Syllabus
&
Model Question Papers

For 1/4 - B.Tech & 1/6 - B.Tech II – Semester

(From the admitted batch of 2015 – 2016 under CBCS Scheme)

Group – A & Group – B

Andhra University College of Engineering (Autonomous)
Andhra University
Visakhapatnam – 530 003
ANDHRA UNIVERSITY: : VISAKHAPATNAM

Contents

COMMON SCHEME OF INSTRUCTION & EXAMINATION

I/IV B.TECH (FOUR YEAR COURSE)
&
I/IV B.TECH (SIX YEAR DOUBLE DEGREE COURSE)
(With effect from **2015-2016** admitted batch onwards)
Under Choice Based Credit System

GROUP – A
For the branches of
(Civil, Chemical, CSE, Information Technology)
II-SEMESTER

Code No.	Course	Credits	Lecture Hrs	Tutorial Hrs	Lab Hrs	Total Contact Hrs/Week	Sessional Marks	Exam Marks	Total Marks
ENG 1201	Mathematics-III*	4	3	1	--	4	30	70	100
ENG 1202	Physics	4	3	1	--	4	30	70	100
ENG 1204	Engineering Graphics	4	2	--	3	5	30	70	100
ENG 1206	Professional Ethics & Moral Values	2	2	--	--	2	30	70	100
DS 1208	Department Subject #	4	3	1	--	4	30	70	100
ENG 1209	Physics Lab	2	--	--	3	3	50	50	100
ENG 1211	Workshop	2	--	--	3	3	50	50	100
ENG 1213	English Language Lab*	2	--	--	3	3	50	50	100
ENG 1214	NCC/NSS/Sports (Audit)*	2	--	--	--	3	--	--	--
	Total	**26**	**13**	**3**	**12**	**31**			

Department Subjects with respective codes are given separately at the end.
*Common to both Group-A and Group-B

ANDHRA UNIVERSITY: : VISAKHAPATNAM

COMMON SCHEME OF INSTRUCTION & EXAMINATION

I/IV B.TECH (FOUR YEAR COURSE)
&
I/IV B.TECH (SIX YEAR DOUBLE DEGREE COURSE)
(With effect from **2015-2016** admitted batch onwards)
Under Choice Based Credit System

GROUP – B
For the branches of
(EEE, ECE, Mechanical, Marine, Metallurgy, Geo-Informatics, Instrumentation Technology)

II-SEMESTER

Code No.	Course	Credits	Lecture Hrs	Tutorial Hrs	Lab Hrs	Total Contact Hrs/Week	Sessional Marks	Exam Marks	Total Marks
ENG 1201	Mathematics-III*	4	3	1	--	4	30	70	100
ENG 1203	Chemistry	4	3	1	--	4	30	70	100
ENG 1205	Comp. Prog. & Num. Methods	4	3	1	--	4	30	70	100
ENG 1207	History of Science & Technology	2	2	--	--	2	30	70	100
DS 1208	Department Subject #	4	3	1	--	4	30	70	100
ENG 1210	Chemistry Lab	2	--	--	3	3	50	50	100
ENG 1212	Comp. Prog. & Num. Methods Lab	2	--	--	3	3	50	50	100
ENG 1213	English Language Lab*	2	--	--	3	3	50	50	100
ENG 1214	Sports/NCC/NSS (Audit)*	2	--	--		3	--	--	--
	Total	**26**	**14**	**4**	**9**	**30**			

Department Subjects with respective codes are given separately at the end.
*Common to both Group-A and Group-B

Group – A
For the branches of
(Civil, Chemical, CSE, Information Technology)
&
Group – B
For the branches of
(EEE, ECE, Mechanical, Marine, Metallurgy, Geo-Informatics, Instrumentation Technology)

ENG 1201: MATHEMATICS-III

Theory	: 3 Periods	**Sessionals**	: 30
Tutorial	: 1 Period	**Ext. Marks**	: 70
Exam	: 3 Hrs.	**Credits**	: 4

Unit – I
Solid Geometry
Equations of Striaght Line-Conditions for a line to line in a plane-Coplanar Lines-Shortest Distance between two lines-Intersection of three planes-Equations of Sphere-Tangent Plane to a Sphere-Cone-Cylinder.

Unit – II
Multiple Integrals-1
Double Integrals-Change of Order of Integration-Double Integrals in Polar Coordinates- Triple Integrals-Change of Variables

Unit – III
Multiple Integrals-2
Beta Funtion-Gamma Function-Relation between Beta and Gamma Function-Error Function or Probability Integral-Area enclosed by Plane Curves-Volumes of Solids-Area of Curved Surface-Calculation of Mass-Centre of Gravity-Moment of Inertia-Principal Axes.

Unit – IV
Fourier Series
Introduction-Euler's Formulae-Conditions for a Fourier Expansion-Functions having points of discontinuity-Change of Interval-Odd and Even Functions-Expansions of Odd or Even Periodic Functions-Half Range Series-Perseval's Formula.

TEXT BOOK:
        Scope and Treatment as in "Higher Engineering Mathematics", by Dr. B. S. Grewal, 43rd edition, Khanna Publishers.

REFERENCE BOOKS:
1. Advanced Engineering Mathematics by Erwin Kreyszig.
2. A text book of Engineering Mathematics, by N. P. Bali and Dr. Manish Goyal, Lakshmi Publications.
3. Advanced Engineering Mathematics by H. K. Dass, S. Chand Company.
4. Higher Engineering Mathematics by B. V. Ramana, Tata Mc Graw Hill Company
5. Engineering Mathematics Series by Chandrica Prasad.

Group – A
For the branches of
(Civil, Chemical, CSE, Information Technology)
&
Group – B
For the branches of
(EEE, ECE, Mechanical, Marine, Metallurgy, Geo-Informatics, Instrumentation Technology)

ENG 1201: MATHEMATICS – III
MODEL QUESTION PAPER

Exam   : 3 Hrs.   **Max. Marks : 70**

Answer all questions in Part A and Four questions from Part B
All questions carry equal marks
Questions of Part A must be answered at one place

Part A

1. (a) Find the angle between the line $\dfrac{x+1}{2}=\dfrac{y}{3}=\dfrac{z-3}{6}$ and the plane $3x+y+z=7$.

   (b) Define right circular cylinder.

   (c) Change the integral $\int_0^\infty \int_0^\infty e^{-(x^2+y^2)}dxdy$ into polar coordinates.

   (d) Express $\int_0^{\frac{\pi}{2}}\sqrt{\tan\theta}\,d\theta$ in terms of gamma function.

   (e) Evaluate $\int_0^1\int_0^{1-y} xy\,dxdy$ using Dirichlets integral.

   (f) Is the function $f(x)=\begin{cases}-1+x, & -1<x\le 0,\\ -1-x, & 0\le x<1\end{cases}$ odd or even ? Justify.

   (g) State the Dirichlet's conditions for the expansion of a function as Fourier series.

Part B

2. (a) Find the image of the point (2, -1, 3) in the plane 3x - 2y – z – 9 = 0.

   (b) Find the magnitude and the equations of the shortest distance between the lines
       $\dfrac{x-1}{2}=\dfrac{y-2}{3}=\dfrac{z+3}{4}$ and $\dfrac{x-2}{3}=\dfrac{y-4}{4}=\dfrac{z-5}{5}$

3. (a) Find the equation of the sphere having its centre on the plane $4x-5y-z=3$ and

       passing through the circle $x^2+y^2+z^2-2x-3y+4z+8=0,\ x-2y+z=8$.

   (b) Find the equation of the right circular cone generated by rotating the line $\dfrac{x}{1}=\dfrac{y}{2}=\dfrac{z}{3}$

about the line $\dfrac{x}{-1} = \dfrac{y}{1} = \dfrac{z}{2}$.

4. (a) Evaluate the integral by changing the order of integration $\int_0^3 \int_1^{\sqrt{4-y}} (x+y)\,dxdy$.

(b) Find by double integration the area of the lemniscate $r^2 = a^2 \cos 2\theta$.

5. (a) Evaluate the integral $\int_1^e \int_1^{\log y} \int_1^{e^x} \log z\, dzdxdy$.

(b) Find the volume common to the cylinders $x^2 + y^2 = a^2$ and $x^2 + z^2 = a^2$.

6. (a) Find the centroid of the area enclosed by the parabola $y^2 = 4ax$, the x-axis and its latus rectum.

(b) Prove that $\int_0^1 \dfrac{xdx}{\sqrt{1 - x^2}} = \dfrac{1}{5}\beta\left(\dfrac{2}{5}, \dfrac{1}{2}\right)$.

7. (a) Find the Fourier Series of $f(x) = \begin{cases} \pi x, & 0 \le x \le 1 \\ \pi(2-x), & 1 \le x \le 2 \end{cases}$, $f(x+2) = f(x)$ for all x.

(b) Expand $f(x) = \begin{cases} 0, & 0 \le x \le \pi \\ \sin x, & \pi \le x \le 2\pi \end{cases}$ as Fourier Series.

8. (a) Find the half range cosine series for f(x) = x in $0 < x < 2$.

(b) Expand $f(x) = \begin{cases} \dfrac{-(\pi+x)}{2} & \text{for } -\pi \le x < 0 \\ \dfrac{(\pi-x)}{2} & \text{for } \quad 0 \le x < \pi \end{cases}$ as a Fourier series and hence deduce that

$$\dfrac{1}{1^2} + \dfrac{1}{2^2} + \dfrac{1}{3^2} + \ldots\ldots\ldots = \dfrac{\pi^2}{6}.$$

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For the branches of
(Civil, Chemical, CSE, Information Technology)

ENG 1202 : PHYSICS

Theory : 3 Periods		**Sessionals** : 30
Tutorial Hrs : 1 Period		**Ext. Marks** : 70
Exam : 3 Hrs.		**Credits** : 4

Unit – I

Thermodynamics   **8 - Hours**
Introduction, Heat and Work, First Law of Thermodynamics and applications, Reversible and Irreversible Process, Carnot Cycle and Efficiency, Second Law of Thermodynamics, Carnot's Theorem, Entropy, Second Law in terms of entropy, Entropy and disorder, Third Law of Thermodynamics (Statement Only).

Unit – II

Electromagnetism   **16 – Hours**
Concept of Electric Flux, Gauss's Law – Some Applications, Electric Potential and Field Strength, Potential due to Point Charge and Dipole, Magnetic Field – Magnetic Force on Current, Torque on Current Loop, The Biot-Savart's Law, B near a Long Wire, B for a Circular Current Loop, Ampere's Law, B for a Solenoid, Hall Effect, Faraday's Law of induction, Lenz's law, Inductance, L-R Circuit, Induced Magnetic Fields, Displacement Current, Maxwell's Equations (Both differential and integral forms), Magnetic Materials: Classification of Magnetic Materials and properties.

Unit – III

                                                                12-Hours

Optics
Interference: Principles of Super Position – Young's Experiment – Coherence – Inference in thin films, Wedge shaped film, Newton's Rings, Michelson Interferometer and its applications.

Diffraction: Single slit (Qualitative and Quantitative Treatment)

Polarization: Polarization by reflection, refraction and double refraction in uniaxial crystals, Nicol Prism, Quarter and Half wave plate, Circular and elliptical polarization and detection.

Unit – IV

                                                                14-Hours

Lasers
Introduction, spontaneous and stimulated emissions, population inversions, pumping, Ruby Laser, Gas Laser (He-Ne Laser), Semiconductor Laser, Applications of Lasers.

Fiber Optics
Optical Fiber and Total Internal Reflection, Acceptance Angle and cone of a Fiber, Numerical Aperture, Fiber optics in Communications, Optical Parts in Fiber, Application of Optical Fibers.

Ultrasonics
Introduction, Production of Ultrasonics by Magnetostriction and Piezoelectric effects,
Ultrasonics and diffraction pattern, Applications of Ultrasonics.

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Unit – V
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Modern Physics
  De Broglie concept of matter waves, Heisenberg uncertainty principle, Schrodinger time
independent wave equation, application to a particle in a box. Free electron theory of metals,
Kronig - Penney model (qualitative treatment), Origin of energy band formation in solids,
Classification of materials into conductors, semi conductors and insulators .

Superconductivity
  Super conductivity, Meisner Effect, Types of Superconductors and Applications of
Superconductors.

Nanophase materials – Introduction and properties, Synthesis - Chemical vapour deposition
method – sol-gel methods, Applications of nano materials.

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(10 Hours)
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Books Recommended
1) Engineering Physics by R.K. Gaur and S.L. Gupta
2) Physics by David Halliday and Robert Resnick – Part I and Part II

Reference Books:
1) Engineering Physics by M.N. Avadhanulu & P.G. Kshirasagar; S. Chand & Company Ltd.
2) Modern Engineering Physics by A.S. Vadudeva
3) University Physics by Young and Freedman
4) Nonconventional Energy by Ashok V. Desai

GROUP – A
For the branches of
(Civil, Chemical, CSE, Information Technology)

ENG 1202 : PHYSICS
MODEL QUESTION PAPER

Exam   : 3 Hrs.   **Max. Marks : 70**

Answer FIVE questions.
The First question is compulsory.
Answer any FOUR out of the remaining Seven.

1. (a) State and Explain first law of thermodynamics. (4)
   (b) What is electric flux explain. (3)
   (c) Explain double refraction (4)
   (d) Explain the basic principle of optical fibre.(3)

2. (a) Explain the working of Carnot's heat engine. Obtain an expression for its efficiency. (10)
   (b) Explain the concept of entropy? (4)

3. (a) State and prove Gauss theorem in electrostatics. (7)
   (b) Explain what is Hall effect and its importance. (7)

4. (a) State and explain Ampere's law. (4)
   (b) Discuss the growth and decay of current in L-R circuit.(10)

5. (a) Obtain the conditions for the interference of light reflected by a thin parallel film. (7)
   (b) Discuss the qualitative description of diffraction of light at single slit. (7)

6. (a) Explain what is population inversion and pumping in lasers? (4)
   (b) With neat diagrams, describe the principle, construction and working of Ruby laser.
        Discuss the applications of lasers.(10)

7. (a) What is Piezoelectric effect? Explain how Ultrasonics can be generated by
        piezoelectric phenomena. (8)
   (b) State and explain Heisenberg's uncertainty principle. (6)

8. (a) Derive Schrödinger time independent wave equation. (8)
            (b) What are nano materials? Give some applications of nano materials. (6)

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For the branches of
(Civil, Chemical, CSE, Information Technology)

ENG 1204 : ENGINEERING GRAPHICS

Theory	: 2 Periods	**Sessionals**	: 30
Lab Hrs	: 3 Period	**Ext. Marks**	: 70
Exam	: 3 Hrs.	**Credits**	: 4

Introduction: Lines, Lettering and Dimensioning. Geometrical Constructions. Introduction to Scales.

Curves: Conic sections: General construction of ellipse, parabola and hyperbola. Construction of involutes. Normal and tangent.

Projections of Points: Principal or Reference Planes, Projections of a point situated in any one of the four quadrants

Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of straight line inclined to both the reference planes:

Projections of Planes: Projection of Perpendicular planes: Perpendicular to both reference planes, perpendicular to one reference plane and parallel to other reference plane and perpendicular to one reference plane and inclined to other reference plane. Projection of Oblique planes. Introduction to Auxiliary Planes.

Projections of Solids: Types of solids: Polyhedra and Solids of revolution. Projection of solids in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to other and axes inclined to both the reference planes.

Projections of Section of Solids: Section Planes: Parallel and inclined section planes, Sections and True shape of section, Sections of Solids: Prism, Pyramid, Cylinder and Cone .

Development of Surfaces: Methods of Development: Parallel line development and radial line development. Development of a cube, prism, cylinder, pyramid and cone.

Isometric Views: Introduction to Isometric projection, Isometric scale and Isometric view. Isometric views of simple planes. Isometric view of Prisms, Pyramids, cylinder and cone. Isometric view of an object when projections are given.

Text Book:
Elementary Engineering Drawing by N.D.Bhatt, Charotar Publishing House.

Reference:
Engineering Graphics by K.L. Narayana and P. Kannaiah, Tata Mc-Graw Hill.

ENG 1204: ENGINEERING GRAPHICS
MODEL QUESTION PAPER

Exam   : 3 Hrs.   **Max. Marks : 70**

Part A is compulsory. Answer any Four questions from Part B.
Part A is to be answered on the main answer book and Part B on the drawing sheet.
All questions carry equal marks.
Assume the missing data if any, suitably.

PART-A

1. Write the following in brief:
   (a). What is representative fraction?
   (b). Define the term horizontal trace.
   (c). What is meant by oblique plane?
   (d). What are the different types of solids?
   (e). Define the term section plane.
   (f). State the methods of development.
   (g). Define isometric scale.

PART-B

2. Construct an ellipse when the distance of the focus from the directrix is equal to 50 mm and eccentricity is $\frac{2}{3}$.

3. A line AB, 75 mm long, is inclined at 45° to the H.P. and 30° to the V.P. Its end B is in the H.P. and 40 mm in front of the V.P. Draw its projections.

4. Draw the projections of a regular pentagon of 40 mm side, having its surface inclined at 30° to the H.P. and a side parallel to the H.P. and inclined at an angle of 60° to the V.P.

5. Draw the projections of a cone, base 45 mm diameter and axis 50 mm long, when it is resting on the ground on a point on its base circle with the axis making an angle of 30° with the H.P. and its top view making 45° with the V.P.

6. A hexagonal prism, has a face on the ground and the axis parallel to the V.P. It is cut by a vertical section plane, the H.T. of which makes an angle of 45° with xy and which cuts the axis at a point 20 mm from one of its ends. Draw its sectional front view and the true shape of the section. Take side of the base 25 mm long and height 65 mm.

7. Draw the development of the lateral surface of the part P of the cylinder in Fig.1.

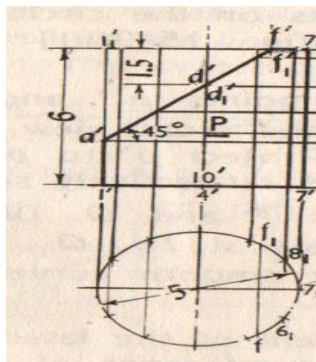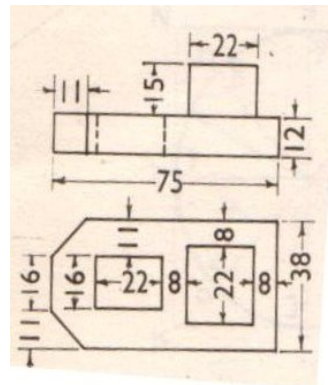8. Draw the isometric view of the below Fig.2

Fig.1.   Fig.2

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ENG 1206 : PROFESSIONAL ETHICS & MORAL VALUES

Theory	: 2 Periods	**Sessionals**	: 30
Tutorial Hrs	: 0 Period	**Ext. Marks**	: 70
Exam	: 3 Hrs.	**Credits**	: 2

Unit – I
Ethics & Human Values: Ethics and Values, Ethical Vision, Ethical Decisions, **Human Values** – Classification of Values, Universality Values. **(6 Periods)**

Unit – II
Engineering Ethics: Nature of Engineering Ethics, Profession and Professionalism, Professional Ethics, Code of Ethics, Sample Codes – IEEE, ASCE, ASME and CSI. **(6 Periods)**

Unit – III
Engineering as Social Experimentation: Engineering as Social Experimentation, Engineering Professionals – Life Skills, Engineers as Managers, Consultants and Leaders, Role of Engineers in Promoting Ethical Climate, Balanced Outlook on Law. **(6 Periods)**

Unit – IV **(6 Periods)**
Safety, Social Responsibility and Rights: Safety and Risk, Moral Responsibility of Engineers for Safety, Case Studies – Bhopal Gas Tragedy, Chernobyl Disaster, Fukushima Nuclear Disaster, Professional Rights, Gender Discrimination, Sexual Harassment at Work Place.

Unit – V
Global Issues: Globalization and MNCs, Environmental Ethics, Computer Ethics, Cyber Crimes, Ethical Living, Concept of Harmony in Life. **(6 Periods)**

Text Books:

Govindarajan M., Natarajan S. and Senthil Kumar V.S., Engineering Ethics, Prentice Hall of India, (PHI) Delhi, 2004.
Subramaniam R., Professional Ethics, Oxford University Press, New Delhi, 2013.

References:

Charles D, Fleddermann, "Engineering Ethics", Pearson/PHI, New Jersey, 2004 (Indian Reprint).

For the branches of
(Civil, Chemical, CSE, Information Technology)

ENG 1206 : PROFESSIONAL ETHICS & MORAL VALUES
MODEL QUESTION PAPER

Exam   : 3 Hrs.   **Max. Marks : 70**

Question No.1 is compulsory.
Answer any FOUR from the remaining
All questions carry equal marks.

1. Write short answers for the following:
   (a) Ethical Vision
   (b) Profession and Professionalism
   (c) Environmental Ethics
   (d) Bhopal Gas Tragedy
   (e) Gender discrimination
   (f) Cyber Crimes
   (g) Engineers as Managers

2. Discuss the scope and aim of Engineering Ethics.

3. Explain the role of Engineers in promoting ethical climate.

4. What are Values? Explain in detail the classification of human values.

5. Elucidate the moral responsibility of engineers towards safety and risk.

6. Define the concept of globalization and explain the role of MNCs in our country.

7. What are the functions of various sample codes of ethics?

8. Discuss the need to focus on professional ethics.

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For the branches of
(Civil, Chemical, CSE, Information Technology)

ENG 1209: PHYSICS LAB

Theory	: 0 Periods	**Sessionals**	: 50
Lab Hrs	: 3 Period	**Ext. Marks**	: 50
Exam	: 3 Hrs.	**Credits**	: 2

List of Experiments

1. Melde's Experiment – Determination of frequency of an electrically maintained turing fork.
2. Newton's Rings – Determination of Radius of Curvature of a Convex Lens
3. Diffracting Grating – Determination of wavelengths of lines of mercury spectrum using spectrometer.
4. Determination of Cauchy's constants using Spectrometer and mercury light.
5. Wedge Method – Determination of thickness of paper by forming parallel interface fringes.
6. Determination of refractive index of Ordinary (μ_0) and Extraordinary (μ_e) rays
7. Variation of Magnetic field along the axis of current carrying circular coil Stewart and Gee's apparatus.
8. Carey Foster's bridge a) laws of resistance b) temperature coefficient of resistance.
9. Lee's Method – Determination of coefficient of thermal conductivity of a abad conductor.
10. Determination of Magnetic Moment and Horizontal (M & H) component of Earth's Magnetic field.
11. Calibration of voltmeter using potentiometer.
12. Calibration of low range Ammeter using potentiometer.
13. Determination of band gap of semi conductor.
14. Laser – Diffraction
15. Hall Effect - a) Determination of Hall Coefficient b) Determination of change density.

Physics Lab will not have a
Model Question Paper

ENG 1211: WORKSHOP

Theory	: 0 Periods		**Sessionals**	: 50
Lab Hrs	: 3 Period		**Ext. Marks**	: 50
Exam	: 3 Hrs.		**Credits**	: 2

Carpentry:
Bench Work, tools used in carpentry.
Jobs for Class work – half lap joint, mortise and tenon joint, half – lap dovetail joint, corner dovetail joint, central bridle joint.

Sheet Metal:
Tools used in sheet metal work, Laying development of the sheet metal jobs, soldering.
Jobs for class works – Square tray, taper tray(sides), funnel, elbow pipe joint, 60^0 pipe joint.

Fitting:
Tools used in fitting work, Different files, chisels, hammers and bech vice.
Jobs for class work – Square, hexagon, rectangular fit, circular fit and triangular fit.

Reference
Elements of workshop technology, Vol.1 by S. K. and H. K. Choudary.

Workshop will not have a
Model Question Paper

ENG 1213: ENGLISH LANGUAGE LAB

Lab Hrs	: 3	**Sessionals**	: 50
Tutorial	: 0 Period	**Ext. Marks**	: 50
Exam	: 3 Hrs.	**Credits**	: 2

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

SYLLABUS:

1. English Sound Pattern – Letters
2. Sounds of English
3. Pronunciation
4. Stress and Intonation.

OBJECTIVES:

- To make students recognize the sounds of English through Audio-Visual aids.
- To help students build their confidence and help overcome their inhibitions and self consciousness while speaking in English. *The focus shall be on fluency.*
- To familiarize the students with stress and intonation and enable them to speak English effectively.

LEARNING OUTCOMES:

- Students will be sensitized towards recognition of English sound pattern.
- The fluency in speech will be enhanced.

Prescribed Text Book:
Speak Well, Board of Editors, Orient Black Swan Publishers, Hyderabad, 2012.

Speak Well, the print as well as audio materials, is learner friendly and suitable for use in a multimedia language laboratory. These materials are developed to facilitate practice in improving the intelligibility and communication skills in English, for technical, students at the undergraduate level.

The materials mainly aim at self study, monitory by a teacher whenever essential. The teacher intervention is kept to a minimum, only to give a right direction to the learners.

Communication in any language depends on clarity of speech. This is true of English too. Articulation of the sounds, and pronunciation of sounds from the basis of intelligibility. The few units focus on bringing home the importance of this aspect with copious examples and opportunities for practice. Models of standard pronunciation are given. Explanations are kept short and simple. The IPA symbols, presenting the sound system in English, used in this are the

same as in standard English dictionaries. These symbols are to be used at the recognition level to facilitate the learners' use of dictionary for pronunciation. Problem areas are pointed out and, where necessary, deviation in the pronunciation of the Indian speakers of English are brought to the notice of the learners.

The units called 'Interactions' pay attention to the natural conversational skills in different contexts with focus on various functions of the language. Model conversations are provided as samples. Notes on appropriate expressions used in different situations' drawn the learners, attention the use of language in context. Exercises and activities reinforce the functions introduced.

Unit-1: Letters and Sounds
      Worksheet-1
Unit-2: Interactions-1
      Worksheet-2
Unit-3: The Sounds of English
      Worksheet-3
Unit-4: Interactions-2
      Worksheet-4
Unit-5: Pronouncing Words-Some important patterns
      Worksheet-5
Unit-6: Interactions-3
      Worksheet-2
Unit-7: Stress and Intonation
      Worksheet-2

Reference Books:
1. Cambridge English Pronouncing Dictionary, Cambridge University Press, India, 2012.
2. A Textbook of English phonetics for Indian students by T. Balasubramanian, Macmillan publisher, 1981.

DISTRIBUTION AND WEIGHTAGE OF MARKS:

1. The practical examination for the English language lab shall be conducted as per the university norms prescribed for the core engineering practical sessions.
2. For the language lab sessions, there shall be a continuous evaluation during the sesmester for 50 sessional marks and 50 semester end examination marks.
3. For the 50 sessional marks, 20 marks shall be awarded for day-to-day performance, 10 marks to be awarded by conducting internal lab test(s), and 20 marks for worksheets attached to the lab manual.
4. For the 50 semester end (external) marks, 30 marks shall be awarded for written examination (dialogues, the sounds of English and the stress) and 20 marks for external examiner viva-voce, tested by way of reading a passage or a conversation.

NOTE: The external lab shall be conducted by the teacher concerned with the help of another English faculty of affiliated colleges of the university/other institutions.

English Language Lab will not have a
Model Question Paper

GROUP – A
For the branches of
(Civil, Chemical, CSE, Information Technology)

ENG 1214: SPORTS/NCC/NSS

Contact Hrs. : 3 Hrs.   **Credits   : 2**

It is only an audit course and the credits are given based on the attendance. Every student should have   a minimum of 75% attendance and as per university rules. Every student should choose either sports or NCC or NSS at the starting of the semester and pursue the same in that semester.

Sports/NCC/NSS will not have a
Model Question Paper

Group – B
For the branches of
(EEE, ECE, Mechanical, Marine, Metallurgy, Geo-Informatics, Instrumentation Technology)

ENG 1203: CHEMISTRY

Theory	: 3 Periods		**Sessionals**	: 30
Tutorial	: 1 Period		**Ext. Marks**	: 70
Exam	: 3 Hrs.		**Credits**	: 4

Chapter – 1: Water Chemistry
Sources of Water – Impurities and their influence of living systems – WHO Limits – Hardness and its Determination – Boiler Troubles and their removal – Water Softening Methods – Lime-Soda, Zeolite and Ion Exchange - Municipal Water Treatment-Break Point Chlorination – Desalination of Sea Water – Reverse Osmosis Method, Electrodialysis.

Chapter – 2: Solid State Chemistry
Solids: Classification of Solids – Types of Crystals – Fundamental Laws of Crystal Structure – X-Rays and Bragg's Law – Imperfections in Crystals – Band Theory of Solids – Chemistry of Semiconductors – Intrinsic, Extrinsic, Compund and Defects – Organic Semi conductors – Super Conductivity – Purification of Solids by Zone refining – Single Crystal Growth – Epitaxial Growth – Liquid Crystals.

Chapter – 3: Polymers and Plastics
Polymers: Definition – Types of Polymerization (Addition & Condensation) – Mechanisms of Polymerization – Radical and Ionic – Thermodynamics of Polymerization Process.
Plastics: Thermosetting and Thermoplastics – Effect of Polymer Structure on Properties of Cellulose Derivatives – Vinyl Resins – Nylon (6,6), Reinforced Plastics – Conducting Polymers.

Chapter – 4: Corrosion
Corrosion: Origin and Theory – Types of Corrosion: Chemical and Electrochemical; Pitting, Inter granular, Waterline, Stress – Galvanic Series – Factors Effecting Corrosion.
Corrosion Controlling Methods: Protective Coatings: Metallic Coatings, Electroplating and Electroless Plating – Chemical conversion Coatings – Phosphate, Chromate, Anodized, Organic Coatings – Paints and Special Paints.

Chapter – 5: Building Materials
Portland Cement: Manufacture of Cement – Dry and Wet Process – Chemical Composition of Cement – Setting and Hardening of Cement – Cement Concrete – R.C.C. – Decay of Concrete and Protective Measures – Special Cements.
Refractories: Classification – Properties – Engineering Applications
Ceramics: Classification – Properties – Engineering Applications

Chapter – 6: Fuels and Lubricants
Solid Fuels: Wood and Coal, Ranking of Coal – Analysis (Proximate and Ultimate) Coke Manufacture – Otto Huffmann's Process – Applications.
Liquid Fuels: Petroleum Refining – Motor Fuels – Petrol and Diesel Oil – Knocking – Octane number – Cetane Number.
Gaseous Fuels: Biogas, LPG and CNG – Characteristics – Applications.
Rocket Fuels: Propellants – Classification – Characteristics

Lubricants: Classification – Mechanism – Properties of Lubricating Oils – Selection of Lubricants for Engineering Applications.

Reference Books:
Engineering Chemistry – PC Jain and M. Jain – Dhanpath Rai and Sons, New Delhi.
A Text book of Engineering Chemistry – S. S. Dara – S. Chand & Co. New Delhi.
Engineering Chemistry – B. K. Sharma – Krishna Prakashan – Meerut.

Group – B
For the branches of
(EEE, ECE, Mechanical, Marine, Metallurgy, Geo-Informatics, Instrumentation Technology)

ENG 1203: CHEMISTRY
MODEL QUESTION PAPER

Exam : 3 Hrs.	Ext. Marks : 70

Answer Question No.1 and Any Other Four Questions.
Each Question Carries 14 Marks (5 x 14 = 70)

16. Write a short note for each of the following   (7 x 2 = 14)
    a) Hardness of water and its removal.
    b) Schottkey defect
    c) Preparation of Nylon 6, 6
    d) Pitting corrosion
    e) Role of gypsum in cement.
    f) Compare LPG and CNG
    g) Liquid Propellants

17. a) Mention boiler troubles and their removal by internal treatment.   6 M
    b) Explain lime-soda process.   4 M
    c) Explain electro dialysis with a neat sketch   4 M

18. a) Explain various imperfections in crystals   6 M
    b) Explain intrinsic and extrinsic semi conductors   4 M
    c) What is zone refining of solids?   4 M

4. a) Briefly explain the mechanisms of addition polymerization   6 M
    b) Differentiate thermosetting and thermoplastic polymers   4 M
    c) Explain the nature of conduction in conducting polymers   4 M

5. a) Explain the mechanism involved in electro chemical corrosion   6 M
    b) Explain any four factors effecting corrosion   4 M
    c) Explain metallic coatings for control of corrosion   4 M

6. a) Explain the wet process of manufacture of cement with a neat sketch and give the final
       composition.   6 M
    b) Explain any four properties and applications of refractories.   4 M
    c) Give the classification of ceramics with examples.   4 M

7. a) Explaining refining of petroleum with a neat sketch and the characteristics of the
       products.   6 M
    b) Explain the manufacture of coke by Otto Hoffmann's process   4 M
    c) Explain any four properties of lubricating oils.   4 M

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ENG 1205: COMPUTER PROGRAMMING USING C & NUMERICAL METHODS

Theory	: 3 Periods	Sessionals	: 30
Tutorial	: 1 Period	Ext. Marks	: 70
Exam	: 3 Hrs.	Credits	: 4

Introduction To C: Basic structure of C program, Constants, Variables and data types, Operators and Expressions, Arithmetic Precedence and associativity, Type Conversions. Managing Input and Output Operations, Formatted Input, Formatted Output.

Decision Making, Branching, Looping ,Arrays & Strings: Decision making with if statement, Simple if statement, The if…else statement, Nesting of if…else statement, the else..if ladder, switch statement, the (?:) operator, the GOTO statement., The while statement, the do statement, The for statement, Jumps in Loops ,One, Two-dimensional Arrays, Character Arrays. Declaration and initialization of Strings, reading and writing of strings, String handling functions, Table of strings.

Functions: Definition of Functions, Return Values and their Types, Function Calls, Function Declaration, Category of Functions: No Arguments and no Return Values, Arguments but no Return Values, Arguments with Return Values, No Argument but Returns a Value, Functions that Return Multiple Values. Nesting of functions, recursion, passing arrays to functions, passing strings to functions, The scope, visibility and lifetime of variables.   .

Pointers: Accessing the address of a variable, declaring pointer variables, initializing of pointer variables, accessing variables using pointers, chain of pointers, pointer expressions, pointers and arrays, pointers and character strings, array of pointes, pointers as function arguments, functions returning pointers, pointers to functions, pointers to structures-Program Applications

Structure and Unions: Defining a structure, declaring structure variables, accessing structure members, structure initialization, copying and comparing structure variables, arrays of structures, arrays within structures, structures within structures, structures and functions and unions, size of structures and bit-fields- Program applications.

File handling: Defining and opening a file, closing a file, Input/ Output operations on files, Error handling during I/O operations, random access to files and Command Line Arguments- Program Applications.

NumericalMethods:Solutions of Algebraic and Transcendental Equations: Bisection Method, Newton Raphson Method.**Interpolation:** Newton's forward and backward Interpolation, Lagrange's Interpolation in unequal intervals.

Numerical Integration: Trapezoidalrule, Simpson's 1/3 rule.**Solutions of Ordinary First Order Differential Equations:** Euler's Method, Modified Euler's Method and Runge-Kutta Method.

Text Books:
Programming in ANSI C, E Balagurusamy, 6th Edition. McGraw Hill Education (India) Private Limited.
Introduction to Numerical Methods, SS Sastry, Prentice Hall.

Reference Books:

Let Us C , Yashwant Kanetkar, BPB Publications, 5th Edition.
Computer Science, A structured programming approach using C", B.A.Forouzan and R.F.Gilberg, " 3rd Edition, Thomson, 2007.
The C –Programming Language' B.W. Kernighan, Dennis M. Ritchie, PHI
Scientific Programming: C-Language, Algorithms and Models in Science, Luciano M. Barone (Author), Enzo Marinari (Author), Giovanni Organtini, World Scientific

For the branches of
(EEE, ECE, Mechanical, Marine, Metallurgy, Geo-Informatics, Instrumentation Technology)

ENG 1205: COMPUTER PROGRAMMING USING C & NUMERICAL METHODS
MODEL QUESTION PAPER

Exam   : 3 Hrs.   **Ext. Marks   : 70**

Answer any FIVE questions.
First Question is compulsory.
Answer any FOUR from the remaining questions.
All questions carry equal marks.

1 a) Write the precedence rules for arithmetic operators and give example.
  b) What is keyword? Write any five keywords and explain them.
  c) What are the advantages of functions?
  d) Distinguish between local and global variables.
  e) What is meant by structure within structure? Explain briefly.
  f) Explain Bisection method.
2 a) Write the general forms of if-else and switch –case statements and compare them.
  b) Write a program to compute roots of quadratic equation using switch-case statement.
3 a) What are loops? Explain various loop statements with suitable example.
  b) Write a C program to find the sum of digits in a given number.
4 a) Explain the following concepts associated with functions:
    i) Function declaration
    ii) Function definition and
    iii) Function call.
  b) Explain various parameter passing mechanisms.
5 a) What is a Pointer? How is it initialized? What is the function of a pointer variable? What are its uses?
  b) Explain the concept of pointers to structures with suitable example.
6 a) Explain the following
    i) Structure
    ii) Accessing elements in structure
    iii) Arrays of structures
  b) Write a program to process employee records by using structures.
7 a) Briefly explain file handling functions.
  b) Write a C program to copy the contents of one file to another file.
8 a) Find the root of the following equation using Newton-Raphson method, correct the result upto 3 decimal places.
            $x^3 - 3x - 5 = 0$.
  b) Evaluate
                  $$\int_{-2}^{2} x \sin(x) \, dx \text{ using Simpson's rule.}$$

ENG 1207 HISTORY OF SCIENCE & TECHNOLOGY

Theory	**: 2 Periods**	**Sessionals**	**: 30**
Tutorial	**: 0 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 2**

Objectives of the Course:

➢ To know the contributions of the scientists for the development of society over a period of time.
➢ To understand the Science and Technological developments that lead to human welfare.
➢ To appreciate the Science and Technological contributions for the development of various sectors of the country.
➢ To identify the technical transfer versus economic progress of the countries.

Learning Outcome: By the end of this course the students should be able to understand the contribution of Scientific and Technological developments for the benefit of the society at large.

Unit – I
Historical Perspective of Science and Technology:
Nature and Definitions; Roots of Science – In Ancient Period and Modern Period (during the British Period); Science and Society; Role of Scientists in the Society. **(6 Periods)**

Unit – II
Policies and Plans After Independence:
Science and Technology Policy Resolutions; New Technology Fund; Technology Development (TIFAC); Programs aimed at Technological Self Reliance; Activities of Council of Scientific and Industrial Research. **(6 Periods)**

Unit – III
Science and Technological Developments in Critical Areas:
Space – The Indian Space Program: India's Geostationary Satellite Services – INSAT System and INSAT Services; **Defense Research and Technology –** Research Coordination, Research efforts and Development of Technologies and Spin-off Technologies for civilian use; **Nuclear Energy –** Effects of a nuclear explosion and India's safety measures. **(6 Periods)**

Unit – IV
Impact of Science and Technology in Major Areas:
Ocean Development: Objective of Ocean Development, Biological Mineral Resources, Marine Research and Capacity Building; **Biotechnology:** Meaning, Biotechnology Techniques-Bioreactors, Cell Fusion, Cell or Tissue Culture, DNA Finger Printing, Cloning, Artificial Insemination and Embryo Transfer Technology and Stem Cell Technology; Application of Biotechnology – Medicine, Biocatalysts, Food Biotechnology, Fuel and Fodder and Development of Biosensors. **(6 Periods)**

Technology Transfer and Development:

Transfer of Technology – Types, Methods, Mechanisms, Process, Channels and Techniques

Appropriate Technology – Criteria and Selection of an Appropriate Technology; Barriers of Technological Change.   **(6 Periods)**

Text Books:

Kalpanma, **Science and Technology in India,** Published and Distributed by Spectrum Books (P) Ltd., New Delhi-58.

Srinivasan M., **Management of Science and Technology (Problems and Prospects),** East – West Press (P) Ltd., New Delhi.

Group – B
For the branches of
(EEE, ECE, Mechanical, Marine, Metallurgy, Geo-Informatics, Instrumentation Technology)

ENG 1207: HISTORY OF SCIENCE & TECHNOLOGY
MODEL QUESTION PAPER

Exam   : 3 Hrs.   **Ext. Marks   : 70**

Answer Question No.**1** compulsorily and
any **Four** questions from remaining.
All questions carry equal marks.
All parts of a question must be answered at one place only.

1. **Write short answers for the following.**
   a) Explain the terms Science and Technology.
   b) Describe the role of Scientist in the society.
   c) Science and Technology Policy resolutions.
   d) Defense Spin-offs.
   e) Biosensors.
   f) Barriers of Technological change.
   g) Types of Technology transfer.

2. Describe the roots of science and technology in ancient period in India.

3. Explain the salient features of new technology fund and programs aimed at technological self reliance.

4. Describe the achievements of Council of Scientific and Industrial Research.

5. Explain the salient features of Space program and INSAT services.

6. Explain the importance of Nuclear energy and describe the nuclear explosion and India's safety measures.

7. Describe the importance of Ocean development and explain the marine research and capacity building.

8. What is Appropriate technology? Explain the criteria for selection of an appropriate technology.

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ENG 1210: CHEMISTRY LAB

Lab Hrs	: 2		**Sessionals**	: 50
Tutorial	: 0 Period		**Ext. Marks**	: 50
Exam	: 3 Hrs.		**Credits**	: 2

1. Determination of Sodium Hydroxide with HCl (Na_2CO_3 Primary Standard)
2. Determination of Fe(II)/Mohr's Salt by Permanganometry
3. Determination of Oxalic Acid by Permanganometry
4. Determination of Hardness of Water sample by EDTA method
5. Determination of Calcium in Portland Cement by Permanganometry
6. Determination of Chromium (VI) by Mohr's Salt Solution
7. Determination of Zinc by EDTA method
8. Determination of Alkalinity (Carbonate and Hydroxide) of water sample-(Demonstration)
9. Determination of Strength of the given HCl solution by titrating against NaOH using a pH meter-(Demonstration)
10. Determination of Copper (II) by Iodometric Titration (Demonstration)

Reference Books:
Vogel's Quantitative Chemical Analysis – V – Edition – Longman
Experiments in Applied Chemistry (For Engineering Students) – Sinita Rattan – S. K. Kataria & Sons, New Delhi.

Chemistry Lab will not have a
Model Question Paper

ENG 1212: COMPUTER PROGRAMMING AND NUMERICAL METHODS LAB

Lab Hrs	**: 2**	**Sessionals**	**: 50**
Tutorial	**: 0 Period**	**Ext. Marks**	**: 50**
Exam	**: 3 Hrs.**	**Credits**	**: 2**

1. Write a program to read x, y coordinates of 3 points and then calculate the area of a triangle formed by them and print the coordinates of the three points and the area of the triangle. What will be the output from your program if the three given points are in a straight line.
2. Write a program which generates 100 random numbers in the range of 1 to 100. Store them in an array and then print the array. Write 3 versions of the program using different loop constructs (eg. for, while and do-while).
3. Write a set of string manipulation functions eg. for getting a sub-string from a given position, copying one string to another, reversing a string and adding one string to another.
4. Write a program which determines the largest and the smallest number that can be stroed in different data types like short, int, long, float and double. What happens when you add 1 to the largest possible integer number that can be stored?
5. Write a program which generates 100 random real numbers in the range of 10.0 to 20.0 and sort them in descending order.
6. Write a function for transporting a square matrix in place (in place means that your are not allowed to have full temporary matrix).
7. First use an editor to create a file with some integer numbers. Now write a program, which reads these numbers and determines their mean and standard deviation.
8. Implement bisection method to find the square root of a given number to a given accuracy.
9. Implement Newton Raphson Method to determine a root of polynomial equation.
10. Given a table o x and corresponding f(x) values, write a program which will determine f(x) value at an intermediate x value using Lagrange's Interpolation.
11. Write a function which will invert a matrix.
12. Implement Simpson's 1/3rd rule for numerical integration.
13. Implement Trapezoidal rule for numerical integration.
14. Write a program to solve a set of linear algebraic equations.
15. Write a program to solve a differential equation using Runge-Kutta Method.

Computer Programming and Numerical
Methods Lab will not have a
Model Question Paper

ENG 1213: ENGLISH LANGUAGE LAB

Lab Hrs	: 3		**Sessionals**	: 50
Tutorial	: 0 Period		**Ext. Marks**	: 50
Exam	: 3 Hrs.		**Credits**	: 2

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

SYLLABUS:

5. English Sound Pattern – Letters
6. Sounds of English
7. Pronunciation
8. Stress and Intonation.

OBJECTIVES:

- To make students recognize the sounds of English through Audio-Visual aids.
- To help students build their confidence and help overcome their inhibitions and self consciousness while speaking in English. *The focus shall be on fluency.*
- To familiarize the students with stress and intonation and enable them to speak English effectively.

LEARNING OUTCOMES:

- Students will be sensitized towards recognition of English sound pattern.
- The fluency in speech will be enhanced.

Prescribed Text Book:
Speak Well, Board of Editors, Orient Black Swan Publishers, Hyderabad, 2012.

Speak Well, the print as well as audio materials, is learner friendly and suitable for use in a multimedia language laboratory. These materials are developed to facilitate practice in improving the intelligibility and communication skills in English, for technical, students at the undergraduate level.

The materials mainly aim at self study, monitory by a teacher whenever essential. The teacher intervention is kept to a minimum, only to give a right direction to the learners.

Communication in any language depends on clarity of speech. This is true of English too. Articulation of the sounds, and pronunciation of sounds from the basis of intelligibility. The few units focus on bringing home the importance of this aspect with copious examples and opportunities for practice. Models of standard pronunciation are given. Explanations are kept short and simple. The IPA symbols, presenting the sound system in English, used in this are the

same as in standard English dictionaries. These symbols are to be used at the recognition level to facilitate the learners' use of dictionary for pronunciation. Problem areas are pointed out and, where necessary, deviation in the pronunciation of the Indian speakers of English are brought to the notice of the learners.

The units called 'Interactions' pay attention to the natural conversational skills in different contexts with focus on various functions of the language. Model conversations are provided as samples. Notes on appropriate expressions used in different situations' drawn the learners, attention the use of language in context. Exercises and activities reinforce the functions introduced.

Unit-1: Letters and Sounds
     Worksheet-1
Unit-2: Interactions-1
     Worksheet-2
Unit-3: The Sounds of English
     Worksheet-3
Unit-4: Interactions-2
     Worksheet-4
Unit-5: Pronouncing Words-Some important patterns
     Worksheet-5
Unit-6: Interactions-3
     Worksheet-2
Unit-7: Stress and Intonation
     Worksheet-2

Reference Books:
3. Cambridge English Pronouncing Dictionary, Cambridge University Press, India, 2012.
4. A Textbook of English phonetics for Indian students by T. Balasubramanian, Macmillan publisher, 1981.

DISTRIBUTION AND WEIGHTAGE OF MARKS:

5. The practical examination for the English language lab shall be conducted as per the university norms prescribed for the core engineering practical sessions.
6. For the language lab sessions, there shall be a continuous evaluation during the sesmester for 50 sessional marks and 50 semester end examination marks.
7. For the 50 sessional marks, 20 marks shall be awarded for day-to-day performance, 10 marks to be awarded by conducting internal lab test(s), and 20 marks for worksheets attached to the lab manual.
8. For the 50 semester end (external) marks, 30 marks shall be awarded for written examination (dialogues, the sounds of English and the stress) and 20 marks for external examiner viva-voce, tested by way of reading a passage or a conversation.

NOTE: The external lab shall be conducted by the teacher concerned with the help of another English faculty of affiliated colleges of the university/other institutions.

English Language Lab will not have a
Model Question Paper

ENG 1214: SPORTS/NCC/NSS

Contact Hrs. : 3 Hrs.   **Credits   : 2**

It is only an audit course and the credits are given based on the attendance. Every student should have   a minimum of 75% attendance and as per university rules. Every student should choose either sports or NCC or NSS at the starting of the semester and pursue the same in that semester.

Sports/NCC/NSS Activity will not have a
Model Question Paper

Department Subjects

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Group – A
For the branch of Civil Engineering

CIV 1208: ENGINEERING GEOLOGY

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Theory	: 2 Periods	**Sessionals**	: 30
Lab Hrs	: 3 Period	**Ext. Marks**	: 70
Exam	: 3 Hrs.	**Credits**	: 4

General Geology: Importance of geology from civil engineering point of view. Branches of geology. Weathering and soils: Soil profile, Erosion and soil formation, types of Indian soils. Land forms produced by, running water, and glaciers. Land forms produced by wind, sea waves and currents. Ground water: origin, groundwater table, porosity and permeability. Aquifers and groundwater moment and water bearing properties of rocks.

<div align="center">

Petrology & Minorlorgy

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Petrology: Definition of rock and rock formation. Rocks- classification, Structure, texture and mineralogical composition. Types of rocks-Ingenious rocks: Granite, synite, dolerite, gabro, diorite, basalt. Sedimentary rocks, dykes and sills: Breccia, conglomerate, Sandstone, Shale, limestone. Metamorphic rocks: Gneiss, khondalite, schist, slate, marble, quartzite, charnokite. Engineering properties of rocks. Weathering of rocks.

Mineralogy: physical properties: form, color, luster, cleavage, fracture, hardness and specific gravity. Study of important rock forming minerals: Silicate sturcutres, Quartz, feldspars, pyroxenes, amphiboles, micas and clays.

<div align="center">

Statigraphy & Structural geology

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Statigraphy: Time scale, Major geological formations of India. Achaeans, Cuddapahs, Vindyans, Gondwanas and Deccan Traps. Mineral resources of Andhra Pradesh.

Structural geology: Elements of structural geology- Strike, dip, plunge. Clinometer compass and Brunton Compass. Classification of folds, faults and joints. Geological methods of Investigations: Geological formations, preparation of geological maps, structural features and groundwater parameters. Natural Hazards: Earthquakes origin and distribution. Volcanoes, Landslides and mass moment. Tsunamis.

<div align="center">

Remote sensing and Geophysical methods

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Remote sensing: Introduction, electromagnetic spectrum, aerial photo, types of aerial photos and flight planning. Aerial mosaics. Elements of photo interpretation. Satellite remote sensing. Satellites, sensors and data products. Principles of GIS. RS and GIS applications to Civil Engineering -Town planning, dams and reservoirs, linear structures and environmental monitoring.

Geophysical methods: principles of geophysical methods, electrical, Seismic, Gravity and magnetic. Principle of Resistivity method and configurations. Applications of Resistivity method in prediction of soil profile, hard rock and ground water table. Principles of Seismic refraction and reflections methods and their applications to Civil Engineering problems. Geological applications to Civil Engineering Structures**.**

Role of engineering geologist in planning, design and construction stages in Civil Engineering works. Geological investigations for dams and reservoirs. Geological investigations for bridges and Multi-storied structures. Geological investigations for highways, air fields and railway lines. Geological investigations for tunnels and coastal structures(Seawalls, groins an bulkheads). Environmental geology.

References:

1. Principles of Engineering Geology by KVGK Gokhale. B.s.Publications-2005
2. Engineering Geology by N.Chennakesavulu, Mc-Millan, India Ltd. 2005
3. A. txt book of Gelogy – Mukherjee.
4. Engineering and general geology by Parbin Singh – Katson Publishing house
5. Fundamentals of Remote sensing by George Josesph. University Press (India) Private limited.
6. Engineering Geology by K.M.Bangaru

Group – A
For the branch of Civil Engineering

CIV 1208: ENGINEERING GEOLOGY

Exam : 3 Hrs.	Max. Marks : 70

Answer any FIVE Questions
All Questions carry equal marks.

1. Answer the following
   a. Describe and draw neat sketch of soil profile
   b. Write any three erosion and depositional features of river.
   c. Write the difference between rock and mineral and give examples
   d. Write about geological time scale
   e. Write about pressure tunnel and draw neat sketch.
2. Explain different physical properties of minerals and give example. Write its importance in Civil Engineering studies.
3. Write about folds and explain different types of folds with neat diagrams and explain how it is a dangerous terrain for constructions.
4. Write about aerial photography and remote sensing and explain how this technique is an advantage in route alignment for the construction of roads and railway lines.
5. Explain the following
   a. Electromagnetic spectrum
   b. Confined and unconfined aquifers
   c. Schlumberger array of electrical resistivity technique
6. Describe the role and functions of an Engineering Geologist in planning, designing, constructions and post constructions in Civil Engineering works.
7. Write about Dams and explain different geological investigations required for safe and sound area for dams and reservoirs.
8. Write any three of the following
   a. Permeability
   b. Granite
   c. Seismic reflection method
   d. Draw traffic tunnel and label its parts
9. Write about electrical resistivity method and explain its importance in Civil Engineering studies.
10. Write any three of the following
    a. Ritchter Scale
    b. Mass movement and Landslides
    c. Aquifer and Aquifuge
    d. Engineering properties of rocks.

CSE 1208: PROBABILITY, STATISTICS AND QUEING THEORY

Theory	**: 2 Periods**	**Sessionals**	**: 30**
Lab Hrs	**: 3 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 4**

Course Objectives:

1) To discuss basics of probability and related theorems , Problems. To study about conditional probability and Bayes theorem.

2) To study about random variables and their properties. To examine , analyze and compare Probability distributions.

3) To discuss regression and estimation techniques.

4) To discuss various types of tests such as F-test, Chi-square test. To study the various queuing models.

Course Outcomes:

At the end of the course student will be able to

1) ability to solve various problems regarding probability and conditional probability.

2) Examine , analyze and compare probability distributions.

3) Prepare null and alternative hypothesis and test its validity based on random sample.

4) ability to solve various types of regression problems.

5) Ability to understand various queuing models.

1. **Probability:** Definitions of Probability, Addition Theorem, Conditional Probability, Multiplication Theorem, Bayes' Theorem of Probability and Geometric Probability.

2. **Random Variables and their Properties:** Discrete Random Variable, Continuous Random
   Variable, Probability Distribution, Joint Probability Distributions Their Properties, Transformation Variables, Mathematical Expectations, Probability Generating Functions.

3. **Probability Distributions:** Discrete Distributions: Binomial, Poisson Negative Binominal Distributions and their Properties; Continuous Distributions : Uniform, Normal, Exponential Distributions and their Properties.

4. **Multivariate Analysis and Curve Fitting**: Correlation, Correlation Coefficient, Rank Correlation, Regression Analysis, Multiple Regression, Principles of Least Squares and Curve Fitting

5. **Estimation and testing of hypothesis**: Sample, Populations, Statistic, Parameter, Sampling Distribution, Standard Error, Un-Biasedness, Efficiency, Maximum Likelihood Estimator, Notion & Interval Estimation.

6. **Sample Tests:** Large Sample Tests Based on Normal Distribution , Small Sample Tests : Testing Equality of Means, Testing Equality of Variances, Test of Correlation Coefficient, Test
for Regression Coefficient; Coefficient of Association, ^{2} – Test for Goodness of Fit, Test for Independence.

7. **Queuing Theory** : Queue Description, Characteristics of a Queuing Model, Study State Solutions of M/M/1: Model, M/M/1 ; N Model, M/M/C: Model, Case Studies

Text Books :

1. Probability & Statistics for Engineers and Scientists,Walpole, Myers, Myers, Ye. Pearson Education.
2. Probability, Statistics and Random Processes T.Veerarajan Tata McGraw – Hill

Reference Books:

1. Probability & Statistics with Reliability, Queuing and Computer Applications, Kishor S. Triv edi, Prentice Hall of India ,1999

Group – A
For the branch of Computer Science & Systems Engineering
(Common with IT)

CSE 1208: PROBABILITY, STATISTICS AND QUEING THEORY

Exam	**: 3 Hrs.**	**Max. Marks : 70**

Answer any FIVE Questions
All Questions carry equal marks.

EEE 1208: ENGINEERING MECHANICS & STRENGTH OF MATERIALS

Theory	: 2 Periods	**Sessionals**	: 30
Lab Hrs	: 3 Period	**Ext. Marks**	: 70
Exam	: 3 Hrs.	**Credits**	: 4

ENGINEERING MECHANICS

STATICS:

Forces in Plane: Concurrent and Parallel Forces in a plane and their equilibrium, General case of forces in a plane, Plane Trusses.

Centroids: Centroids of composite plane figures.

Moment of Inertia (M.I.): M.I. of plane figures, parallel axes theorem, Polar moment of Inertia, concept of mass moment of inertia.

DYNAMICS:

Rectilinear Translation: kinematics, principle of dynamics, motion of particle under constant force, force proportional to displacement and free vibrations (shm), D-Alembert's principle, Work-Energy principle, Impulse-Momentum principle.

Rotation of a Rigid Body about a Fixed Axis: kinematics, equation of motion of a rigid body about a fixed axis, rotation under constant moment, Torsional vibration.

STRENGTH OF MATERIALS

Stress and Strains: Simple Stresses and Strains, stresses on incline plane, 2-dimensional stress systems, principal stress and principal planes.

Shear Force and Bending Moment Diagrams: Types of loads, Types of Supports, Shear force and Bending moment diagrams for cantilever and simply supported beams under concentrated loads and under uniformly distributed loads.

Bending Stresses in Beams: Flexure formula, Bending stresses in the above types of beams with rectangular and circular sections.

Torsions of Circular Shafts: Torsion equation, determination of shear stresses.

Textbooks:

1. Engineering Mechanics by Timo Shenko & Young (relevant sections only)
2. Elements of strength of materials by S. Timo Shanko (relevant sections only)

EEE 1208: ENGINEERING MECHANICS & STRENGTH OF MATERIALS
MODEL QUESTION PAPER

Exam   : 3 Hrs.   Max. Marks : 70

Question No. 1 is compulsory.
Answer any FOUR from the remaining questions.
All Questions carry equal marks.

1. (a) State Lami's theorem
   (b) Distinguish between concurrent forces and coplanar forces.
   (c) Define the term centroid and centre of gravity.
   (d) State D-Alembert's principle.
   (e) What is the relation between the B.M. and S.F.
   (f) What is the maximum shear stress w.r.t. the mean shear stress for rectangular and circular sections?
   (g) What us pure bending? Give an example.

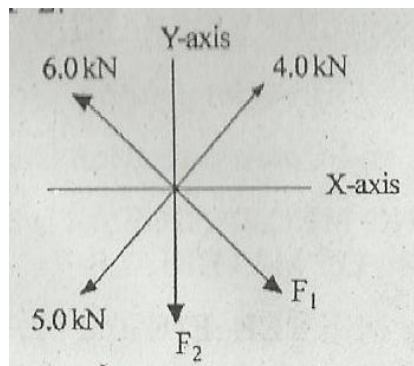2. (a) The forces shown in the figure 1 below are in equilibrium. Determine the forces F1 and F2

Figure 1

   (b) Determine the position of the centre of gravity of the Plane figure 2 shown below
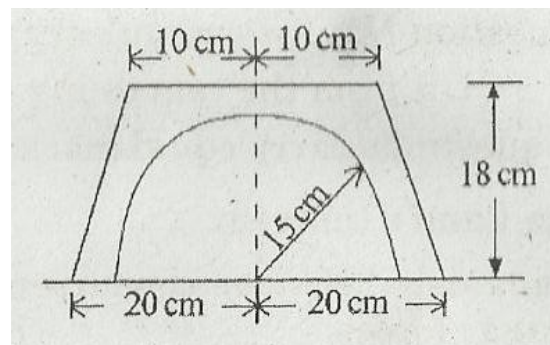

Figure 2

3. Determine the forces in the members of the truss shown in figure 3 below
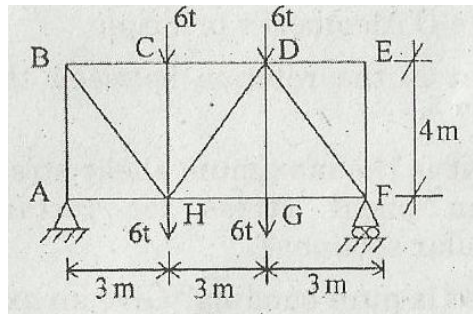
51

Figure 3

4. (a) A body moved on a rough surface horizontally for 2.5 m from rest in 5 seconds. If the coefficient of friction between the body and the surface is 0.45, determine the forces responsible for this movement. Take 250N as the weight of the body.

(b) Show that the path of a projectile is parabola.

5. (a) The displacement 'x' of a particle along a straight line at time 't' follows the law
$$x = x_0(2e^{-kt} - e^{-2kt})$$
where 'x₀' is the initial displacement. Obtain expression for the velocity and acceleration at any time 't'. Find also the maximum velocity of the particle.

(b) Find the angle of banking for a highway curve of 100 m radius designed to accommodate Cars travelling at 140 kmph, if the coefficient of friction between the tire and the road is 0.6. Also determine the lateral forced experienced by another car of weight 10 KN travelling on the same track at constant speed of 75 kmph.

6. (a) Draw a neat sketch and explain salient features of the stress strain diagram of mild steel.

(b) The principal stresses at a point in a bar are 200 N/mm² (tensile) and 100 N/mm² (compressive). Determine the resultant stress in magnitude and the direction on a plane inclined at 60° to the axis of the major principal stress. Also determine the maximum intensity of shear stress in the material at the point.

7. (a) Draw SFD and BMD for a cantilever beam of length 5 m, which carries UDL of intensity 2 kN/m over the entire span and 5 kN/m. Clockwise couple at the free end.

(b) The intensity of loading on a simply supported beam of 5 meters span increases uniformly from 8 kN/m at one end to 16 kN/m at the other end. Find the position and magnitude of the maximum bending moment. Also draw SFD and BMD's

8. (a) Derive torsion formula.

(b) Determine the breadth and depth of a rectangular beam to resist a moment of 20 kN/m. The allowable normal stress is limited to 20 MPa. Breadth to depth ratio is

    (i)   0.5
    (ii)   0.25
    (iii)   1.0

ECE 1208: BASIC ELECTRONICS ENGINEERING

Theory	: 2 Periods		**Sessionals**	: 30
Lab Hrs	: 3 Period		**Ext. Marks**	: 70
Exam	: 3 Hrs.		**Credits**	: 4

1. **Common Electronic materials and properties:**
   Conductors, Insulators, Semi Conductors, Intrinsic, Extrinsic semiconductors, conduction in semiconductors, charge mobility, Fermi Dirac function, Fermi level, charge densities, diffusion current density, drift current density, Hall effect.

2. **Passive Components, Circuit Theorems and Basic meters:**
   Types of passive components, types of resistors, resistor color code, capacitors, concept of charging and discharging, types of capacitances, inductors, mutual inductance, inductance of two coils, KCL, KVL, common meters, CRO.

3. **Fundamentals of diodes and special diodes:**
   Elementary concepts, V-I characteristics and applications of PN junction diode, Varactor diode, Zener diode, LED, Tunnel diode, Photo diode, Schottky diode and PIN diode.

4. **Fundamentals of BJT, FET and MOSFET (Elementary concepts):**
   Transistor construction, Operation of the transistor, transistor configuration, input and output characteristics, applications of transistor in three configurations, comparison of BJT and JFET, JFET construction, operation of FET, JFET characteristics, JFET configurations and applications, concept of MOSFET, types of MOSFETs.

5. **Basic concepts of Power devices and Integrated Circuits (ICs):**
   Construction, applications and features of UJT, SCR, DIAC and TRIAC, introduction to Integrated Circuits, classification of ICs, salient features of OP-AMP, characteristics of an ideal OP-AMP and applications, salient features of 555 timer and applications.

Text Books:

1. Electronic Devices and Circuits by **G.S.N.Raju**, IK International, New Delhi.
Reference Books:
1. Basic Electronics by **Bernard Grob**, 4th edition, International Student edition, MC Graw Hill publishers.
2. Electronic Devices and Circuits by **Sanjeev Guptha**.
3. Electronic Devices and Circuits Theory by **Robert L. Boylestad & Louis Nashelsky**, PHI edition.

Group – B
For the branch of Electronics and Communication Engineering

ECE 1208: BASIC ELECTRONICS ENGINEERING
MODEL QUESTION PAPER

Exam : 3 Hrs.	**Max. Marks : 70**

Question No.1 is Compulsory. Answer any other FOUR Questions
All Questions carry equal marks

1. (a) Write down the types of Capacitances.   (7x2=14)
    (b) Draw the equivalent circuit of Tunnel diode
    (c) How diode can be used as a switch?
    (d) What are the applications of Bipolar junction transistor?
    (e) Define Pinchoff voltage.
    (f) Draw the structural diagram of SCR.
    (g) Write about the classification of IC's.

2. (a) Explain Intrinsic and Extrinsic semiconductors.   (7+7)
    (b) Derive the expressions for Diffusion current density and drift current density.

3. (a) Explain the concept of KCL and KVL with examples.   (7+7)
    (b) Explain the types of resistors and resistor's color code in detail.

4. (a) Explain the VI characteristics and applications of PN junction diode.   (7+7)
    (b) Explain the operation of Zener diode with the help of their VI characteristics and mention its applications.

5. (a) Explain the operation of CB transistor configuration with its input and output characteristics.
    (b) Compare BJT and JFET with respect to their properties.   (7+7)

6. (a) Discuss the ideal characteristics and applications of OP-AMP.   (7+7)
    (b) Explain the construction, operation and application of UJT.

7. (a) Explain the operation of MOSFET with a neat diagram.   (7+7)
    (b) Explain the salient features of 555 timer.

8. Write short notes on the following   (5+5+4)
        (a) Hall effect
        (b) CRO
        (c) PIN diode

MECH 1208: METALLURGY AND MATERIALS ENGINEERING

Theory	: 2 Periods	**Sessionals**	: 30
Lab Hrs	: 3 Period	**Ext. Marks**	: 70
Exam	: 3 Hrs.	**Credits**	: 4

Structure of crystalline solids: Atomic structure & bonding in solids- Crystal structures- calculations of radius, Coordination Number and Atomic Packing Factor for different cubic structures - Imperfection in solids, point defects, Linear defects, Planar defects and Volume defects- Concept of Slip & twinning.

Phase diagrams: Basic terms- phase rule- Lever rule & free energy of phase mixtures cooling curves- Phase diagram & phase transformation - construction of phase diagrams- binary phase diagrams - Brass, Bronze, Al-Cu and AlSi phase diagrams- Invariant reactions, eutectic, , peritectic, eutectoid, peritectoid, metatectic & monotectic reactions, Iron carbon phase diagram & microstructures of plain carbon steel & cast iron

Heat treatment: Heat treatment of steel- Annealing, and its types, normalizing, hardening, tempering, martemering, austempering - TTT diagrams, drawing of TTT diagram, TTT diagram for hypo-& hypereutectoid steels, effect of alloying elements, CCT diagram- Martensitic transformation, nature of martensitic transformation- Surface hardening processes like case hardening, carburizing, cyaniding, nitriding Induction hardening, hardenabilty, Jominy end-quench test, Age hardening of Al & Cu alloys Precipitation Hardening

Engineering Alloys: Properties, composition, microstructure and uses of low carbon, mild medium & high carbon steels. stainless steels, high speed steels, Hadfield steels, tool steels - Cast irons, gray CI, white CI, malleable CI, SC iron-The light alloys- Al & Mg & Titanium alloys- Copper & its alloys: brasses & bronzes- super alloys, Smart materials- Nano materials.

Composite Materials: Classification of composite materials, dispersion strengthened, particle reinforced and fiber reinforced composite laminates properties of matrix and reinforcement materials and structural applications of different types of composite materials.

Text Books:
1. "Materials Science & Engineering- An Introduction", William D.Callister Jr. Wiley India Pvt. Ltd. 6th Edition, 2006, New Delhi.
2. Physical Metallurgy, Principles & Practices", V Raghavan.PHI 2nd Edition 2006, New Delhi.
References
1. Introduction to Physical Metallurgy by Sidney H Avner Tata McGraw-Hill Education 1997
2. Materials Science And Engineering: A First Course By V. Raghavan Phi 5th Edition 2011, New Delhi

Group – B
For the branch of Mechanical Engineering

MECH 1208: METALLURGY AND MATERIALS ENGINEERING
MODEL QUESTION PAPER

Exam : 3 Hrs.	**Max. Marks : 70**

Answer any FIVE Questions
All Questions carry equal marks.

1. a) Derive an expressions for relation between atomic radius and lattice constant in case of i. BCC, ii. FCC and HCP
   b) What are various sources of dislocations? How do they affect the properties of materials? Suggest way and means to remove or minimize them?

2. a) Differentiate between the following:
   i. A system and a State
   ii. Extrinsic and intrinsic properties
   iii. Degree of freedom and constraint and
   iv. Phase and component
   b) Describe Hume- Rothery's rules and their importance in the development of alloys?

3. a) What are the different case hardening techniques? Explain the carbo-nitriding process?
   b) Explain Austenite-Bainitic transformation of eutectoid steel with help of TTT curves?

4. a) Classify Plain carbon steels? Explain the effect of carbon on the properties of plain carbon steels?
   b) What are the effects of adding Mn, Ti, Pb and P on the properties of ferrous alloys?

5. a) What are agglomerated composites? Name some of them. How do they differ from laminated and reinforced composites?
   b) Explain why is the resign- mixed glass fibres stronger than the resign itself? How can you achieve three dimensional strengths in a fibrous composite?

6. a) Characteristics of cast iron
   b) Effect of Nickel and or Chromium as an alloying element in steel.
   c) Properties and applications of titanium alloys

7. a) What is annealing? What are the different types of annealing process? Explain?
   b) Explain construction of phase diagram of Copper (Cu) and Zinc (Zn) system with neat diagram?

8. a) With neat diagram, show the salient points on Iron Iron Carbide Diagram?
   b) Mention the properties and applications of the following materials
   i. High Speed Steels
   ii. Hadfield Steels
   iii. Aluminum Alloys
   iv. Titanium Alloys

NAM 1208: INTRODUCTION TO NAVAL ARCHITECTURE

Theory	**: 2 Periods**	**Sessionals**	**: 30**
Lab Hrs	**: 3 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 4**

1. History – Development of primitive floating vehicles / platforms. Evolution of ship types; evolution of materials used in ship construction. Contribution of the ships to civilisation, trade and discovery of the planet Earth.

2. Fundamentals of Floatation - Archimedes principle, laws of floatation and stability.

3. Classification of ships and other Marine platforms. Definition and general arrangement of typical ships and Marine platforms.

4. Ship terminology and their meaning. Ship lines and procedure to draw them.

5. Introduction to ship construction / production process. Visit to Shipyard.

6. Economics of waterway transportation.

7. Domain of Naval Architecture Studies and role of a Naval Architect.

8. Challenges and state of the art.

9. Avenues for a Naval Architect.

Textbook:

Introduction to Naval Architecture by Eric Tupper- Butterworth Heinemann Publications

Group – B
For the branch of Naval Architecture and Marine Engineering

NAM 1208: INTRODUCTION TO NAVAL ARCHITECTURE
MODEL QUESTION PAPER

| **Exam** | **: 3 Hrs.** | **Max. Marks : 70** |

Answer Question No. 1 and Four Questions from the remaining
All questions carry equal marks.
Answer to Question No. 1 must be at one place

(1) (a) State Archimedes principle.   (7 x 2)

(b) Name any two materials used for ship hull construction.
(c) Mention the names of any two ship types.
(d) Define superstructure of a ship.
(e) Name any two countries discovered through voyages on oceans.
(f) Name any two primitive floating vehicles / platforms.
(g) Define draught of a ship.

(2) Explain in detail the role of a Naval Architect in a shipyard.   (14)

(3) Define ship lines and explain the procedure to draw the ship lines.   (14)

(4) Define ship. Explain classification of ships. Draw the general Arrangement of a Bulk carrier.
                                                                      (14)

(5) Explain the ship construction process vis – a – vis observations during shipyard visit. (14)

(6) Explain the economics of water way transportation vis – a –vis road and rail transportation.
                                                                      (14)

(7) State and explain the laws of floatation.   (14)

(8) Write short notes on the following: (4 x 3 ½)
    (a) Avenues for a Naval Architect.
    (b) Ship hull.
    (c) Challenges for a Naval Architect.
    (d) State of the art in Naval Architecture studies.

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GINF 1208: GEOMORPHOLOGY

Theory	: 2 Periods		**Sessionals**	: 30
Lab Hrs	: 3 Period		**Ext. Marks**	: 70
Exam	: 3 Hrs.		**Credits**	: 4

Unit I

Definition and scope of geomorphology; Fundamental concepts in geomorphology; Endogenetic processes: volcanism and tectonism; Exogenetic processes: weathering, Mass-wasting and erosion; geomorphic agents.

Unit II

Fluvial processes and landforms: valleys and valley forming processes - associated features; Alluvium – active and relict alluvium; Floodplain morphology; Types of streams - Genetic classification of streams; Alluvial fans and deltasShore Zone processes and landforms: shore line, shore zone and coast; Wind waves, tides, littoral currents, storm surges and tsunamis; Erosional and depositional landforms

Unit III

Glacial processes and landforms: ice and glaciers; types of glaciers; glacial motion; Regimen of glaciers – nourishment and wastage of glaciers; active, passive and dead glaciers; erosional and depositional landforms.Eolian processes and landforms; dominance of wind processes in arid and semi-arid regions; erosional and depositional landforms

Unit IV

Scope and significance of soil studies; soil and regolith; soil forming factors – geological, climatic, topographical, biological and time factors; Soil components – mineral matter, organic matter, soil-water and soil-air; Soil Properties – colour, texture, structure, acidity and alkalinity; soil profile; Pedogenic regimes – laterisation, gleisation, podzologisation, calcification and salinisation; soil classifications – zonal system, and Seventh approximation system.

Unit V

Applied geomorphology: landform interpretation for groundwater explorations; mineral exploration – surface expressions of ore bodies; weathering residues, placer deposits; applications in engineering projects: route selection – highways, canals, transmission lines; site selections – dam sites, industries; townships

Text Books

1. Geomorphology by A.L. Bloom, Waveland Pr.Inc. 2004
2. Principles of Geomorphology by W.D. Thornbury, Wiley Eastern, 1984
3. Landscape Systems by T.L. McKnight, Pretice-Hall International, 1987
4. Fundamentals of Geomorphology by R. Huggett, Routledge, 2007

Group – B
For the branch of Geo-Informatics

GINF 1208: GEOMORPHOLOGY
MODEL QUESTION PAPER

Exam   : 3 Hrs.   **Max. Marks : 70**

Answer Question No. 1 and Four Questions from the remaining
All questions carry equal marks.
Answer to Question No. 1 must be at one place

Group – B
For the branch of Instrumentation Technology

INST 1208: MATERIAL SCIENCE

Theory	: 2 Periods	**Sessionals**	: 30
Lab Hrs	: 3 Period	**Ext. Marks**	: 70
Exam	: 3 Hrs.	**Credits**	: 4

Mechanical Properties of Materials : Tensile Testing-Impact Testing-hardness Tests-Brinell, Vickers and Rockwell tests-Plastic deformation-Fracture toughness-Creep-fatigue-Cold work-Recovery-recrystallization-Grain growth.

Conducting Materials: Relaxation Time and Electrical Conductivity. Sources of Resistivity of Metals and Alloys, Electrical Conductivity at High Frequencies. Geometrical and Magnetic Field Effects on Electrical Conductivity. Types of Conducting Materials.

Dielectric Materials: Types of Electric Polarization, Frequency and Temperature Effects on Polarization, Dielectric Loss, Dielectric Breakdown, Insulating Materials, Ferro-electric Materials, Electrets.

Magnetic Materials: Types of Magnetic materials, Ferro and Ferri magnetism, and related Phenomena- Domain structure-Hysteresis Loop, Hard and Soft Magnetic materials, Ferrites , Magnetic bubbles.

Semiconducting Materials : Intrinsic and Extrinsic semiconductors-different semi conducting materials-band shapes of real semiconductors- direct and Indirect band gap materials- Fermi energy level and P-N junction diode,homojunction and Heterojunction- Transistor action.

Composite materials. General Characteristics of Composite materials A. Fibers – Glass, Carbon, Ceramic and Aramid fibers. B. Matrices – Polymer, Graphite, Ceramic and Metal Matrices – Characteristics of fibers and matrices.

Text Books :

1. Material Science, M. Arumugam, Anuradha Agencies Publishers.
2. Science of Engineering Materials, C. M. Srivastava and C. Srinivasan, Wiley Eastern Ltd.
3. Material Science and Engineering by V.Raghavan-prentice Hall of India, New Delhi

Group – B
For the branch of Instrumentation Technology

INST 1208: MATERIAL SCIENCE
MODEL QUESTION PAPER

Exam : 3 Hrs. **Max. Marks : 70**

Answer any FIVE Questions
All Questions carry equal marks.

MET 1208: ELEMENTS OF MATERIAL SCIENCE

Theory	: 2 Periods	**Sessionals**	: 30
Lab Hrs	: 3 Period	**Ext. Marks**	: 70
Exam	: 3 Hrs.	**Credits**	: 4

Introduction, classification of materials, Space Lattice and unit cells, crystal systems, Indices of planes and directions. Structure of common metallic materials.

Crystal Defects: Point, Line and Surface defects. Dislocations, types, Burgers' Vector, Dislocation movement by slip, climb and cross slip, Dislocation sources.

Plastic Deformation of single crystals: Deformation by slip, CRSS for slip, deformation by twinning, Strain hardenning of single crystals

Textbooks:

1. Material Science and Engineering by V. Raghavan.
2. Physical Metallurgy by S. H. Avner.

Reference books:

6. Material Science and Engineering by L. H. Van Vleck, 5th edition, Addision Wealey (1985).
7. Structure and properties of materials by R. M. Rose, L. A. Shepard and J. Wulff, Vol. 1,4 John Willey (1966)
8. Essentials of Material Science by A.C. Guy, McGraw Hill (1976)
9. The Science and Engineering Materials by D.R. Askeland. 2nd Edition, Chapman and Hall (1990)
10. Physical Metallurgy, Vijendra Singh.

MET 1208: ELEMENTS OF MATERIAL SCIENCE
MODEL QUESTION PAPER

Exam   : 3 Hrs.   **Max. Marks : 70**

First Question is Compulsory and answer any FOUR from rest

1. Write a short notes on the following   7 x 2 = 14
    a. Space lattice
    b. Unit Cell
    c. P-N stress
    d. Jogs
    e. Burger's Vector
    f. Slip Bands
    g. Twins
2. (a) Draw the unit cells for BCC, FCC & HCP crystals. Calculate the effective number
        of atoms for each unit cell   (9)
    (b) How the indexing of planes and directions will be done? Explain   (5)
3. (a) What are the crystal defects? Explain in detail with neat sketches   (8)
    (b) With neat sketches give the various types of crystal systems   (6)
4. (a) What are dislocations? With a neat sketches explain.   (10)
    (b) What are the various sources for Dislocations   (4)
5. (a) Distinguish between Slip and Twinning   (8)
    (b) Write note on dislocation climb and cross slip   (6)
6. (a) What is CRSS? Explain   (6)
    (b) Write a note on plastic deformation of a single crystal   (8)
7. (a) With a neat sketch explain the strain hardening of single crystal   (10)
    (b) What are Sessile and Glissile dislocations? Discuss   (4)
8. Write any two of the following   2 x 7 = 14
        (a) Dislocation movement by Slip
        (b) Dislocation forest
        (c) Materials Classification

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