on power series, Curvature, Radius of curvature (Cartesian, polar and parametric Co-ordinates) Envelopes, Evolutes and Involutes.

UNIT - IV

Functions of several variables : Tracing of curves in Cartesian and Polar coordinates - Limits and Continuity of functions of two variables - Partial derivatives - Total differential and Derivatives - Approximation by total differentials - Derivatives of composite and Imlicit functions - Higher order partial derivatives - Homogeneous functions - Taylor theorem for functions of two variables - Maxima and Minima of functions of two variables with and without constraints - Lagrange's method of multipliers.

UNIT - V

Vector Calculus : Multiple Integrals : Doble and Triple integrals - Scalar and Vector fields - Vector differentiation - Directional derivative - Gradient of a scalar field - Divergence, Curl of a vector field - Line, Surface and Volume integrals - Green's theorem in a plane, Gauss Divergence theorem, Stoke's theorem (With Proof's) and their applications.

Suggested Reading :

1. Ervin Kreyszig *"Advanced Engineering Mathematics"*, John Wiley & Sons, 8th Edition, 1999.
2. Shanti Narayan, *Differential Calculus*, S. Chand & Co., 1996.
3. B.S. Grewal, *Higher Engineering Mathematics*, Khanna Publications, 34th Edition, 1998.
4. R.K. Jain & SRK Iyengar, *Advanced Engineering Mathematics*, Narosa Publication, 2nd Edition, 2003.

MATHEMATICS - II

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT - I

Ordinary Differential Equations of first order : Formation of differential equations - Solutions of differential equation - Initial and Boundary value problems - Solutions of equations in Separable from - Equations reducible to Separable form - Exact first order differential equations - Integrating factors - Linear first order equations - Some special first order equations - Bernoulli's equation - Riccati's equation - Clairut's equation - Orthogonal trajectories of a given family of curves - Growth and Decay - Newton's law of Cooling.

UNIT - II

Linear Differential equations : Solutions of linear differential equations - Methods for solutions of linear equations - Differential operator - Solutions of second order linear homogenous equations with constant coefficients - Method of reduction of order for variable coefficients - Linear homogenous second order equations - Solutions of higher order homogenous linear equations with constant coefficients - Solutions of non homogenous linear equations - Method of Variation of Parameters.

UNIT - III

Laplace Transform : Laplace transform - Inverse Laplace transform - Properties of Laplace transform - Laplace transform of Unit step functions, Impulse function and periodic functions - Convolution theorem - Solution of ordinary differential equations with constant coefficients using Laplace transform.

UNIT - IV

Series Solution of differential equations : Introduction - Ordinary and Singular points of an equation - power series solution - Special differential equations - Bessel differential equation and its solution - Legendre's differential equation and its series solution - Bessel's function and its Generating function - Legendre polynominals - Rodrigue's formula - Generating function for Legendre's polynomials - Recurrence relations for Legendre's polynomials - Orthogonal property of Legendre polynomials.

UNIT - V

Special functions : Gamma function - Beta function Relation between Gamma function and Beta function - Error function - Chebyshev polynomials - Generating function Orthogonal Properties of Chebyshev polynomials - Recurrence formulae Tn (X) and Un (X).

Suggested Reading :

1. R.K. Jain & S.R.K. Iyengar *"Advanced Engineering Mathematics"*, Narosa Publications, 2nd Edition, 2003.
2. C.Ray Wylie & Louis C. Barrett *"Advanced Engineering Mathematics"*. McGraw Hill, 6th Edition, 1995.
3. Bali & Iyengar, *"Engineering Mathematics"*, Laxmi Publications, 6th Edition, 2004.
4. Erwin Kreyszig, *"Advanced Engineering Mathematics"*, John Wiley, 8th Edition, 1999.

ENGINEERING PHYSICS

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT - I

1. **Wave Optics :**

   Interference : Introduction, Interference in thin films (reflected light), Newton's rings Experiment.

   Diffraction : Diffraction at a single slit, double slit and diffraction grating . (N-slits).

   Polarization : Introduction to polarization, Malus law, double refraction, Nicols prism, quarter and half wave plates, optical activity, Laurent's half shade polarimeter.

2. **Laser & Holography :** Basic principles of laser, Einstein coefficients, Ruby laser, He-Ne laser and semiconductor laser, applications of laser.

   Basic principle of holography, recording and reconstruction of hologram and applications of holography.

3. **Fiber Optics :** Inrtroduction, types of optical fibers, propagation of light through an optical fiber, critical angle, acceptance angle, and numerical aperture (NA) pulse dispersion, fiber materials, fiber drawing process (double crucible method), applications.

UNIT - II

1. **Elements of statistical mechanics :** Maxwell Bolzmann, Bose-Einstein and Fermi-Dirac distribution functions, photon gas, Planck's law of black body radiation distribution, Rayleigh-Jeaus law, Weins law, electron gas, Farmi energy.

2. **Quantum mechanics :** Matter waves - deBroglie's hypothesis - Heisengerg's uncertainity principle, Schrodinger's wave equation (time dependent and time independent) particle in an infinite square well, potential step and potential barrier.

3. **Special theory of relativity :** Postulates, Lorentz transformation equation of space and time, length contraction, time dilation, relativistic addition of velocities, variation of mass with velocity, Einestein mass energy relation.

UNIT - III

1. **Electromagnetic theory :** Review of steady and variying fields, conduction and displacement current, Maxwell's equations in integral and differential forms, electro magnetic waves, plane wave, and Poynting vector.

2. **Crystallography and Crystal imperfections :** Space lattice, unit cell, crystal systems, Bravais lattices, atomic radius, coordination number, number of atoms per unit cell, packing fraction, lattice planes, Miller indices, Bragg's law, Experimental determination of lattice constant by powder diffraction method, point defects, Schottky and Frankel defects, equilbrium concentration of Schottky and Frankel defects.

3. **Free-electron theory of metals :** Filling up of energy levels and Fermi level, concept of band formation, Kronig - Penny model (qualitative), classification of solids into conductors, insulators and semi conductors.

UNIT - IV

1. **Semi Conductor Physics :** Introduction to semiconductors, carrier concentration in intrinsic semiconductor, conductivity of semiconductors, Hall effect, LED Thermistor.

2. **Thin Films :** Thin film preparation techniques, and their applications - solar cells and gas sensors.

3. **Principles of modern techniques for study of materials :** Optical microscopy, Electron microscope, X-Ray fluorescence and Augur processes, ESR, NMR, Mass Bauer spectroscopy and Bragg's spectrometer.

UNIT - V

1. Dielectrics : Different types of electric polarization, determination of dielectric constant (Schering bridge method), frequency and temperature dependence, Ferro electric materials - Barium titanate.

2. **Magnetic materials :** Introduction, Weiss molecular field theory of ferro magnetism, magnetic domain, magnetic hystersis, hard and soft and magnetic materials, ferrites and their applications.

3. **Super Conductors :** Super conductivity, general properties of super conductors, Types of super conductors, High temperature super conductors (in brief) and applications.

Suggested Reading :

1. M.N. Avadhanulu and P.G. Kshirsagar, *Engineering Physics*, S. Chand, Ist Edition, 1992.

2. R.K. Gaur and S.L. Gupta, *Engineering Physics*, Dhanpat Rai, 7th Edition, 2005.

3. M. Arumugam, *Materials Science*, Anuradha Agencies, 2002.

4. A. Goswami, *Thin film fundamentals*, New Age International.

5. C.M. Srivastava & C. Srinivasan, *Science of Engineering Materials*, New Age International, 2nd Edition.

ENGINEERING CHEMISTRY

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT - I

THERMODYNAMICS :

a) **First law of Thermodynamics :** Definitions - Extensive and Intensive properties, Thermodynamics State and Path functions - Reversible & Irreversible processes - Work done in Isothermal & Adiabatic reversible and irreversible processes; Statement of first law of thermodynamics Internal energy and enthalpy.

Second law of Thermodynamics : Success and limitations of First Law of Thermodynamics. Spontaneous and Non-Spontaneous processes, Heat Engine & its Efficiency. Statements of Second law of thermodynamics.

b) **Entropy :** Concepts of Entropy, Entropy changes in Reversible & Irreversible processes, Second law in terms of Entropy. Physical significance of entropy - Entropy calculations - Entropy change during expansion of perfect gas. Gibbs Free energy & its Significance, Conditions of equilibrium and spontaneity - Variation of Free Energy with temperature and pressure. Gibbs - Helmholtz equation and its applications Clausius - Clapeyron equation and its applications to liquid, vapour equilibria - Vanthoffs Isotherm, Vanthoffs Isochore - Numericals.

Thermodynamics of Open Systems - Partial Molall Properties, Significance, Chemical Potential - An Impetus of all Chemical Processes.

UNIT - II

ELECTRO CHEMISTRY :

a) **Ionics :** Electrolytic Conductors, Specific (K_x). Equivalent (λ), Molecular Conductance (μ) - Measurement of Electrolytic conductance. Effect of Dilution on K, λ - Ionic Mobility - Transport Number and its determination - Hittorffs method and its signifcance. Kohlrauch's law & its applications : i) for weak Electrolytes (ii) Solubility of Sparingly soluble salts. Relationship between Transport number, Ionic Mobility and Ionic Conductance - Conductometric titrations - numerical problems.

b) **Electrodics :** EMF of electro chemical cells - cell notation and cell reaction - Electrode Potentials - Standard Electrode Potentials - SOP & SRP - Nernst equation its derivation and applications - Electro chemical Series - significance. Reversible and Irreversible cells. Types of electrodes (a) Gas Electrode (H_2 Electrode). (b) Metal ion Elecrtode (Zn/Zn^{+2}) (c) Redox Electrode (Quinhydrone Electrode) (d) Metal - insoluble salt Electrode (Calomel Electrode) - Determination of pH by using Hydrogen Electrode, Quinhydrone Electrode, Glass Electrode - Potentiometric Acid - Base and Redrox titrations - (numerical problems).

UNIT - III

COROSSION & WATER CHEMISTRY :

a) **Corrosion :** Causes and effects - Types of Corrosion - chemical (dry) and electro chemical (wet) corrosion. Theories of Corrosion - Galvanic Corrosion - Formation of Anodic areas through differential aeration - Types of Corrosion - Water line, Pitting, Crevice, and Microbial Corrosion.

Factors affecting the rate of Corrosion (a) Position of metals in Galvanic Series, (b) Relative areas of anode and cathode, (c) Nature of corrosion product, (d) Temperature, (e) Humidity and (f) pH.

Corrosion control methods : Cathodic Protection - Sacrificial Anode and Impressed Current methods.

Surface coatings : Types of Metallic Coatings, Anodic and Cathodic coatings - Methods of application of metallic coatings - Electroplating (Nickel Plating) & Electroless plating (Copper Plating)

Paints - constituents and their functions.

b) **Water Chemistry :** Hardness of water - Types - Units of Hardness - Determination of Temporary & Permanent Hardness of water by E.D.T.A. method (Numerical problems) - Alkalinity of water & its determination - water softering by Ion Exchange & Reverse Osmosis methods - Specifications of Potable water. Disinfection of drinking water by Chlorination - Break point Chlorination and Ozonolysis - Boiler scales : Causes & effects.

UNIT - IV

MACRO MOLECULES :

(a) **Definitions of the terms :** monomers, polymers. Nomenclature : Homo - Hetero - Co - Graft Polymers. Types of Polymerisation i) Addition (ii) Condensation

(iii) Co - Polymerisation - Examples. Mechanism of Addition Polymerisation (Free radical). Thermoplastics & Thermosetting resins - Differences.

Types of Polymers :

(i) **Plastics :** Preparation, Properties & Uses of PVC (plasticised & unplasticised) Teflon, Bakelite, Epoxy resins.

ii) **Fibres :** Structure - Properties & Applications of Nylon 6 : 6, Polyesters, Polyurethanes.

iii) **Rubbers / Elastomers :** Natural & Aritifical rubbers. Valcanisation - its effects on raw rubber; Preparation, Properties & Uses of Buna-S, Buna-N, Butyl Rubber, Neoprene, Silicone Rubbers - their significance. Biodegradable polymers : Concept. Conducting polymers, mechanism of conducting polymers, Intrinsic conducting polymers, Polyacetylene & Polynitrile - Doped conducting polymers - Exrtrinsic & Blended conducting polymers - Application of conducting polymers.

b) **Nano Chemistry :** Definition - Atomic and Molecular State - applications - sensors and swtiches.

UNIT -V

CHEMICAL FUELS & CHEMISTRY OF BATTERIES :

a) **Introduction** - Classification of Fuels. Primary, Secondary-Solid. Liquid an f Gaseous fuels - requirements of a good fuel. Determination of Calorific valu : by Bomb Calorimeter - HCV, LCV. Theoretical calculation of Calorific value by Dulong's formula - numericals.

Solid fuels - Coal and its chemical Composition, Proximate and Ultimate analysis.

Liquid Fuels - Source - Fractionation of Petroleum Crude - Gasoline, Diesel. Kerosene. Cracking & its Significance - Catalytic Cracking by fixed bed method. Knocking. Fuel Rating - Octane and Cetane numbers. Unleaded Petrol. Catalytic converters.

Bio Diesel - Trans esterification.

Gaseous Fuels - LPG, CNG - Combustion - Ignition temperature of a fuel, calcuation of Air quantities by Weight and Volume required for combustion of a fuel - Numerical problems.

b) **Chemistry of Batteries :** Electrodes. cell reaction - charging and discharging - Merits, Demerits and applications of :

i) Primary Batteries : Dry cell, Lithium cell

ii) Secondary Batteries : Lead acid battery and Lithium ion cell

iii) Fuel cells : H_2-O_2 cell.

Suggested Reading :

1) C. Parameshwara Murthy, C.V. Agarwal and Andra Naidu - *Engineering Chemistry,* B.S. Publications, 2006.

2) P.C. Jain & Monica Jain, *Engg Chemistry*, Dhanpat Rai & Sons, New Delhi, 15th edition, 2005.

3) B.S. Bahl, Arun Bahl & G.D. Tuli, *Essentials of Physical Chemistry*; S. Chand & Co., 2004.

4) P.L. Soni and O.P. Dharmara, *A Text Book of Physical Chemistry,* Sultan Chand and Sons, 2002.

5) Rastogi R.P. and Misra. R.R., *Chemical Thermodynamics,* Vikas Publications, New Delhi, 1985.

PROGRAMMING IN C & C++

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT - I

Introduction of computers : Block diagram of computer, evolution of operating systems, machine language, assembly language, high level languages, history of C, and the C standard library. The basics of a typical C program development environment.

Introduction to C Programming : Simple C programs, memory concepts, arithimetic in C, decision making.

Structured program development in C : Algorithms, pseudo code, control structures, if / else, while, assignment, increment and decrement operators.

C Program Control : Repetition, for, switch, do/while, break, continue, logical operators.

UNIT - II

C Functions : Program modules, math library, functions, definitions, prototypes, header files, calling functions, random number generation, storage classes, scope rules, recursion, iteration.

C Arrays : Introduction, declaring arrays, passing arrays, sorting arrays, searching arrays, multi-dimensional arrays.

C Pointers : Pointer variable declarations and initializations, pointer operators, calling functions by references using const, pointer and arithmetic pointers and arrays, arrays of pointers.

UNIT - III

C characters and strings : Fundamentals, characters handling library, strong conversion, functions, standard input/output library functions, string manipulation, comparison, search & memory function.

C formated input/output : Streams, printing integers, floating point numbers, strings, characters, conversion specifiers, field width and precision, using flags, printing literals and escape sequences, scanf, C Structure definition, initialization, accessing members,

using structures with functions, types of, unions bitwise operators, bit fields, enumeration constants.

C File Processing : Data heirarchy, files and streams, creating / reading sequential access files, creating / writing / reading random access files.

C Preprocessor : #include, #define, conditional compilation.

UNIT - IV

C++ : Introduction, simple program, standard library, header files, inline functions, references and reference parameters, default arguments, empty parameter lists, unary, scope resolution operator, function overloading, functions templates.

Classes and data abstraction : Class scope, accessing class members, interface, constructions, destructions, const objects and member functions, this pointer, new and delete operators, static class members.

C++ operator overloading : Fundamentals, restrictions, overloading unary / binary operators, overloading ++ and --.

UNIT - V

C++ Inheritance : Base and derived classes, casting base class, pointers to derived class pointers, using member functions overriding, public, protected and private inheritance, constructors and destructors in derived classes.

C++ Virtual Functions : Abstract base class, polymorphism, dynamic binding, virtual destructors.

C++ Stream Input/Output : Streams, stream output, stream input.

C++ Templates : Introduction, class templates, templates and inheritance, templates and static members.

C++ Exception Handling : Try, throw, catch.

Suggested Reading :

1. Deitel HM, Deitel PJ (2001), *"C How to program"*, Pearson Education, 3rd Edition, 2001.

2. Tony Goddis, *"Starting out with C++"*, Standard version, Dreamtech Press, 3rd Edition.

3. B.W. Kernighan & D.M. Ritchie, *"The 'C' Programming Language"*, Prentice Hall India, 2nd Edition. 1990.

4. Dietel HM, Deitel PJ, *"C++ How to Program"*, Prentice Hall, 1994.

CE 101

ENGINEERING MECHANICS

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT - I

System of forces : Concepts of force, components of forces in a plane and in space, various systems of forces and their resultants, moment of force and its applications, and couples.

Equilibrium of force system : Free body diagrams, equations of equilibrium of planar systems and spatial systems.

UNIT - II

Centroids and centre of gravity : Significance of centroids and moments of area, theorems of Pappus, centroids of line elements, plane areas and composite areas. centroids of bodies.

Friction : Type of friction, limiting friction, laws of friction, static and dynamic frictions, belt friction, friction of motion of bodies and connecting systems, wedge, screw - jack, and differential screw jack.

UNIT - III

Area moments of Inertia : Definition, polar moments of inertia, transfer theorems, moments of inertia of composite areas, product of inertia, transfer formulae for product of inertia.

Mass moments of inertia : Moments of inertia of masses, transfer formula and moments of inertia of composite bodies.

UNIT - IV

Kinematics : Rectilinear motion, curvilinear motion, velocity and acceleration, types of rigid body motion, and analysis in a plane.

Kinetics : Analysis as a particle, and analysis as a rigid body in translation, central force motion, equations of planar motion, fixed axis rotation.

UNIT - V

Work energy method : Equation for translation, work - energy principles applied to particle motion, connected systems, fixed rotation and plane motion.

Mechanical vibrations : Definition, concepts, simple harmonic motion, free vibrations. simple pendulum and compound pendulum.

References :
1. F.L. Singer, *Engineering Mechanics,* Harper Collins Publishers, India, 1994.
2. F.P. Beer and E.R. Johnston, Jr., *Vector Mechanics for Engineers,* TMH, 2004.
3. S. Rajasekaran, et al, *Engineering Mechanics,* Vikas Pub., 2002.
4. S.B. Junarkar and H.J. Shah, *Applied Mechanics,* Charotar Pub., 2001.

CE 102

ENGINEERING GRAPHICS

Instruction	6	Periods per week
Duration of University Examination	3	Hours
University Examination	100	Marks
Sessional	50	Marks

UNIT - I

Instruments and their use : Lettering and various types of lines, scales, reduced and enlarged scales, representative fraction, types of of scales plain, diagonal and vernier.

Geometrical construction : Construction of regular polygons inscribed in a circle, given the side of the polygon.

Curves in engineering practice : Construction of engineering curves such as ellipse, parabola, hyperbola, cycloid, epicycloid, hypocycloid and involute.

UNIT - II

Projections of points and straight lines : Points placed in different quadrants, projections of straight lines, parallel to one or both the reference planes and contained by one or both the reference planes, perpendicular to one and inclined to the other and inclined to both the reference planes, and traces.

Projections of planes : Perpendicular planes, traces of planes, oblique planes and auxiliary planes.

UNIT - III

Projections of solids : Polyhedra, solids of revolution, projections of solids with axis inclined to one or both the reference planes.

UNIT - IV

Sections of solids : True shapes of section, sections of prisms, pyramids, cylinders and cones.

Development of surface : Development of surface of various solids such as prisms, pyramids, cylinders and cone in simple position.

UNIT - V

Isometric projections : Isometric scale, isometric projections of prisms, pyramids, cylinders, cones and spheres and combination of two or three solids.

Intersection of surfaces : Intersection of cylinder to cylinder, and cylinder to cone.

References :

1.   N.D. Bhatt, *Elementary Engineering Drawing*, Charotar Pub., 2004.

2.   K.L. Narayana and P. Kannaiah, *Text Book on Engineering Drawing*, SCITECH Publications, 2002.

11. Preparation of Polymer Bakelite.

INSTRUMENTAL CHEMICAL ANALYSIS

12. Introduction to instrumental chemical analysis and use of electrical and electronic balance upto 4th decimal place.

CONDUCTOMETRY

13. Conductometric acid-base titration-strong acid Vs strong base.

14. Condutometric weak acid Vs strong base titration, Conductometric mixture of acids Vs strong base tritration.

POTENTIOMETRY

15. Potentiometric acid base titration, strong acid Vs strong base using quinhydrone electrode.

16. Potentiometric titration of weak acid-vs strong base using quinhydrone electrode.

17. Potentiometric redox titration $KMnO_4$ Vs Fe^{2+}

pH METRY

18. pH metric strong acid Vs strong base titration

19. pH metric weak acid Vs strong base titration.

COLOROMETRY

20. Verification of Beers law : using potassium permanganate and estimation of $KMnO_4$ (Mn) in the given solution.

KINETICS

21. First order reaction - hydrolysis of methyl aceate

22. Second order reaction - potassium iodide and persulphate reaction.

SPECTROPHOTOMETER

23. Recording of Cu^{+2} spectrum, determination of λ max and molar assorptivity.

Suggested Readings :

1. B.D. Khosla, A. Gulati, V.C. Garg., *Senior Practical Physical Chemistry,* S. Chand and Company, New Delhi, 11th Edition, 2002.

2. S.K. Bhasin and Sudha Rani, *Laboratory Manual on Engineering Chemistry,* Dhanpat Rai Publishing Company, 2003.

WORKSHOP PRACTICE

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

Branch of Engg.	Trades for Practice	Trades for Demonstration
Mechanical	Fitting	Sheet Metal Work
Production	Carpentry	Smithy
Civil	House wiring	
EEE	Welding	
	Plumbing	
CSE	Fitting	Welding
ECE	Carpentry	Smithy
IT	House Wiring	
IE	Sheet Metal Work	
	Plumbing	

Grades for exercises in the trades for practice shall be given to the students. Emphasis must be given for developing necessary skills.

PHYSICS LABORATORY

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

1. Moment of Inertia - Fly Wheel.
2. Determination of Wavelength - Fresnel's biprism.
3. Determination of Wavelength - Newton's rings.
4. Determination of Wavelength - Grating (normal incidence method)
5. Determination of Planck's Constant - Photocell.
6. Determination of Wavelength of ultrasonic waves.
7. Fiber Optics a) N.A. (b) losses, (c) LED & (d) detector characteristics
8. Diffraction at a single slit
9. Characteristics of a themistor or energy gap of semi-conductor.
10. B-H Curve.
11. Dielectric constant
12. Characteristics of p-n junction diode.
13. Characteristics of Solar Cell
14. Hall effect.
15. e/m of an electron (Thomson's method)
16. Error analysis using torsional pendulum.
17. Holography - recording and reconstruction.
18. Intensity measurement using He-Ne gas laser.
19. Thermo electric power
20. Determination of Wavelength of given laser light.
21. Determination of specfic rotation - polarimeter.

Note : Out of above 21 experiments. student has to perform atleast 15 experiments.

CHEMISTRY LABORATORY

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

VOLUMETRIC ANALYSIS

1. Introduction to Volumetric Analysis.
2. Techniques of Weighing and usage of Simple analytical balance.

PERMANGANOMETRY

3. Preparation of standard solution of Oxalic acid or Soidum Oxalate and Standarisation of $KMnO_4$ Solution.

4. Preparation of Standard solution of Mohr Salt, Standarization of $KMnO_4$ solution & Estimation of ferrous iron in the given solution.

5. Ore Analysis - Determination of Manganese in pyrolussite.

DICHROMETRY

6. Preparation of Standard solution of Potassium Dichromate, Standarisation of Mohr salt solution & Estimation of Dichromate in the given solution.

IODOMETRY

7. Preparation of standa d solution of potassium dichromate and standarization of Sodium thiosulphate solution.

8. Estimation of copper in the given solution by using standard Hypo Solution.

ACIDIMETRY

9. Preparation of standard sodium carbonate solution, Standarization of hydrocholoric acid & Estimation of Carbonate, Bicarbonate in the given mixture.

COMPLEXOMETRY

10. Preparation of standard Magnesium Sulphate solution, standarization of EDTA solution and estimation of temporary and permanent hardness in the given sample of water.

PROGRAMMING LABORATORY

Instruction	2	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

1. Familiarization with an editor.

   The following problems should be programmed using 'C' programming language.

2. Sinx and Cosx values using series expansion.

3. Frequency of occurrence of characters and special characters like /n, /t white spaces in a given text input.

4. Bubble sort with an array.

5. Linear and Binary searches.

6. Matrix addition and multiplication using pointers.

7. Generation of address labels using structures.

8. Sequential file operations.

9. Functions of string manipulations without using library function.

   The following problems should be programmed using 'C++ programming language.

10. Finding maximum, minimum and sum of given set of numbers.

11. Implementation of a matrix class.

12. Classes for Bank Account, Student information, Library catalog.

13. Creation of complex class with operator overloading.

14. Creation of inheritance heirarchy for graphic shapes.

15. Template functions for min( ) and max( ) for finding minimum and maximum in a list of numbers.

16. Programs for finding the number of characters, words, and sentences in the given test input.

ENGLISH LANGUAGE LABORATORY

Instruction	2	Periods per week
Sessional	25	Marks

Note : While teaching the following items, emphasis may be laid on intensive practice in the language lab. Lecturing may be avoided as far as possible.

1. Introduction to English Phonetics; Organs of Speech - the respiratory, phonatory and articulatory systems; Introduction to International Phonetic Alphabet.

2. Sound system of English : The classification and description of vowels and consonants in detail, consonant clusters.

3. Aspects of connected speech : Syllable division and word accent; Intonation; strong and weak forms, falling-rising, rising-falling and rising-falling tones; Rhythm.

4. Role Play / Diaglogue and discussion in a variety of situations and settings.

5. Debate and Group Discussion.

6. Interview Skills

7. Presentation Skills and Public Speaking

8. Seminars

9. Use of multimedia for improvement of communication skills (Television, Radio, Internet etc.)

I. **Recommended Software for Computer Aided Language Laboratory : The Minimum requirements for A CALL Lab are the following :**

1. Desk-top Systems with LAN facility.

2. Server - (Teacher's console).

3. Student booths and chairs

4. CALL Platform Software.

5. English Language Learning Software :

   a) Clarity Sky Pronunciation Suite or Pronunciation Power - 2

   b) Technology in Context.

   c) Study Skills Success.

   d) Language in Use, Cambridge University Press, 2004.

e) Cambridge Advanced Learner's Dictionary (with CD) Cambridge University Press, 2005.

f) Oxford Advanced Learner's Dictionary (with CD), A.S. Hornby, Oxford University Press, 2006.

g) English Pronouncing Dictionary (with CD), Daniel Jones, Cambridge Univserity Press.

II. Books Recommended :

1. A Handbook for English Language Laboratories of Engineering Colleges, E. Suresh and P. Sreehari, Foundation Books, 2006.

2. A Practical Course in English Pronunciation (with CDs), J. Sethi et al, Prentice Hall India, 2005.

3. Winning at Interviews, Edgar Thorpe, Pearson Education, 2006.

4. How to prepare for Group Discussions (with audio cassette), Tata McGraw Hill, 2006.

5. Presentation Skills, Suzy Siddonn, Universities Press, 2004.

SCHEME OF INSTRUCTION AND EXAMINATION
B.E. IInd YEAR
CIVIL ENGINEERING

SEMESTER - I

Sl. No.	Syllabus Ref. No.	Subject	Scheme of Instruction Periods per Week		Scheme of Examination	Maximum Marks	
			L	D/P	Dura-tion in Hrs	Univ. Exam	Sessi-onals
		THEORY					
1.	MT 201	Mathematics – III	4	-	3	75	25
2.	CE 201	Building Drawing	-	6	3	75	25
3.	CE 202	Engineering Materials and Construction	3	-	3	75	25
4.	CE 203	Engineering Geology	4	-	3	75	25
5.	CE 204	Strength of Materials - I	4	2	3	75	25
6.	CE 205	Surveying – I	4	-	3	75	25
		PRACTICALS					
1.	CE 231	Engineering Geology Laboratory	-	3	3	50	25
2.	CE 232	Surveying - I Lab.	-	3	3	50	25
3.	CE 233	Computer Aided Civil Engineering Drafting Lab.	-	2	3	50	25
		Total	19	16	-	600	225

1