UNIVERSITY OF CALICUT

(Abstract)

Faculty of Engineering – B Tech – Regulation Scheme and Syllabi of Combined First and Second Semester B.Tech Regular and Part-Time Degree Courses from 2009 Admission onwards – Implemented - orders issued.

GENERAL AND ACADEMIC BRANCH – I 'E' SECTION

No. GA I/E1/4228/08 Dated, Calicut University. P.O., 26.06.2009

Read :- 1)The Minutes of the meeting of Board of Studies in Engineering (UG) held on 24.03.2009.
2) The Minutes of the meeting of Faculty of Engineering held on 11.05.2009 Item No. 1.
3) The Extract of item No. II N of the minutes of the meeting of the Academic Council held on 14.05.2009.

ORDER

As per paper read 1st above, the Board of Studies in Engineering (UG) prepared the Regulations Scheme and Syllabi of Combined First and Second Semester B.Tech Regular and Part-Time Degree Courses from 2009 admission onwards.

As per paper read (2) above Faculty of Engineering approved the minutes of the Board of Studies in Engineering (UG) held on 24.03.2009 and the meeting of the Academic Council held on 14.05.2009 approved the same as per paper read 3rd above.

Sanction has therefore been accorded for implementing the Regulations, Scheme and Syllabus of Combined First and Second Semester B.Tech Regular and Part-Time Degree Courses with effect from 2009 admission onwards.

Orders are issued accordingly.

(Course, Regulations, Appended)

Sd/-
DEPUTY REGISTRAR (G&A-I)
For REGISTRAR.

To

The Principal of all Affiliated Engineering Colleges.
(B Tech Scheme and Syllabus will be available in University Website)

Copy to : The Controller of Examinations/ Dean, Faulty of Engineering/ Chairman, BOS in Engg(UG)/Ex Sn/EG I Sn/SF/FC /System Administrator with a request to upload the Syllabus in the website.)

Forwarded/By Order

SECTION OFFICER

University of Calicut

Course Regulations, Scheme and Syllabi of B.Tech. Degree Programe

(2009 admission onwards)

Combined First and Second Semesters

Common for All Branches

Code	Subject	Hours/week			Marks		End-sem duration-hours	Credits
		L	T	P/D	Inte-rnal	End-sem		
EN09 101	Engineering Mathematics I	2	1	-	30	70	3	4
EN09 102	Engineering Mathematics II	2	1	-	30	70	3	4
EN09 103	Engineering Physics	2	-	-	30	70	3	3
EN09 103(P)	*Physics Lab*	-	-	1	50	50	3	1
EN09 104	Engineering Chemistry	2	-	-	30	70	3	3
EN09 104(P)	*Chemistry Lab*	-	-	1	50	50	3	1
EN09 105	Engineering Mechanics	2	1	-	30	70	3	4
EN09 106	Basics of Civil and Mechanical Engg.	2	1	-	30	70	3	4
EN09 107	Basics of Electrical, Electronics & Communication Engg.	2	1	-	30	70	3	4
EN09 108	Engineering Graphics	0	-	3	30	70	3	3
EN09 109(P)	*Computer Programming in C*	1	-	1	50	50	3	3
EN09 110(P)	*Mechanical Workshops*	-	-	2	50	50	3	2
EN09 111(P)	*Electrical and Civil Workshops*	-	-	2	50	50	3	2
	Total	**15**	**5**	**10**				**38**

University of Calicut

EN09 101: Engineering Mathematics I

(Common for all branches)

Teaching scheme **Credits:** 4

2 hours lecture and 1 hour tutorial per week

Objectives

This course is addressed to those who intend to apply the subject at the proper place and time, while keeping him/her aware to the needs of the society where he/she can lend his/her expert service, and also to those who can be useful to the community without even going through the formal process of drilling through rigorous treatment of mathematics.

Module I: Differential Calculus (15 hours)

Indeterminate forms – L'Hopitals rule – Radius of curvature (Only Cartesian form)– Center of curvature - Evolute – Functions of more than one variables - Idea of Partial Differentiation – Euler's theorem for Homogeneous functions – Chain rule of Partial differentiation – Application in errors and Approximations – Change of variables – Jacobians – Maxima and Minima of functions of two variables – Method of Legrange multipliers.

Module II: Infinite Series (15 hours)

Definition of Convergence and Divergence of Infinite series – Ratio test – Comparison test – Raabe's test – Root test – Series of positive and negative terms – Absolute convergence – Test for Alternating series – Power series – Interval of Convergence – Taylor's and Maclaurin's series expansion of functions – Leibnitz formula for the n^{th} derivative of product of two functions – Its use in Taylor's and Maclaurin's series expansions.

Module III: Matrices (15 hours)

Rank of a matrix – Reduction of a matrix to Normal and Echelon forms – System of Linear equations – Consistency of System of Linear Equations – Gauss elimination method – System of Homogeneous Linear equations – Solution of System of Homogeneous Linear equations by Gauss elimination method – Eigen Values and Eigen Vectors – Cayley-Hamilton Theorem – Diagonalisation of a matrix using Eigen vectors – Quadratic forms – Definite, Semi-definite and Indefinite forms – Matrix associated with a quadratic form – Reduction to Canonical form by orthogonal transformation.

Module IV: Fourier Series and Harmonic Analysis (15 hours)

Periodic functions – Trigonometric series – Fourier series – Euler Formulae – Even and Odd functions – Fourier series of Even and Odd functions – Functions having arbitrary period – Fourier series of Functions having arbitrary period – Half-range expansions – Numerical method for determining Fourier coefficients – Harmonic Analysis.

Reference books

1. Michael D Greenberg, *Advanced Engineering Mathematics* (2nd Edition), Pearson Education Asia.
2. Wylie C.R and L.C. Barrent, *Advanced Engineering Mathematics*, McGraw Hill.
3. Kreyzig E., *Advanced Engineering Mathematics*, Wiley eastern.
4. Piskunov N., *Differential and Integral calculus*, MIR Publishers.
5. Ayres F., *Matrices*, Schaum's Outline Series, McGraw Hill.
6. Sastry S.S., *Advanced Engineering Mathematics-Vol. I and II*., Prentice Hall of India.
7. Glyn James., *Advanced Engineering* Mathematics, 3/e, Pearson Education Asia.
8. Dr.ChandraMohan,Dr.Varegheese Philip, *Engineering Mathematics I,II,III & IV* , Sanguine Technical Publishers.
9. Peter V O'Neil, *Advanced Engineering Mathematics*, Thomson India Edition.

Internal Continuous Assessment *(Maximum Marks-30)*

60% - Tests (minimum 2)
30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.
10% - Regularity in the class

University Examination Pattern

PART A:	*Short answer questions (one/two sentences)* All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.	*5 x 2 marks=10 marks*
PART B:	*Analytical/Problem solving questions* Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.	*4 x 5 marks=20 marks*
PART C:	*Descriptive/Analytical/Problem solving questions* Two questions from each module with choice to answer one question.	*4 x 10 marks=40 marks*

Maximum Total Marks: 70

EN09 102: Engineering Mathematics II

(Common for all branches)

Teaching scheme **Credits:** 4

2 hours lecture and 1 hour tutorial per week

Objectives

Mathematics is a necessary avenue to scientific knowledge which opens new vistas of mental activity. A sound knowledge of engineering mathematics is a 'sine qua non' for the modern engineer to attain new heights in all aspects of engineering practice. This course provides the student with plentiful opportunities to work with and apply the concepts, and to build skills and experience in mathematical reasoning and engineering problem solving.

Module I: Ordinary Differential Equations (15 hours)

Equations of first order – Separable, Homogeneous and Linear – Exact Equations – Orthogonal trajectories – Linear second order equations – Homogeneous Linear equation of second order with constant coefficients – fundamental system of solutions – Solutions of the general Linear equations of second order with constant coefficients – method of variation of parameters – Cauchy's equation.

Module II: Laplace transforms (15 hours)

Gamma and Beta functions – Definitions and simple properties – Laplace transform – Inverse Laplace transform – shifting theorems – Transforms of derivatives and integrals – Differentiation and integration of transforms – Convolution theorem (No proof) – Transform of Unit step function – Transform of Impulse function – transforms of periodic functions – Solution of ordinary Differential equations using Laplace transform.

Module III: Vector Differential Calculus (15 hours)

Vector function of a Single Variable – Differentiation of vector functions – Scalar and Vector fields – Gradient of Scalar fields – Divergence and Curl of Vector Fields – Physical meanings – Relations between the vector differential operators.

Module IV: Vector Integral Calculus (15 hours)

Double and Triple integrals – Their evaluation: Line, Surface and Volume integrals – Green's Theorem – Gauss Divergence Theorem – Stoke's Theorem (Proofs of these theorems are excluded) – Line integrals independent of the Path.

Reference books

1. Michael D Greenberg, *Advanced Engineering Mathematics* (2nd Edition), Pearson Education Asia.
2. Wylie C.R and L.C. Barrent, *Advanced Engineering Mathematics*, McGraw Hill.
3. Kreyzig E., *Advanced Engineering Mathematics*, Wiley eastern.
4. Piskunov N., *Differential and Integral calculus*, MIR Publishers.
5. Ayres F., *Matrices*, Schaum's Outline Series, McGraw Hill.
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7. Glyn James., *Advanced Engineering* Mathematics, 3/e, Pearson Education Asia.
8. Dr.ChandraMohan,Dr.Varegheese Philip, *Engineering Mathematics I,II,III & IV* , Sanguine Technical Publishers.
9. Peter V O'Neil, *Advanced Engineering Mathematics*, Thomson India Edition.

Internal Continuous Assessment *(Maximum Marks-30)*

60% - Tests (minimum 2)
30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.
10% - Regularity in the class

University Examination Pattern

PART A: *Short answer questions (one/two sentences)* *5 x 2 marks=10 marks*

All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

PART B: *Analytical/Problem solving questions* *4 x 5 marks=20 marks*

Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.

PART C: *Descriptive/Analytical/Problem solving questions* *4 x 10 marks=40 marks*

Two questions from each module with choice to answer one question.

Maximum Total Marks: 70

EN09 103: Engineering Physics

(Common for all branches)

Teaching scheme **Credits:** 3

2 hours lecture per week

Objectives

- *To impart the basic concepts and ideas in physics*
- *To develop scientific attitudes and enable the students to correlate the concepts of physics with the core programmes*

Module 1(15 hours)

Interfernce of light-superposition of waves-conditions for interference-spatial coherence-temporal coherence-interference in thin films-Plane parallel films- -Colours of thin films in reflected and transmitted light- interference in wedge shaped films- Testing of optical flatness-Newtons Rings-theory and expression for the radius in reflected light.-Measurement of wavelength and refractive index

Diffraction of light-Fresnel and Fraunhoffer class of Diffraction-Fresnels halfperiod zone-Fraunhofer Diffraction at a single slit-(Qualitative Analysis) -Diffraction Grating- simple theory of diffraction transmission grating- Determination of wavelength of monochromatic light using grating. Rayleighs criteria for resolution of spectral lines-Resolving power and dispersive power of grating- mathematical expressions.

Crystal structure—space lattice-basis- translation vector- primitive lattice cell-unit cell-No.of lattice points per unit cell-simple cubic-bcc-fcc-latticeplanes and miller indices--spacing beween three dimensional lattice planes-cubic crystals-structure of sodium chloride –Distance between adjacent atoms for NaCl crystal- Reciprocal lattice-X-ray diffraction and Braggs law –use in crystal studies.

Module II (15 hours)

Polarisation of light-Plane polarised light-Production of polarised light- Double refraction-Optic axis and principle plane-Huyghens Explanation of double refraction in uniaxial crystals-positive and negative crystals--Nicol prism - construction and working -Quarter wave and half wave plate-Theory of elliptically and circularly polarised light-Analytical analysis-production and detection of plane polarised,elliptically polarised and circularly polarised light-polaroids-Optical activity-Laws of optical rotation-specific rotation-Laurents half shade polarimeter-Determination of concentration of sugar solution-Applications of polarised light.

Laser-introduction--spontaneous and stimulated emission-principle of laser- properties of laser-Einstein coefficients and the analysis of lasing conditions- Basic components of a laser-Different types of lasers- construction,working and applications of Ruby laser-Neodymium YAG laser- He-Ne laser- semiconductor laser-Applications of laser in medicine,industry,science and communication. Holography-basic principle-Comparison with ordinary photography-Recording and reconstruction of holograms-applications .

Optical fibre--Basic structure of an optical fibre - step-index fibre and graded index fibre-propagation of light in an optical fibre-acceptance angle and acceptance cone- Numerical aperture of a step-index fibre-Numerical aperture of a graded index fibre-modes of propagation-step index monomode fibre-Multimode stepindex fibre- Graded multimode fibre-Attenuation in optic fibres-fibre losses-material loss,scattering loss,absorption loss,leaky modes- dispersion in optical fibres-Applications .

Module III (15 hours)

Semi-conductor physics-energy bands in solids-classification of solids on the basis of energy band gap-Fermi level-intrinsic semi conductors- carrier (electron and hole concentration) in instrinsic semiconductors-Fermi level in intrinsic semiconductors-law of mass action- Electrical conductivity- Extrinsic semiconductors- N-type and P-type-Donor and acceptor states-Fermi level in extrinsic semiconductors.

Semi-conductor devices-PN junction diode-Voltage-current characteristics of a PN junction-Static and Dynamic resistance of a diode-Zener diode-Avalanche breakdown and zener breakdown-zener characteristics-voltage regulation using zener diode-construction,working and uses of tunnel diode , Light emitting diode – varacter diode-Solar cell- liquid crystal display-applications-Bipolar junction transistor-Action of a transistor as an amplifier-characteristics of a npn transistor in CE Configuration-input resistance-output resistance- current amplification factor.

Superconductivity-Introduction--transition temperature-Meissner effect-properties of super conductors.Types of superconductors-type 1 and type 2- AC Josephsons effect- DC Jospehsons effect- Flux quantisation-Squid-High temperature superconductors-Applications of super conductivity.

Module IV (15 hours)

Quantum mechanics-Introduction-origin of quantum theory-black body radiation and photo electric effect (brief ideas only)-matter waves- wave packet-uncertainty principle-(two forms)Time dependent Shrodinger equation for a free particle-Particle in force field and time dependent Schrodinger equation-Time independent schrodinger equation-Physical intrepretation of wave function-application -Particle in a Box (one dimensional) –Energy eigen values and wave functions

Ultrasonics-piezo electric effect-Magnetostriction effect-production of ultrasonics-properties of ultrasonics- ultrasonic diffractometer and determination of velocity of ultrasonics in a liquid-Application of ultrasonics in non destructive testing - Accoustics of building-reverberation-Absorption Coefficient- Sabines formula for reverberation time(Derivation)-Accoustic intensity-loudness-decibel-phon-conditions for good acoustics(Qualitative study).

Nanoscience-basic ideas of Nanoscience and nano technology-Nano clusters-carbon nanotubes-properties and applications-Future prospects and applications of Nanotechnology (Qualitative ideas)

Text Books

1. Physics for Engineers-M.R.Seenivasan-New Age Publishers 1996 Edition.
2. A Text book of Engineering Physics-A.S.Vasudeva S.Chand publishers 2008 Edition
3. A Text book of Electronics-S.L.Kakani and K.C. Bhandari-New Age International(p) publishers 2000 Edition
4. Nanoscience and Technology-VS Muralidharan& A.Subramania-Ane Books Pvt.Ltd.2009 Edition

Reference books.

1. Fundamentals Optics- Jenkins F.A. and White H.E. Mc Graw Hill Publication
2. Optics-Ajoy Ghatak- Tata McGraw-Hill Publishing companyLtd
3. Introduction to solid state physics- Charles Kittel-Wiley Eastern
4. Concepts of Modern Physics –Arthur Beiser- Tata McGraw-Hill Publishing company Ltd
5. Lasers and non linear optics-B.B.Laud-Wiley Eastern
6. Introduction to Semi conductor materials and Devices-Tyagi M.S. Jhon wiley and Sons.
7. Nano:The essentials-T.Pradeep-Tata McGraw-Hill Publishing company Ltd.
8. Optical Fibres and Fibre Optic Communication Systems-Subir Kumar Sarkar-S.Chand Publishers
9. Engineering Physics-G.S.Raghuvanshi-Printice Hall of India
10. Text book of Optics-Brijlal and Subramanyam-S.Chand publishers
11. Modern Physics- Murukesan R-S.Chand and Co.
12. A Text book of Sound-N. Subramaniam &Brij Lal-Vikas publishing house Ltd.

Internal Continuous Assessment *(Maximum Marks-30)*

60% - Tests (minimum 2)
30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.
10% - Regularity in the class

University Examination Pattern

PART A:	*Short answer questions (one/two sentences)* All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.	*5 x 2 marks=10 marks*
PART B:	*Analytical/Problem solving questions* Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.	*4 x 5 marks=20 marks*
PART C:	*Descriptive/Analytical/Problem solving questions* Two questions from each module with choice to answer one question.	*4 x 10 marks=40 marks*

Maximum Total Marks: 70

EN09 103(P) : Physics Lab

(Common for all branches)

Teaching scheme **Credit:** 1

1 hour practical per week

Objectives

- *To develop scientific and experimental skills of the students*
- *To correlate the theoretical principles with application based studies.*

1. Characteristics of Zener diode.
2. Determination of band gap energy in a semi-conductor using a reverse biased p-n junction
3. Voltage regulation using Zener diode.
4. Static characteristics of a transistor in common emitter configuration
5. Characteristics of photo diode
6. Characteristics of a LED and wavelength of emitted radiation.
7. Draw the characteristics of a solar cell.
8. Wavelength of mercury spectral lines using diffraction grating and spectrometer.
9. Determination of angle of a Quartz /calcite prism and hence determine the refractive indices of ordinary and extra ordinary rays in calcite or quartz prism
10. Diameter of a thin wire or thickness of a thin paper by Air-wedge method.
11. Wavelength of sodium light by Newtons Ring method. Radius of curvature of the lens by Boys method
12. Specific rotation of cane sugar solution using polarimeter.
13. To investigate the relationship between optical activity and wavelength.
14. Wavelength of laser using Grating. Standardise the Grating using sodium light.
15. To study the relation between the sine of the angle of diffraction and the wavelength of light.
16. Resolving and dispersive power of Grating.
17. To determine the angular divergence of a laser beam using He-Ne laser or diode laser.
18. To measure the numerical aperture of an optical fibre.
19. Wavelength and velocity of ultrasonic waves using ultrasonic diffractometer.
20. Frequency of electrically maintained tuning fork (transverse and longitudinal modes)

(Minimum 12 experiments should be completed)

Reference books.
1.Practical physics with viva voice-Dr.S.L.Gupta and Dr.V.Kumar-pragati Prakashan Publishers
2.Experiments in Engineering Physics-M.N.Avadhanulu,A.A.Dani and

Internal Continuous Assessment *(Maximum Marks-50)*

50% - Laboratory practical and record
40% - Test
10% - Regularity in the class

End Semester Examination *(Maximum Marks-50)*

70% - Procedure and tabulation form, Conducting experiment, results and inference
20% - Viva voce
10% - Fair record

EN09 104: Engineering Chemistry

(Common for all branches))

Teaching scheme **Credits:** 3

2 hours lecture per week

Objectives

- *To familiarise the students on application oriented themes like the chemistry of materials used in engineering discipline*
- *To focus the students on the chemistry of compounds resulting from pollution, waste generation and environmental degradation and to apply the knowledge in solving these current environmental problems effectively.*

Module I (18 hours)

Semi conductors – Band theory – intrinsic and extrinsic semiconductors – conductivity in semiconductors – Effect of temperature on conductivity - semi conductivity in non-elemental materials – stoichiometric and nonstoichiometric semiconducting compounds – ultrapure silicon production – zone refining

Introduction to Nanoscience – carbon nanotubes and nanowires – applications

Liquid crystals – classification – Molecular ordering – identification – polymeric liquid crystals – application of liquid crystals – displays and thermography

Water – specification for various purposes- (industrial, domestic, drinking) Analysis of water – Hardness, alkalinity Disadvantages of hard water – determination of hardness- EDTA method – softening – lime soda, Ion exchange methods – purification of water for domestic use – Estimation of dissolved oxygen

Module II (18 hours)

Polymers – classification – Types of polymerization – addition, condensation, co-polymerisation, co-ordination polymerization – Mechanism – cationic, anionic, free radical

Polymerisation techniques – Bulk, solution, suspension and emulsion

Structure relation to properties

Themoplastics – PE, PVC, PS, PVA - Thermosetting – Bakelite, UF, Silicones - Fibres – Nylon 6, Nylon 66, Dacron - Natural rubber – Vulcanisation - Synthetic rubber – Buna S, Buna N, - Silicon rubber – compounding – Applications of polymers in Electrical and Electronic industry

Lubricants – Theories of friction – Mechanism of lubrication Thick film, thin film, extreme pressure. Classification – solid, liquid, semisolid – properties – viscosity, flash point, fire point, cloud and pour point, Aniline point, corrosion stability.

Module III (12 hours)

Electrochemistry – single electrode potential – Helmholtz double layer – Nernst equation – derivation – types of electrodes (M/M^+, $M/MA/A^-$, M/A^+, A^{2+}, $Pt/H_2,H^+$, glass electrode) Electrochemical cells, concentration cells - salt bridge –emf measurement – Poggendorf's compensation method – Electrochemical series – applications – storage cells – Lead acid accumulator – alkaline cells – Nickel cadmium – fuel cells – H_2/O_2 fuel cell – solar cells – Chemical sensors.

Acids and basis – Lowry Bronsted and Lewis concepts. Concept of pH – pH measurement using glass electrode – Dissociation constants – Buffer solution – Henderson equation for calculation of pH

Module IV (12 hours)

Corrosion and its control – theories of corrosion – dry corrosion and wet corrosion – galvanic series - corrosion of iron in acidic, neutral and basic conditions – Differential aeration corrosion, stress corrosion – galvanic corrosion – Factors influencing corrosion.

Corrosion protection – self protecting corrosion products – Pilling Bed worth rule- Coatings – Organic (Paints and polymers) Inorganic – Metallic (galvanizing, tinning, electroplating, cementation) Nonmetallic (phosphate, chromate, anodising, chemical oxide). Passivation of metals by chemical treatment – protection by sacrificial anode – Impressed current.

Pollution – Definitions – classification of pollutants – Effect on environment – Air pollution – Photochemical Smog – Ozone depletion – Chapman cycle of Ozone formation – CFC dissociation and its reaction with Ozone – Alternate refrigerants – Thermal pollution – Methods of control of air pollution - water pollution – BOD, COD determination.

Text Books

1. Jain and Jain (2007) "Engineering Chemistry" Dhanpat Rai Publishing Co.
2. Shashi Chawla (2006) "A text Book of Engineering Chemistry" Dhanpat Rai publishing Co.
3. Dr. Kochubaby Manjooran – Modern Engineering Chemistry – Kannantheri Publication, Kochi.

Reference Books

1. B.R. Gowarikar et. al "Polymer Science" New Age International.
2. S. Deswal and A. Deswal "A basic course in Environmental Studies" Dhanpat Rai publishing Co.
3. A.K. De "Environmental Chemistry" New Age International.
4. B.K. Sharma "Electrochemistry" Goel Publishing House.
5. V. Raghavan "Material Science and Engineering – A First Course" Prentice Hall of India Pvt. Ltd.
6. V.S. Muraleedharan and A. Subramania – Nano Science and Technology, Ane Books Pvt. Ltd., New Delhi.

Internal Continuous Assessment *(Maximum Marks-30)*

60% - Tests (minimum 2)
30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.
10% - Regularity in the class

University Examination Pattern

PART A: Short answer questions (one/two sentences) *5 x 2 marks=10 marks*

All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

PART B: Analytical/Problem solving questions *4 x 5 marks=20 marks*

Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.

PART C: Descriptive/Analytical/Problem solving questions *4 x 10 marks=40 marks*

Two questions from each module with choice to answer one question.

Maximum Total Marks: 70

EN09 104(P): Chemistry Lab

(Common for all branches)

Teaching scheme **Credit:** 1

1 hour practical per week

Objectives

- *To equip the students with the working knowledge of chemical principles, nature and transformation of materials and their applications.*
- *To develop analytical capabilities of students so that they can understand the role of chemistry in the field of Engineering and Environmental Sciences*

1. Estimation of ion in Mohr's salt using standard $K_2Cr_2O_7$
2. Estimation of iron in a sample of iron ore
3. Estimation of copper in a given sample of brass

4. Estimation of total hardness in a given sample of water using EDTA.
5. Estimation of chloride ions in domestic water
6. Determination of dissolved oxygen present in a given sample of water (Winkler's Method)
7. Determination of available chlorine in a sample of bleaching powder
8. Determination of flash point and fire point of an oil using Pensky Martens flash point apparatus
9. Determination of EMF of a cell by Poggendorf's compensation method
10. Preparation of buffers and standardization of pH meter
11. Estimation of iron, chromium, lead and Cadmium in water – Colourimetrically
12. Preparation of urea –formaldehyde and phenol formaldehyde resin

(Minimum 8 experiments should be completed)

Reference Books

A.I. Vogel – A text book of Quantitative Analysis – ELBS, London.
Dr. Sunita Rattan – Experiments in Applied Chemistry – S.K. Kataria and Sons, New Delhi.

Internal Continuous Assessment *(Maximum Marks-50)*

50% - Laboratory practical and record
40% - Test
10% - Regularity in the class

End Semester Examination *(Maximum Marks-50)*

70% - Procedure and tabulation form, Conducting experiment, results and inference
20% - Viva voce
10% - Fair record

EN09 105: Engineering Mechanics

(Common for all branches)

Teaching scheme **Credits:** 4

2 hours lecture and 1 hour tutorial per week

Objectives

- *To acquaint with general method of solving engineering problems.*
- *To illustrate the application of the methods learned in Mechanics in practical engineering problems.*

Units: *System International*

Module I (16 hours)

Introduction to engineering mechanics - units - dimensions - vector and scalar quantities - laws of mechanics - elements of vector algebra - important vector quantities - equivalent force systems -

translation of a force to a parallel position - resultant of a force system - simplest resultant of special force systems - distributed force systems - equations of equilibrium - free body diagrams - free bodies involving interior sections - general equations of equilibrium - problems of equilibrium - static indeterminacy. (Both vector and scalar formulations are to be introduced to solve problems.)

Module II (16 hours)

Friction – laws of friction – simple contact friction problems.

Introduction to structural mechanics - trusses - analysis of simple trusses - method of sections – method of joints.

Properties of simple and composite plane areas and curves – first moment and centroid– theorems of Pappus-Guldinus - second moment of plane and composite areas – parallel and perpendicular axis theorems – polar moment of inertia of area – product of inertia and principal axis (conceptual level treatment only).
Moment of inertia of a rigid body and lamina (derivation of MI for cylinder, rod and sphere).

Module III (14 hours)

Kinematics of particles - rectilinear motion - curvilinear motion – motion of a projectile - tangential and normal acceleration
Kinetics of particles - rectilinear motion – curvilinear motion - Newton's second law– D'Alembert's principle – motion on horizontal and inclined surfaces – motion of connected bodies.
Work, power and energy –work-energy equation – transformation and conservation of energy – impulse and momentum.

Module IV (14 hours)

Kinematics rigid bodies - rotation of a rigid body about a fixed axis - plane motion of a rigid body - instantaneous center

Kinetics rigid bodies - equations of motion of a rigid body rotating about a fixed axis - rotation under the action of a constant moment - D'Alembert's principle – equations of motion for general plane motion - principle of work and energy.

Text Books

1. Shames I.H, *Engineering Mechanics - Statics and Dynamics*, 4th ed.,Prentice-Hall of India, New Delhi, 2001
2. Hibbeler R. C. , *Engineering Mechanics, Vol.I statics, Vol II Dynamics*, 2nd ed., Pearson Education, Delhi, 2004.
3. Timoshenko S. and Young D. H., *Engineering Mechanics*, 4th ed., McGraw Hill International Edition, Singapore, 1956.

Reference Books

1. Beer F.P and Johnston E.R., *Vector Mechanics for Engineers - Vol.1 Statics and Vol.2 Dynamics*, 3rd ed., Tata McGraw Hill, New Delhi, 2000.
2. Meriam J.L and Kraige L.G., *Engineering Mechanics - Vol.1 Statics and Vol.2 Dynamics*, 5th ed., Wiley Student Edition, Kundli, 2004
3. Rajasekharan S. and Sankarasubramanian G., *Engineering Mechanics –Statics and Dynamics*, 3rd ed., Vikas Publishing House, Delhi, 2005

Internal Continuous Assessment *(Maximum Marks-30)*

60% - Tests (minimum 2)
30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.
10% - Regularity in the class

University Examination Pattern

PART A:	*Short answer questions (one/two sentences)* All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.	*5 x 2 marks=10 marks*
PART B:	*Analytical/Problem solving questions* Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.	*4 x 5 marks=20 marks*
PART C:	*Descriptive/Analytical/Problem solving questions* Two questions from each module with choice to answer one question.	*4 x 10 marks=40 marks*

Maximum Total Marks: 70

EN 09 106: Basics of Civil and Mechanical Engg.

(Common for all branches))

Credits: 4

Section 1: Basics of Civil Engineering

Teaching scheme
1 hour lecture per week

Objective
To give a basic knowledge of the topics in Civil Engineering.

(In- depth treatment is not required)

Module I (15 hours)
Scope of Civil Engineering- Role of Civil Engineers in nation building.
Brief description of Engineering properties and applications of the following construction materials (i) Lateritic stone (ii) brick (iii) cement (iv) sand (v) Rubble & Crushed stone (vi) Timber

(vii) Iron & steel. (Study on laboratory tests not expected, detailed manufacturing processes of materials not expected).

Stone and brick masonry construction- bonds used in general constructions- Cement mortar and Cement Concrete - Properties and applications- Reinforced Cement Concrete Fundamentals - points to be observed during masonry construction and concreting.
(Only brief description is expected).

Module II (15 hours)

Introduction to Surveying- brief description of the following instruments (i) chain and accessories (ii) Dumpy level (iii) Theodolite. Use of levelling instrument for determining reduced levels of various stations- Simple problems on Levelling - use of theodolite for measuring horizontal angles – Simple problems on horizontal distance and plane area. (Only brief description is expected).

Building drawing- plan, section and elevation of a single room building with RCC roof (sketching in the paper/note book only is expected).

Type and functions of the following structural components of buildings
(i) Foundation (ii) Wall (iii) Column (iv) Beam (v) Slab (vi) Arch & Lintels (vii) Plane Trusses.

Geometric, structural, and functional features of Roads, Bridges and Dams.

Text Books

1. L.S.Jayagopal and R. Rudramoorthy-"Basic Civil and Mechanical Engineering"- Vikas Publishing house Pvt Ltd, New Delhi New-110014.

Reference Books

1. Rangwala. S. " Engineering Materials", Charator book stall, Anand
2. Arora. K.R. Surveying Vol I and Vol II, Standard Book house,
3. Punmia. B.C- Building Construction, Laxmi Publications
4. Rajput. R.K.—"Engineering Materials", S. Chand and Company
5. Balagopal. T.S. Prabhu et.al " Building Drawing and Detailing, Spades.

Internal Continuous Assessment *(Maximum Marks-15)*

60% - Tests (minimum 2)
30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.
10% - Regularity in the class

University Examination Pattern – for Section 1
Note: Section 1 and Section 2 are to be answered in separate answer books

PART A: *Short answer questions (one/two sentences)* — *2 x 2 marks=4 marks*, *1 x 1 mark = 1 mark*

All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

PART B: *Analytical/Problem solving questions* — *2 x 5 marks=10 marks*

Candidates have to answer two questions out of three. There should be at least one question from each module and not more than two questions from any module.

PART C: *Descriptive/Analytical/Problem solving questions* — *2 x 10 marks=20 marks*

Two questions from each module with choice to answer one question.

Section 2: Basics of Mechanical Engineering

Teaching scheme
1 hour lecture and 1 hour tutorial per week

Objectives

- *To impart the basics of thermodynamics, heat engines, thermal power plants, hydraulic machines and power plants, renewable energy power plants etc*
- *To impart the basics of Power transmission elements and basic manufacturing processes.*
- *Only preliminary understanding of the subject is to be imparted, as this is a basic course.*

Module I (Basic Thermodynamics and applications) (16 hours)
Basic Thermodynamics- Concept of temperature, Zeroth law, heat and work, First law, Internal Energy concept, Second law (Statement and explanation only) –Heat engine, refrigerator and heat pump _ Concepts of entropy - Thermodynamic cycles -Carnot cycle, Otto cycle, Diesel cycle, Brayton cycle.
Internal Combustion Engines – Classification - SI and CI engines, Two stroke and Four stroke engines, Carburetted and MPFI engines, CRDI engines. Working principles only.
Power plants –layout and working of Gas turbine Power plants, Steam power plants, Diesel power plants and Nuclear power plants.
Vapour compression and Air refrigeration systems – Concept of Ton of Refrigeration and COP, simple cycle and schematic diagram only. Brayton cycle- derivation of efficiency of the cycle – simple problems
Renewable and non –renewable sources of energy – Fuels and their properties – coal, LSHS, FO, LNG , HSD, Biodiesel and biogas – layout and working principles of solar, wind, tidal, OTEC, Geothermal, power plants.

Module II (Hydraulic machines and Manufacturing systems) (14 hours)
Hydel power plants and pumps.- Hydraulic Turbines - Classification, construction, working and applications. Hydraulic pumps - Classification, Reciprocating and centrifugal pumps, Priming, multistage pumps, pumps like vane, gear and jet pumps (working principle and applications only).
Basic Power transmission systems- Belt and chain drives, expressions for power transmitted, belt tension, & coefficient of friction relationships- gears and gear trains - Rack & pinion, Slider crank mechanism, eccentric mechanism (basics only)
Basic manufacturing processes- Casting (Sand and die casting processes), Forging (open and closed die forging & net shape forging), Rolling (2 and 3 roll process), Extrusion (Direct, indirect and hydrostatic extrusion), Welding (SMAW & Oxy fuel welding)

Reference Books

1. A textbook on Internal Combustion Engines – Mathur and Sharma, Dhanpat Rai & Sons
2. Elements of Mechanical Engineering – Roy and Choudhary
3. Power plant engineering – P.K. Nag, Tata Mc Graw Hill
4. Basic Mechanical Engineering – Benjamin

Internal Continuous Assessment *(Maximum Marks-15)*

60% - Tests (minimum 2)
30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.
10% - Regularity in the class

University Examination Pattern – for Section 2
Note: (Section 1 and Section 2 are to be answered in separate answer books)

PART A:	*Short answer questions (one/two sentences)* All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.	*2 x 2 marks=4 marks* *1 x 1 mark = 1 mark*
PART B:	*Analytical/Problem solving questions* Candidates have to answer two questions out of three. There should be at least one question from each module and not more than two questions from any module.	*2 x 5 marks=10 marks*
PART C:	*Descriptive/Analytical/Problem solving questions* Two questions from each module with choice to answer one question.	*2 x 10 marks=20 marks*

Maximum Total Marks: 35

EN09 107: Basics of Electrical, Electronics & Communication Engineering

(Common for all branches)

Teaching Scheme **Credits**: 4
2 hours lecture and 1 hour tutorial per week

Section 1: Basics of Electrical Engineering

Objective

- *To provide the basic concepts and an overview of Electrical Engineering.*

Module I (15 hours)

Kirchoff's laws – solution of series-parallel circuits with DC excitation. (2Hrs) Magnetic circuits – MMF, flux, reluctance – comparison of magnetic and electric circuits. (3 Hrs) Faraday's laws – Lenz's law – statically and dynamically induced EMF – self and mutual inductance – coefficient of coupling. (3 Hrs)

Single phase AC circuits – generation of sinusoidal EMF – cycle, frequency, time period – average and RMS values – form factor and peak factor of sine wave only – analysis of simple R,L,C circuits – reactance and impedance – active, reactive and apparent power – power factor. (5Hrs)

3-phase circuits – generation of 3-phase AC voltage – Star and Delta connection – voltage & current relationships in star and delta (balanced only). (2 Hrs)

Module II (15 Hours) (Basic Concepts only)

Single phase transformer – construction – principle of operation – EMF equation – transformation ratio – ideal transformer only. (3 Hrs)

DC motor and generator – constructional details – EMF equation of dc generator - shunt, series and compound (schematics only) – applications of dc motors. (3 Hrs)

3-phase induction motor – squirrel cage and wound rotor type – constructional details – rotating magnetic field (concepts only) - principle of operation – slip – applications. (3 Hrs)
3-phase synchronous generators – constructional details – salient-pole and cylindrical rotor type - principle of operation. (3 Hrs)
Basic structure of ac power system (1Hr)
Electrical estimation of small residential building (quantity of materials only) (2Hrs)

Text Books

1. Edward Hughes, *Electrical Technology*, Pearson Education
2. Vincent Del Toro, *Electrical Engineering Fundamentals* , Pearson Education

Reference Books

1. Kothari & Nagrath, *Theory & problems of Basic Electrical Engineering*, Tata McGraw Hill
2. Ashfaq Husain, *Fundamentals of Electrical Engineering*, Dhanpat Rai & Co.
3. J.B. Gupta, *A course in electrical installation, estimation & costing*, S.K. Kataria & Sons

Internal Continuous Assessment *(Maximum Marks-15)*

60% - Tests (minimum 2)
30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.
10% - Regularity in the class

University Examination Pattern – for Section 1
Note: Section 1 and Section 2 are to be answered in separate answer books

PART A: *Short answer questions (one/two sentences)* — *2 x 2 marks=4 marks*, *1 x 1 mark = 1 mark*

All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

PART B: *Analytical/Problem solving questions* — *2 x 5 marks=10 marks*

Candidates have to answer two questions out of three. There should be at least one question from each module and not more than two questions from any module.

PART C: *Descriptive/Analytical/Problem solving questions* — *2 x 10 marks=20 marks*

Two questions from each module with choice to answer one question.

Maximum Total Marks: 35

Section 2: Basics of Electronics and Communication Engineering

Objectives

- *To impart knowledge about basic electronic and digital systems*
- *To give basic ideas about various communication systems*

(Only system level block diagram approach, no analysis required)

Module I (14 hours)

Amplifiers: Principle of electronic amplifiers – Block diagram representation – Classification – Significance of input impedance, output impedance, output power, power gain, voltage gain and frequency response – noise in amplifiers – cascaded amplifiers – concept of differential amplifiers and operational amplifiers – open loop and closed loop systems – effect of negative feedback – concept of oscillators.(7 Hours)
Digital Systems : Logic gates – logic states – Boolean algebra – algebraic logic minimisation – generating logic diagram from Boolean expression – introduction to TTL and CMOS logic – programmable logic devices . (4 Hours)
Measurements and Data Acquisition Systems : Working and block diagram of CRO – sensors – actuators – principle of digital voltmeter – concept of multiplexing – principle of ADC and DAC .. (3 Hours)

Module II (16 hours)

Radio Communication : Modulation - Principle Of AM & FM – block diagrams of transmitters – wave forms – band width – principle of AM & FM demodulation - comparison of AM &FM – principle of super heterodyne receiver – block diagram**. (**4 Hours)

Radar and Navigation : principle of Radar – Radar equation [Derivation not required] – block schematics of pulsed Radar and continuous wave Radar – applications of Radar – introduction to navigational aids. (4 Hours)

Communicational Systems : principle of microwave communication – frequency band – repeaters – block diagrams – principle of satellite communication systems – transponder – block diagram of optical communicational systems – principle of light transmission through fibre – advantages of optical communication – basic principles of cellular communications – concepts of cells – frequency reuse – handoff – roaming – principle of GSM , CDMA, GPRS technologies . (8 Hours)

Text Books

1. Neil Storey, 'Electronics; A Systems Approach' Pearson Education, 2nd Ed., New Delhi
2. Santhiram Kal.'Basic Electronics-Devices, Circuits & IT fundamentals', PHI, New Delhi
3. Louis E Frenzel,'Principles of Electronic Communication systems', Tata McGraw Hill, New Delhi
4. William Stallimgs.'Wireless Communications & Networks', Pearson Education, New Delhi
5. David A Bell.'Electronic Instrumentation & Measurements', PHI, New Delhi

Internal Continuous Assessment *(Maximum Marks-15)*

60% - Tests (minimum 2)
30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.
10% - Regularity in the class

University Examination Pattern – for Section 2
Note: Section 1 and Section 2 are to be answered in separate answer books

PART A:	*Short answer questions (one/two sentences)* All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.	*2 x 2 marks=4 marks* *1 x 1 mark = 1 mark*
PART B:	*Analytical/Problem solving questions* Candidates have to answer two questions out of three. There should be at least one question from each module and not more than two questions from any module.	*2 x 5 marks=10 marks*
PART C:	*Descriptive/Analytical/Problem solving questions* Two questions from each module with choice to answer one question.	*2 x 10 marks=20 marks*

Maximum Total Marks: 35

EN09 108: Engineering Graphics

(Common for all branches)

Teaching scheme **Credits:** 3
3 hours drawing per week

Objectives

By going through the contents student will be able to:

- *Understand systems of drawing.*
- *Produce orthographic drawing of points, lines and solids.*
- *Produce isometric views of any object.*
- *Develop skill to produce perspective views of any object.*
- *Develop skill to convert the pictorial views of simple engineering objects into orthographic views.*

Module – I (9 Hours; 1 Drawing Exercise)

Drawing instruments and their use - Different types of lines - Lettering and dimensioning – Scales - Familiarization with current Indian Standard Code of practice for general engineering drawing - Construction of Conic sections - Construction of Cycloid, Involutes and Helix
(For internal work assessment only, not for University Examination)

Module-II (24 Hours; 4 Drawing exercises)

a) Introduction to projections - Systems of projections - Vertical, Horizontal and Profile planes - Principles of first and third angle projections - Projections of points in different quadrants - Orthographic projections of straight lines parallel to both reference planes - Perpendicular to one of the reference planes - Inclined to one and parallel to other reference plane - Inclined to both the reference planes and occupied in one quadrant - Traces of lines - True length and inclination of a line with reference planes - Line occupied

in more than one quadrant - Line inclined to the two reference planes but parallel to the profile plane.

b) Projections of plane lamina of geometrical shapes - Plane lamina parallel to one of the reference planes - Inclined to one and perpendicular to the other reference plane - Inclined to both the reference planes - Inclined to the two reference planes but perpendicular to the profile plane.

Module- III (18 Hours; 3 Drawing exercises)

a) Projections of Polyhedra, Solids of revolution and Frustums - Projections of solids with axis parallel to one and inclined to the other reference plane - Axis inclined to both the reference planes - Projections of solids on auxiliary planes (Solids to be drawn: Cube, Prisms, Pyramids, Tetrahedron, Cone and Cylinder)

b) Sections of solids - Sections by cutting planes parallel to the reference planes - Cutting plane inclined to one and perpendicular to other reference plane - True shape of the section by projecting on auxiliary plane (Solids to be drawn: Cube, Prisms, Pyramids, Tetrahedron, Cone and Cylinder)

Module- IV (15 Hours; 3 Drawing exercises)

a) Intersection of surfaces - Methods of determining the curve of intersection - Line method - Cutting plane method - Axes of the solids perpendicular to each other and one of them is perpendicular to vertical plane and other is perpendicular to horizontal plane - Intersection of two prisms - Intersection of two cylinders – Intersection of cylinder and cone.

b) Development of surfaces of solids - Method of parallel line and radial line developments - Development of Polyhedra, Cylinder, Cone and sectioned solids - Development of solids having hole or cut - Development of Elbow and T-joint.

Module- V (15 Hours; 3 Drawing exercises)

a) Introduction to isometric projection - Isometric scale - Isometric views - Isometric projections of Prisms, Pyramids, Cylinder, Cone, Spheres, sectioned solids and combination of them.

b) Introduction to perspective projections - Classification of perspective views - Visual ray and vanishing point method of drawing perspective projection - Perspective views of plane figures such as polygons and circles - Perspective views of solids like Prisms, Pyramids and Cube.

c) Introduction to multiview projection of objects - The principle of the six orthographic views -
Conversion of pictorial views of simple engineering objects into orthographic views.

Module- VI (9 Hours; 2 Drawing exercises)

a) Introduction to Computer Aided Drafting (CAD) - Preparation of engineering drawings by using any software capable of drafting and modeling - Creation of simple figures like polygon and general multiline figures - Drawing of front view and top view of solid like Prism, Pyramid and Cylinder and dimensioning - Drawing of front view and top view of objects from pictorial view.

b) Conventional representation of threaded fasteners - Drawing of nuts, bolts, washers and screws - Locking arrangements of nuts - Bolted and screwed joints - Foundation bolts.

(For internal work assessment only, not for University Examination)

NOTE: *All drawing exercises mentioned above are for class work. Additional exercises where ever necessary may be given as home assignments*

B.

Text Books

1. John.K.C, Engineering graphics, Jet Publications, Thrissur
2. P.I.Varghese, Engineering Graphics, VIP Publications, Thrissur
3. Bhatt.N.D, Elementary Engineering Drawing, Charotar Publishing House, Delhi
4. K.N.Anilkumar, Engineering Graphics, Adhuth Narayanan Publishers, Kottayam

Reference Books.

Internal Continuous Assessment *(Maximum Marks-30)*

60% - Drawing exercises (Best 12 sheets)
30% - Tests (minimum 2)
10% - Regularity in the class

University Examination Pattern

- *No question from modules I and VI*
- *Answer THREE questions from Part A and any TWO questions from Part B. All questions carry equal marks*

PART A	Q 1	Two questions (a) and (b) of 14 marks each from module II, one from module II (a) and one from module II(b), with choice to answer any one.	*3 x 14 marks= 42 marks*
	Q II	Two questions (a) and (b) of 14 marks each from module III, one from module III(a) and one from module III(b), with choice to answer any one.	
	Q III	Two questions (a) and (b) of 14 marks each from module IV, one from module IV(a) and one from module IV(b), with choice to answer any one.	
PART B	Q IV	3 Questions (a), (b) and (c) of 14 marks each from module V, one from module V(a), one from module V(b) and one from module V(c), with choice to answer any two.	*2 x 14 marks = 28 marks*

Maximum Total Marks=70

EN09 109(P): Computer Programming in C

(Common for all branches)

Teaching scheme **Credits:** 3

1 hour lecture and 1 hour practical per week

Objectives

- *To impart the basic concepts of computer and information technology*
- *To develop skill in problem solving concepts through learning C programming in practical approach.*

Module I (7 hours)

Introduction to Computers: CPU, Memory, input-output devices, secondary storage devices, Processor Concepts - Evolution and comparative study of processors. Machine language, assembly language, and high level language. Inside a PC, Latest trends and technologies of storage, memory, processor, printing etc. Concept of Program and data, System software - BIOS, Operating System-Definition-Functions-Windows, and Linux. Compilers and assemblers. Application software. Definition and scope of IT, Computer networks, LAN, WiFi, Internet Services.

Module II (6 hours)

Basic elements of C: Flow chart and algorithm – Development of algorithms for simple problems. Structure of C program – Operators and expressions – Procedure and order of evaluation – Input and Output functions. While, do-while and for statements, if, if-else, switch, break, continue, goto, and labels. Programming examples.

Module III (7 hours)

Functions and Program structures: Functions – declaring, defining, and accessing functions – parameter passing methods – Recursion – Storage classes – Extern, auto, register and static. Library functions. Header files – C pre-processor. Example programs.

Arrays: Defining and processing arrays – passing arrays to functions – two dimensional and multidimensional arrays – application of arrays. Example programs.

Module IV (10 hours)

Pointer: Concepts, declaration, initialization of pointer variables – Pointers and functions – pointers and arrays – Pointers and structures – Command line arguments – Dynamic memory allocations. Example programs.

Structures, unions, and file handling: Structures – declaration, definition and initialization of

structures – Nested structures – Arrays of structures – Structures and function. Union – typedef. Concept of a file – File pointer – File operations. Basic concepts of linked lists. Example programs.

Lab Exercises

1. Lab Practice – Familiarization of OS- DOS, Windows and Linux – Simple OS commands – Creation of folders/directories, copying and deleting files etc. Simple shell programming (3 Hrs)
2. Lab praise- identifying the hardware components inside a computer (2 hrs)
3. Lab Practice/Demo - Editor, compiler, linker, loader (with a simple C program) (3 Hrs)
4. Lab Practice- Common application softwares – DTP & Office suite, Presentation slides, pdf and ps reader (5 Hrs)
5. Usage of INTERNET for academic purposes, ftp, torrent – demo (2 hours)
6. Programming exercises in C covering the following topics (15 hours)
   (a) Functions (b) Arrays (c) Pointers
   (d) Structures and unions
   (e) File handling

Text Books

1. B.Gottfried, *Programming with C*, 2nd ed, Tata McGraw Hill, New Delhi, 2006
2. P. Norton, *Peter Norton's Introduction to Computers,* 6th ed., Tata McGraw Hill, New Delhi, 2004.
3. B. W. Kernighan, and D. M. Ritchie, *The C Programming Language*, Prentice Hall of India, New Delhi, 1988
4. E. Balaguruswamy, *Programming in ANSI C*, 3rd ed., Tata McGraw Hill, New Delhi, 2004

Reference Books

1. K. N. King. *C Programming: A Modern Approach*, 2nd ed., W. W. Norton & Company, 2008
2. P. Norton, *Peter Norton's Computing Fundamentals, 6th ed.,* Tata McGraw Hill, New Delhi, 2004.
3. S .Kochan , *Programming in C*, CBS publishers & distributors
4. M. Meyer, R. Baber, B. Pfaffenberger. *Computers in Your Future*, 3rd ed., Pearson Education India

Internal Continuous Assessment *(Maximum Marks – 50)*

40% - Laboratory practical and record
20% - Test(s)
30% - Assignments such as home work, term-project, programming exercises, etc.
10% - Regularity in the class

End Semester Examination Pattern *(Maximum Marks – 50)*

The examination shall be conducted in two sections, theory section of 1 hour duration and practical section of 2 hours duration.

Section – 1 (Theory) – This will be a common test; question paper shall be set jointly by external and internal examiners.

PART A: *Short answer questions* *5 x 1 marks=5 marks*

All questions are compulsory. There should be at least one question from each module.

PART B: *Descriptive/Analytical/Problem solving questions* *4 x 5 marks=20 marks*

Two questions from each module with choice to answer one question.

Total Marks: 25

Section – 2 (Practical) *(Total Marks: 25)*

B. 70% - Algorithm/Procedure, Writing and executing C-program, Results/Inference
20% - Viva voce
10% - Record

EN09 110(P): Mechanical Workshops

(Common for all branches)

Teaching scheme **Credits:** 2

2 hours practical per week

Objectives

- *To inculcate engineering aptitude, confidence and experience towards technical skills*
- *To train the students mentally and physically for industries*
- *To impart knowledge and technical skills on basic manufacturing methods*

A) **Carpentry:** study of tools and joints – plaining, chiselling, marking and sawing practice, Different joints
B) **Fitting:** study of tools, chipping, filing, cutting, drilling, tapping, male and female joints, stepped joints
C) **Smithy:** study of tools, forging of square prism, hexagonal bolt
D) **Foundry:** study of tools, sand preparation, moulding practice
E) **Sheet Metal work:** study of tools, selection of different gauge sheets, types of joints, trays and containers
F) **Plumbing Practice:** study of tools, study of pipe fittings, pipe joints, cutting, threading and laying practice.

Note : For end-semester examination, the student shall be examined in any one of the first five trades (A-E)

Internal Continuous Assessment *(Maximum Marks-50)*

50% - Laboratory practical and record
40% - Test
10% - Regularity in the class

End Semester Examination *(Maximum Marks-50)*

70% - Procedure and tabulation form, Conducting experiment, results and inference
20% - Viva voce
10% - Fair record

EN09 111(P) Electrical and Civil Work shops

(Common for all branches)

Teaching Scheme **Credits**: 2

2 hours practical per week

Section 1: Electrical Engineering Work shop

Objective

- *To impart a basic knowledge of electrical circuits, machines and power systems.*

1. Familiarization of various types of Service mains – Wiring installations – Accessories and house hold electrical appliances.
2. Methods of earthling- Measurement of earth resistance- Testing of electrical installations- Precautions against and cure from electric shock
3. Practice of making different joints(Britannia, Married and T- Joints) on copper/ aluminium bare conductors.
4. Wiring practice of a circuit to control two lamps by two SPST switches.
5. Wiring practice of a circuit to control one lamp by two SPDT switches.
6. Wiring practice of a circuit to control one fluorescent lamp and one three pin plug socket.
7. Wiring practice of a main switch board consisting of ICDP switch, DB, MCB's and ELCB's.
8. Familiarization of various parts of electrical motors and wiring of three phase and single phase motor with starter.
9. Familiarization of energy meter and measurement of energy consumption by a single phase load.
10. Familiarization of various electrical and electronic components such as transformers, resistors, AF and RF chokes, capacitors, transistors, diodes, IC's and PCB.
11. Assembling and soldering practice of single phase full wave bridge rectifier circuit with i) capacitor circuit ii) regulator IC

Internal Continuous Assessment *(Maximum Marks-25)*

50% - Laboratory practical and record
40% - Test
10% - Regularity in the class

End Semester Examination *(Maximum Marks-25)*

70% - Procedure and tabulation form, Conducting experiment, results and inference
20% - Viva voce
10% - Fair record

Section 2: Civil Engineering Work shop

Objectives

- *To provide experience on plotting, measuring/determining horizontal distances, level differences between stations and horizontal angles.*
- *To provide experience on setting out for small buildings, masonry construction, plumbing work and model making.*

1. Chain Surveying - Study of chain and accessories, Plotting one side of a building/ Five or six points in the field using chain and cross-staff
2. Compass surveying (Study of compass, Plotting one side of a building/Five or six points in the field using compass
3. Levelling - Study of levelling instruments, Determination of reduced levels of five or six points in the field.
4. Theodolite - Study of Theodolite, Measuring horizontal angles
5. Setting out practice
6. Brick Masonry
7. Plumbing - Demonstration of plumbing fixtures-Exercise in joints
8. Model making of simple solids

Internal Continuous Assessment *(Maximum Marks-25)*

50% - Laboratory practical and record
40% - Test
10% - Regularity in the class

End Semester Examination *(Maximum Marks-25)*

70% - Procedure, conducting experiment, results, tabulation, and inference
20% - Viva voce
10% - Fair record