UTTAR PRADESH UNIVERSITY LUCKNOW

Syllabus

[Effective from Session 2013-14]
(1st Year)

[B.Tech. Agricultural Engineering]

STUDY & EVALUATION SCHEME (B.TECH. AG. ENGG.)

w.e.f-2013-14

Ist Year Ist Semester

S.No.	Course Code	SUBJECT	PERIODS			Evaluation Scheme				SUBJECT TOTAL	Credit
						SESSIONAL EXAM			ESE		
			L	T	P	CT	TA	Total			
THEORY											
1	NAG101	Engg. Maths-I	3	1	0	30	20	50	100	150	4
2	NAS-104/204	Professional Communication	3	1	0	30	20	50	100	150	4
3	NAG-102	Engg. Chemistry	3	1	0	30	20	50	100	150	4
4	NAG-103	Agriculture for Engineers	3	1	0	30	20	50	100	150	4
5	NAG-104	Engg. Physics	2	1	0	15	10	25	50	75	3
6	NAS-105/205	Environmental & Ecology	2	0	0	15	10	25	50	75	2
PRACTICAL / TRAINING / PROJECT											
7	NAS-154/254	Professional Communication Lab	0	0	2	10	10	20	30	50	1
8	NAG-151	Engg. Chemistry Lab	0	0	2	10	10	20	30	50	1
9	NAG-152	Agriculture for Engineers Lab	0	0	2	10	10	20	30	50	1
10	NAG-153	Engg. Physics Lab	0	0	2	10	10	20	30	50	1
11	GP-101	G.P.	0					50		50	0
		Total	**16**	**5**	**8**					**1000**	**25**

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Ist Year IInd Semester

S. No.	Course Code	SUBJECT	PERIODS			Evaluation Scheme				SUBJECT TOTAL	Credit
						SESSIONAL EXAM			ESE		
			L	T	P	CT	TA	Total			
		THEORY									
1	NAG201	Engg. Maths-II	3	1	0	30	20	50	100	150	4
2	NAG202	Engg. Mechanics	3	1	0	30	20	50	100	150	4
3	NAG203	Thermodynamics & Heat Engine	3	1	0	30	20	50	100	150	4
4	NAG204	Surveying & Leveling	3	1	0	30	20	50	100	150	4
5	NAG205	Fundamentals of Computer Programming	2	1	0	15	10	25	50	75	3
6	NME-101/201	Basic Manufacturing Processes	2	0	0	15	10	25	50	75	2
PRACTICAL / TRAINING / PROJECT											
7	NAG251	Surveying & Leveling Lab	0	0	2	10	10	20	30	50	1
8	NAG252	Computer Programming Lab	0	0	2	10	10	20	30	50	1
9	NEW-151/252	Work shop Practice Lab	0	1	3	10	10	20	30	50	2
10	NCE-151/251	Computer Aided Engg. Graphics Lab	0	1	3	10	10	20	30	50	2
11	GP201	G.P.						50		50	0
		Total	**16**	**7**	**10**					**1000**	**27**

NAG-101 : Engineering Mathematics- I

Unit	Topic	Lectures
1 **1a.** **1b.**	**Elementary Differentiation:** • Definition • Limit and continuity • Derivatives of some standard functions • Derivatives of sum and difference • Derivatives of product and quotient of functions • Derivatives of composite functions and chain rule • Logarithmic differentiation • Parametric differentiation **Elementary Integration:** • Integration as inverse process of differentiation • Integration of some standard functions • Integration by substitution • Integration by parts • Integration by partial fraction	8
2	• Taylor's and Maclaurin's series for one variable (without proof) • Indeterminate forms • Curvature: Cartesian formula for radius of curvature • Asymptotes for Cartesian coordinates only **Functions of two or more independent variables:** • Partial differentiation • Homogeneous functions and Euler's theorem • Total differentiation and Change of variables • Jacobians • Maxima and minima (simple problems only)	8
3	**Multiple Integration** • Double integrations (Cartesian form) • Change of order of integration • Application of double integration to find the area (Cartesian form) • Triple integrals • Application of triple integrals to find the volume (Cartesian form) • Gamma functions • Beta functions	8
4	**Ordinary differential equations of first order and first degree:** • Exact differential equations • Equations reducible to exact form by integrating factors • Linear differential equation • Bernoulli's differential equations **Linear differential equations of higher orders with constant coefficients:** • Complementary functions • Particular integrals • Method of variation of parameters (second order only) **Simultaneous linear differential equations with constant coefficients**	8
5	**Matrices:** • Definition & types matrices • Elementary transformations • Rank of a matrix • Reduction to normal form and triangular form • Inverse of a matrix • Consistency and solution of linear equations • Eigen values • Cayley-Hamilton theorem (without proof) • Eigen vectors • Diagonalisation of matrices	8

Text books:

1. Mathematics part-I, text book for class XII, NCERT publications 2012.
2. Mathematics part-II, text book for class XII, NCERT publications 2012.
3. H.K. Dass and Rama Verma, Introduction to engineering mathematics-I S Chand Publication, 2012.
4. B.V. Ramana, Higher Engineering Mathematics. Tata McGraw-Hill Publishing Company Ltd. 2009

Reference books

1. E.Kreyszig, Advance Engineering Mathematics. John Wiley & Sons, 2005.
2. B.S. Grewal, Higher Engineering Mathematics. Khanna Publisher, 2005.
3. Peter V. O'Neil, Advance Engineering Mathematics. Thomson (Cengage) Learning, 2007.

Unit-1 Fundamentals of Communication

Technical Communication: features: Distinction between General and Technical communication; Language as a tool of communication; Levels of communication: Interpersonal, Organizational, Mass communications; The flow of Communication: Downward, Upward, Lateral of Horizontal (Peer group): Importance of technical communication; Barriers to Communication.

Unit-II Constituents of Technical Written Communication

Words and Phrases: Word formation. Synonyms and Antonyms; Homophones; Select vocabulary of about 500-1000 New words; **Correct Usage**: all Parts of Speech; Modals; Concord; Articles; Infinitives; Requisites of Sentence Construction: Paragraph Development: Techniques and Methods- Inductive, Deductive, Spatial, Linear, Chronological etc; The Art of Condensation-various steps.

Unit-III Business Communication

Principles, Sales & Credit letters;

Claim and Adjustment Letters; Job application and Resumes**.**

Reports: Types; Significance; Structure, Style & Writing of Reports.

Technical Proposal; Parts; Types; Writing of Proposal; Significance.

Negotiation & Business Presentation skills.

Unit-IV Presentation Strategies and Listening Skills.

Defining Purpose; Audience & Local; Organizing Contents; Preparing Outline; Audio-visual Aids; Nuances of Delivery; Body Language; Dimensions of Speech: Syllable; Accent; Pitch; Rhythm; Intonation; Paralinguistic features of voice; Listening Skills: Active Listening, Passive Listening. methods for improving Listening Skills.

Unit-V Value-Based Text Readings

Following essays form the suggested text book with emphasis on Mechanics of writing.

(i) Humanistic and Scientific Approaches to Human Activity by Moody E. Prior

(ii) The Language of Literature and Science by A. Huxley

(iii) Man and Nature by J.Bronowski

(iv) The Social Function of Literature by Ian Watt

(v) Science and Survival by Barry Commoner

(vi) The Mother of the Sciences by A.J.Bahm

(vii) The Effect of Scientific Temper on Man by Bertrand Russell.

Text Book

1. Improve Your Writing ed. V.N.Arora and Laxmi Chandra, Oxford Univ. Press, 2001, New Delhi..
2. Technical Communication: A Practical Approach: Madhu Rani and Seema Verma- Acme Learning, New Delhi-2011
3. Technical Communication- Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press,2007, New Delhi.

Reference Books

1. Communication Skills for Engineers and Scientists, Sangeeta Sharma et.al. PHI Learning Pvt.Ltd,2011, New Delhi.
2. Business Correspondence and Report Writing by Prof. R.C.Sharma & Krishna Mohan, Tata McGraw Hill & Co.Ltd.,2001, New Delhi.
3. Word Power Made Easy by Norman Lewis, W.R.Goyal Pub. &Distributors, 2009,Delhi.
4. Developing Communication Skills by Krishna Mohan, Mecra Bannerji- Macmillan India Ltd. 1990, Delhi.
5. Manual of Practical Communication by L.U.B.Pandey: A.I.T.B.S. Publications India Ltd.; Krishan Nagar, 2013, Delhi.
6. English Grammar and Usage by R.P.Sinha, Oxford University Press, 2005, New Delhi.
7. Spoken English- A manual of Speech and Phonetics by R.K.Bansal & J.B.Harrison, Orient Blackswan, 2013, New Delhi.
8. Business English by Ken Taylor, Orient Blackswan, 2011, New Delhi.

Unit	Topic	Lectures
1 1a. 1b.	**Introduction to Water** • Temporary and Permanent hardness • Zeolite process • Lime Soda process • Disadvantage of hard water • Scale and sludge formation in boilers • Boiler corrosion • **Chemical fuels:** • Classification of fuels • Calorific Value • Advantage of Solid, liquid and gaseous fuels	10
2 2.a 2b.	**Corrosion:** • Cause • Types • Methods of Prevention-pitting and stress corrosion • **Lubricants:** • Properties • Mechanism • Classification and Tests • Viscosity and Viscosity Index • Flash and Fire point • Cloud and Pour Point	8
3 3.a 3.b	**Polymers:** • Types of Polymerization • Properties • Use and Methods for the determination of molecular weight of polymers **Electro-chemistry:** • Specific molecular conductivity • Equivalent conductivity • Determination of conductivity • E.M.F and it's measurements • Polarization • Voltage	8
4	**Chemical Kinatics** • Order and Molecularity of reaction • First and Second order reactions • Derivations of equation for first order and second order • Determination of order of reaction • Energy of activation • Arrbenus equation • Numerical of first and second order reactions.	8
5	**Food Chemistry** • Principle of food Chemistry • Introduction of lipids • Proteins • Carbohydrates • Vitamins • Minerals Preservators • Enzymes and their uses • Nutrition • The energy requirements of the body	8

Text books:

1. Engg Chemistry by P.C Jain & Monika Jain, Publication Jain Brothers.
2. Fundamental of Biochemistry by A.C. Deb, Publication New Central Book Agency P Ltd.

Reference Material:

1. Engg Chemistry by Mani & Mishra, Publication Cengage Lerening India Pvt Ltd
2. Principle of Food Chemistry by John M. DeMan, An Aspen Publication

Unit	Topic	Lectures
1 1a. 1b.	**Introduction to soils** **Soil Characteristics** • Nature and origin of soil • Soil forming rocks and minerals, their classification and composition • Soil forming processes • Classification of soils • Soil taxonomy orders • Important soil physical properties; and their importance • Soil particle distribution • Soil inorganic colloids – their composition, • Properties and origin of charge • Ion exchange in soil and nutrient availability;	10
2	**Soil organic matter** • Its composition and decomposition, effect on soil fertility • Soil reaction – acid, saline and sodic soils • Quality or irrigation water • Essential plants nutrients • Functions and deficiency symptoms in plants • Important inorganic fertilizers and their reactions in soils	8
3	**Agronomy** • Definition and scope of agronomy • Classification of crops • Effect of different weather parameters on crop growth and development • Principles of tillage, tilth and its characteristics • Soil water plant relationship and water requirement of crops • Crop rotation • Cropping systems • Relay cropping • Mixed cropping	8
4	**Horticulture** • Scope of horticultural and vegetable crops • Soil and climatic requirements for fruits • Soil and climatic requirements for Vegetables • Soil and climatic requirements for Floriculture crops • Improved varieties of horticulture crops • High-tech horticulture- Polyhouses for flowers and vegetables(in-brief)	8
5	**Criteria for site selection of horticulture crops** • layout and planting methods • Nursery raising • Macro and micro propagation methods • Pant growing structures • Puning and training • Fertilizer application process • Fertigation • Irrigation methods • Harvesting • Grading and packaging • Post harvest practices • Garden tools, management of orchard • Extraction and storage of vegetables seeds	8

Text books:

1. T D Biswas, S K Mukherjee ‘Soil Science’ –TMH Publication
2. T. Yellamanda Reddy, G.H Sankara Reddy ‘Principle of Agronomy’ - Kalyani Publication
3. Jitendra Singh ‘Basic Horticulture’.Kalyani Publishers

Reference Material:

1. Mehta. K. K. Reclamation of Alkali Soil in India, Oxford & IBH Publication
2. Maharaj Singh. Education for Sustainable Agriculture. Indian J. Agron

Unit	Topic	Lectures
1 **1a.** **1b.**	**Surface tension** • Angle of contact • Excess of pressure inside a spherical surface • Capillary rise • Jager's method surface tension determination **Viscosity** • Stream line motion • Turbulent motion • Coefficient of viscosity • Critical velocity • Poiseuille's equation & Viscometer	8
2 **2a.** **2b.**	**Optics** **Interference** • Principle of superposition • Types of interference • Young's experiment • Determination of thickness of thin sheets • Interference in thin films • Thin films testing • Young's double slit experiment • Coherent sources • Michelson interferometer **Diffraction** • Definition of diffraction • Types of diffraction • Fraunhofer diffraction at single slit • Diffraction at double slit • Diffraction grating • Resolving & dispersive power of grating	10
3 **3a.** **3b.**	**Polarisation** • Polarization • Plane of polarization • Brewesters law • Malus law • Detection of circularly & elliptically polarized light • Quarter and half wave plate • Specific rotation and strength of sugar solution **Lasers** • Spontaneous and stimulated emission • Einstein A & B coefficient • Population inversion • He- Ne & ruby lasers	8
4	**Magnetic properties of materials** • Para, dia & ferro magnetism • Langevinus theory • Hysteresis loss • Quantum theory • Heisenberg uncertainty principle • Wave function • De- boglie waves • Schrodinger wave equation	8

5 **5 a.** **5b.**	**X- rays** • Absorption of X-rays • Diffraction of X-rays • Braggs spectrometer **Electronics** • Distinction between metals, insulators & semi conductors • Intrinsic & extrinsic semiconductor • Determination of energy gap in semiconductors	8

Text books:

1- Mechanics by D.S. Mathur, Publication S Chand Publication

2- A text book of optics by N. Subrahmanyan & Brij Lal, Publication S Chand & Company Limited

3- Concepts of Modern physics by Beiser, Publication The Mc Graw Hill-Company

Reference Material:

1. Introduction to special theory of Relativity by Robert Resnick ,Publication John Wiley & Sons
2. Physics of Atoms by Wehr Richords & Adiav, Publication TMH
3. Principle of Lasers by O. Svelto, Publication Springer

UNIT-I: Nature of Environment

Introduction to Environmental Science - Definition and scope and need for public awareness Ecosystems Concept, structure and functions, restoration of damaged ecosystems

Biodiversity – Definition, description at national and global level, threats and conservation Natural Resources - Renewable and non-renewable and their equitable use for sustainability, Material cycles – carbon, nitrogen and sulphur cycle.

Conventional and Non-conventional Energy Sources – fossil fuel-based, hydroelectric, wind, -nuclear and solar energy, biomass, biodiesel, hydrogen as an alternative fuel

UNIT-II: Impact of Human Activity on Environment

Human Population and Environment – Population growth, population explosion and migration; Impact of farming, housing, mining, transportation and industrial growth

Social Issues Related to Environment– Sustainable development, urban problems (related to water and energy conservation and waste management), resettlement and rehabilitation Environmental ethics

UNIT-III: Environmental Changes and Human Health

Environmental Pollution–Definition, causes and effects, control measures for water, air, soil, marine, land, noise, thermal pollution,

Climate change– Greenhouse effect and global warming**,** acid rain**,** ozone layer formation and depletion

Impact on human health – water and air borne diseases, diseases induced by residual impurities in drinking water (fluoride and arsenic); Toxic wastes and carcinogens; Nuclear hazards

UNIT- IV: Environmental Protection through Assessment and Education

Indicators and Impact Assessment **–** Bio-indicators, Natural disasters and disaster management, Impact assessment through inventorying and monitoring

Environmental Protection– Role of individuals, organizations and government in pollution control

Laws, Conventions and Treaties–National legislation, issues in the enforcement of environmental legislation, initiatives by non- governmental organizations, global efforts in environmental protection

Environmental education–women and value education

Recommended Textbook:

Environmental Studies, J Krishnawamy , R J Ranjit Daniels, Wiley India.

Recommended Reference Books:

1. Environmental Science, Bernard J. Nebel, Richard T. Right, 9780132854467, Prentice Hall Professional 1993.
2. Environment and Ecology, R K Khandal, 978-81-265-4277-2, Wiley India.
3. Environmental Science, 8th Ed ISV, Botkin and Keller, 9788126534142, Wiley India.
4. Environmental Studies, R Rajagopalan, 978-0195673937, Oxford University Press
5. Textbook of Environmental Science and Technology, M.Anjireddy, BS Publications
6. Environmental Studies, Soli. J Arceivala, Shyam, R Asolekar, 9781259006050, McGrawHill India, 2012.
7. Environmental Studies, D.L. Manjunath, 9788131709122 Pearson Education India, 2007
8. Textbook of Environment Ecology , Singh, Acme Learning
9. Perspective in Environmental Studies, Kaushik, New Age International
10. Environmental Studies, B. Joseph, 2nd Ed, 978-0070648134, Tata McGraw Hill

Interactive and Communicative Practical with emphasis on Oral Presentation/Spoken Communication based on International Phonetic Alphabets (I.P.A.)

LIST OF PRACTICALS

1. Group Discussion: Practical based on Accurate and Current Grammatical Patterns.
2. Conversational Skills for Interviews under suitable Professional Communication Lab conditions with emphasis on Kinesics.
3. Communication Skills for Seminars/Conferences/Workshops with emphasis on Paralinguistics/ Kinesics.
4. Presentation Skills for Technical Paper/Project Reports/ Professional Reports based on proper Stress and Intonation Mechanics.
5. Official/Public Speaking based on suitable Rhythmic Patterns.
6. Theme- Presentation/ Key-Note Presentation based on correct argumentation methodologies.
7. Individual Speech Delivery/Conferences with skills to defend Interjections/Quizzes.
8. Argumentative Skills/Role Play Presentation with Stress and Intonation.
9. Comprehension Skills based on Reading and Listening Practicals on a model Audio-Visual Usage.

Reference Books

1. Bansal R.K. & Harrison: Phonetics in English, Orient Longman, New Delhi.
2. Sethi & Dhamija: A Course in Phonetics and Spoken English, Prentice Hall, New Delhi.
3. L.U.B.Pandey & R.P.Singh, A Manual of Practical Communication, A.I.T.B.S. Pub. India Ltd. Krishan Nagar, Delhi.
4. Joans Daniel, English Pronouncing Dictionary, Cambridge Univ. Press.

Exp. No.	Experiment
1	Determination of temporary and permanent hardness of water by EDTA method
2	Determination of BOD & COD in water sample
3	Determination of viscosity of oil
4	Estimation of available chlorine in bleaching powder
5	Determination of carbonate and noncarbonated hardness by soda reagent
6	Determination of coagulation of water and chloride ion content
7	Determination of λmax and verification of Beer Lambert Law
8	Determination of calorific value of fuel
9	Determination of specific rotation of an optically active compound
10	Determination of molar refraction of organic compounds
11	Estimation of dissolved oxygen in water

NAG-152 :AGRICULTURE FOR ENGINEERS LAB

Exp. No.	Experiment
1	Identification of rocks and minerals
2	Examination of soil profile in the field
3	Determination of bulk density
4	Determination particle density and porosity of soil
5	Determination of organic carbon of soil
6-9	Identification of crops and their varieties seeds and weeds
10	Fertilizer application methods
11	Different weed control methods
12	Study of different garden tools

NAG-153 :ENGG PHYSICS LAB

Exp. No.	Experiment
1	To determine the wavelength of monochromatic light with the help of Newton's Rings
2	To determine the diffraction pattern using plane transmission grating.
3	To determine the specific rotation of cane sugar solution using half shade polarimeter.
4	To determine the specific Resistance by carry Foster Bridge.
5	To determine the viscosity of a liquid by Poisullues method .
6	To obtain hystesesis curve (B-H Curve)
7	To study the variation of magnetic field with distance along the axis of a current carrying circular coil and to determine the radius of coil.
8	To find out the wave length of light by prism.
9	Determination of ultrasonic wave velocity in a liquid medium
10	To determine the energy band gap in a semiconductor using a p-n Junction diode
11	To determine the slit width from Fraunhofer diffraction pattern using laser beam
12	To study the variations of thermo e.m.f. of a copper-constantan thermocouple with temperature
13	To find the numerical aperture of optical fiber

Unit	Topic	Lectures
1	**Vector Calculus:** • Differentiation of vectors • Scalar & vector point functions, vector differential operator del. • Gradient of a scalar function & their geometrical meaning. • Normal & Directional derivative. • Divergence of a vector function and their physical interpretation. • Curl of a vector function & their physical meaning. • Line integral. • Surface integral. • Volume integral- illustrative examples*. • Green's theorem (for a plane) • Stoke's theorem- illustrative examples*. • Gauss's theorem- illustrative examples*. **Note: In case of illustrative examples*, question are not to be set.**	9
2	**Functions of Complex variable:** • Limit, continuity & differentiability • Analytic function & Cauchy-Riemann equations (Cartesian form) • Harmonic function • Conjugate function. • Milne Thomson method.	9
3	**Fourier series & Partial differential equation:** • Periodic functions. • Fourier series & Dirichlet's conditions. • Fourier series of period 2π and Euler's formulae. • Even function & odd function. • Half range series (Period π) • Fourier series of functions having arbitrary period (Period 2c) • Half range, series (arbitrary period) • Introduction & formation of partial differentiate equation. • Linear partial differentiate equation with constant coefficient. • Non-homogeneous linear equations.	9
4	**Application of partial differential equation:** • Introduction & Method of separation of variables. • One dimensional wave equation (without proof) and problems. • One dimensional heat equation (without proof) and problems. • Two dimensional steady state heat flow equation (without proof) & problems	9
5	**Statistical Technique:** • Introduction. • Measures of central tendency: mean, median & mode. • Mean deviation. • Standard deviation. • Skewness. • Karl Pearson's coefficient of skewness. • Principle of Least square. • Method of Least square: fitting of straight line, parabola, change of scale.	9

Text books:

1. H.K. Dass & Rajnish Verma, Higher Engg. Mathematics. S. Chand & Company Ltd., 2012
2. B.V. Ramana, Higher Engineering Mathematics, Tata Mc Graw-Hill Publishing Company Ltd. 2008.

Reference books

1. B.S. Grewal, Higher Engineering Mathematics. Khanna Publisher, 2005.
2. E.Kreyszig, Advance Engineering Mathematics. John Wiley & Sons, 2005.
3. Peter V. O'Neil, Advance Engineering Mathematics. Thomson (Cengage) Learning, 2007.

Unit	Topic	Lectures
1	**Two dimensional force systems** • Basic Concepts • Low of Parallelogram of Forces • Laws of motion • Resolution of Coplanar Forces • Transmissibility of forces • Resultant of Coplanar Forces • Moment of a Force • Principle of Moments • Resolution of a Force in to a force and a Couple • Conditions of Equilibrium • Free body diagrams	10
2	**Friction** • Introduction • Laws of Coulomb Friction • Equilibrium of Bodies involving Dry Friction • Belt friction **Beam** • Introduction • Shear force and bending moment • Deferential equations for Equilibrium • Shear force and bending moment diagrams for statically Determinate Beams.	8
3	**Trusses** • Introduction • Simple truss and solution of simple truss • Method f joints • Method of sections	8
4	**Centroid and Moment of Inertia** • Centroid of plane, curve • Centroid of Area • Centroid volume and composite bodies • Moment of inertia of plain area • Parallel Axes theorem • Perpendicular axes theorems • Principle moment Inertia • Mass Moment of Inertia of Circular ring, Disc, cylinder, Sphere and cone about their axis of Symmetry	8
5	**Simple stress and Strain** • Normal and shear stresses • stress- strain Diagrams for ductile and brittle material • Elastic constants • One Dimensional Loading of members of varying cross-sections	8

Text books:

1. A Text Book of Engineering Mechanics by Dr.R. K. Bansal, Laxmi Publication 5 edition 2008.
2. Strength of Material by S.Ramamrutham Dhanpat Rai Publication Company Sixteenth Edition 2008 .

1. Reference Material:

3. Engineering Mechanics, Statistics and Dynamics by A Nelson TMH 4th Reprint 2012

Engineering Mechanics by S.Ramamrutham Dhanpat Rai Publication Company

Text books:

1-Thermodynamics by Dr. D.S. Kumar , Katson Publication first Edition 2009-2010

Unit	Topic	Text Book/ Topics	Lectures
1	**Thermodynamics properties** • Closed and open system • Flow and non-flow processes • Gas laws • Laws of thermodynamics • Internal energy • Application of first law in heating and expansion of gases in non-flow processes • First law applied to steady flow processes.	Text Book 1 1.3 6.1 4.1 to 4.5 5.1 to 5.3 5.4 5.5 5.5.1 to 5.5.5	10
2	**Second Law of Thermodynamics** • Kelvin-Planck statement • Claussius statemet • Reversible processes • Carnot cycle • Carnot theorem	Text Book 1 7.3.1 7.3.2 7.6 7.7 7.9	8
3	**Entropy** • Physical concept of entropy • Change of entropy of gases at constant Volume • Change of entropy of gases at constant Pressure • Change of entropy of gases at constant Temperature • Change of entropy of gases at reversible adiabatic process • Change of entropy of gases at poly tropic proces	Text Book 1 8.1 to 8.5 8.6.1 8.6.2 8.6.3 8.6.4 8.6.5	8
4	**Steam Generator** • Classification of steam boilers • Lancashire boiler • Locomotive boiler • Boiler mountings • Boiler accessories • Desirable properties of working fluid used for power plants • Rankine cycle • Introduction to compound steam engines	Text Book-2 13.5 13.9 13.11 14.2 14.14 2.11 10.4 18.1 to 18.13	8
5	**Thermodynamic air Cycle** • Air Standard efficiency • Engine efficiencies and terms • Otto cycle • Diesel cycle • Dual cycle • Mean effective pressure • Measurement of IP and BP • Heat balance calculations	Text Book 2 27.7 27.7 6.16 6.17 6.18 27.3 27.4 to 27.6 27.9	8

2- A text book of thermal engineering by R.S. Khurmi & J.K .Gupta , S Chand & Company Limited reprint 2002

Reference Material:

1- A text book of Thermodynamics by D K Jha , Discovery publishing House

2- Engineering Thermodynamics by P K Nag ,TMH publication

NAG-204 : Surveying & Levelling

Unit	Topic	Lectures
1	**Surveying** • Principle and basic concepts of surveying • Plans and maps • Classification of surveying • Basic measurements • Units of measurement • Types of Scales • Recording the measurement • Principal of chain surveying • Types of Chains • Types of Ranging and Chaining • Chain and tape errors & corrections • Selection of survey station and lines • Offset measurement • Cross Staff Optical Square-Prism Square • Obstacles in chaining and ranging	**10**
2	**Traversing :** • Methods of traversing • Prismatic compass • Surveyors compass • Angle and bearing • Quadrantal system • Local attraction • Dip of angle • magnetic declination • Plotting a traverse survey • Errors In compass survey • Bow ditch's rule • Transit rule	**8**
3	**Plane tabling :** • Plane tabling instruments and accessories • Methods and principal • Two points problem • Three points problem • Errors in plane tabling Planimeter Sextant Band level, • Abney level • Clinometer, Pentameter • Computation of areas methods	**8**
4	**Leveling** • Definition , Basic principal of levelling • Benchmark • Types of levels optical • Principal causes telescopes sensitivity of bubble tubes • Leveling staff • Temporary adjustment, Permanent adjustment of levels • Field book entries • Reduction of levels missing entries , • Types of levelling • Simple and differential levelling • Check leveling & reciprocal leveling • Precise levelling • profile leveling	**8**
5	**Theodolite** • Theodolite traversing • Theodolite Surveying	**8**

- Ranging by theodolite
- Temporary & Permanent adjustment of theodolite.

Text books:

1- Surveying and Levelling Part-1 by T.P. Kanetkar & S.V.Kulkarni , Pune Vidyarthi Griha Prakashan

Reference Material:

1- Surveying and Levelling By B C Punamia Vol-I & Vol-II,Laxmi Publications,2005

2-Surveying-III Higher Surveying, B.C Punamia, Laxmi Publications 2004

NVG-105 : Fundamentals of Computer Programming

UNIT I:

Introduction to Computer System: Hardware, Software-system software, & application software; Introduction to Computing Environment; Introduction to Problem solving and notion of algorithm: Flow charting, Pseudo code, corresponding sample C-programme, Testing the code; Number Systems and their conversion: Decimal, Binary, Octal and Hexadecimal representations, bit, byte; Character representation: ASCII, sorting order; System software re-visited: machine language, symbolic language, higher level languages, what is a compiler, what is an operating system, Introduction to programme development.

UNIT II:

Structure of a C-program, comments, identifiers; Fundamental Data Types**:** Character types, Integer, short, long, unsigned, single and double-precision floating point, complex, boolean, constants; Basic Input/Output: printf, formatting, scanf, eof errors; Operators and Expressions: Using numeric and relational operators, mixed operands and type conversion, Logical operators, Bit operations, Operator precedence and associatively, Functions in C: standard function, defining a function, inter-function communication- passing arguments by value, scope rules and global variables; Top-down program development.

UNIT III:

Conditional Program Execution: Applying if and switch statements, nesting if and else, use of break and default with switch; Program Loops and Iteration: Uses of while-do and for loops, , Arrays: Array notation and representation,

UNIT IV:

Sequential search, Sorting arrays; Strings and string handling functions, Recursion;

Structures: Purpose and usage of structures, declaring structures, assigning of structures, Pointers to Objects**:** Pointer and address arithmetic, pointer operations and declarations, using pointers as function arguments

Unit-I Engineering Materials

Materials and Civilization, their socio economic impact. Engineering Materials their classification and applications. **1**

Metals & Alloys: Properties and Applications

Mechanical Properties of Materials: Strength, elasticity, plasticity, stiffness, malleability, ductility, brittleness, malleability, toughness, hardness, resilience, hardness, machine ability, formability, weld ability. Elementary ideas of fracture fatigue & creep. **2**

Steels and Cast Irons: Carbon steels, their classification based on percentage of carbon as low, mild, medium & high carbon steel, their properties & applications. Wrought iron. Cast iron. Alloy steels: stainless steel, tool steel. **2**

Alloys of Non Ferrous Metals: Common uses of various non-ferrous metals (Copper, Zink, Tin, Magnesium, Lead, Aluminum etc.) & alloys and its composition such as Cu-alloys: Brass, Bronze, Al-alloys. **2**

Unit-II Basic Metal Forming & Casting Processes.

Forming Processes: Basic metal forming operations & uses of such as: Forging, Rolling, Wire & Tube-drawing/making and Extrusion, and their uses.

Press-work: Die & Punch assembly, cutting and forming, its applications.

Hot-working versus cold-working **4**

Casting: Pattern: Materials, types and allowances. Type and composition of Molding sands and their desirable properties. Mould making with the use of a core. Gating system. Casting defects & remedies. Cupola Furnace. Die-casting and its uses. **3**

Unit-III Machining and Welding Operations and their Applications

Machining: Basic principles of Lathe-machine and operations performed on it. Basic description of machines and operations of Shaper-Planer, Drilling, Milling & Grinding. **4**

Welding: Introduction, classification of welding processes. Gas-welding, types of flames and their applications. Electric-Arc welding. Resistance welding. Soldering & Brazing processes and their uses. **3**

Unit-IV Misc. Topics/ Processes

Heat Treatment Processes: Introduction to Heat- treatment of carbon steels: annealing, normalizing, quenching, tempering and case-hardening. **2**

Manufacturing Establishment: Plant location. Plant layout–its types. Types of Production. Production versus Productivity. **1**

Non-Metallic Materials: Common types & uses of Wood, Cement-concrete, Ceramics, Rubber, Plastics and Composite-materials. **3**

Misc. Processes: Introduction to Galvanizing and Electroplating. **1**

Reference Books:

1. "Processes and Materials of Manufacture", Lindberg, PHI
2. "Manufacturing Engineering And Technology", Kalpakjian and Schmid, Pearson
3. "Manufacturing Processes", Kalpakjian and Schmid, Pearson
4. "Manufacturing Processes", H. N .Gupta, R. C. Gupta, Arun Mital, New Age

NAG-251 : SURVEYING & LEVELING LAB

Exp. No.	Experiment
1	Chain survey of an area and preparation of map
2	Compass survey of an area and plotting of compass survey
3	Plane table surveying
5	Contour survey of an area and preparation of contour map
6	Introduction of software in drawing contour
7	Theodolite surveying
8	Ranging by theodolite
9	Height of object by using theodolite
10	Advancement of Total stations

NAG-252 : Computer Programming Lab

1 Get familiar with OS and Environment.

2 Get familiar with C compiler

3 Implement and Test Small Routine in C

4 Data type and variable: Evaluation of Expression

5 Operators & Expression: Evaluation of Expression

6 IF, SWITCH Statements: Iteration

7 Repetition structure in C: Iteration, Function

8 Modular Programming: Recursion, Function

9 Arrays & Structures

10 Pointers: Linked Lists

11 Searching, Selection & Sorting

12 Sorting & Strings

13 Files & Std C Preprocessor

14 Std C Library, Use of Std. C Library

1. Carpentry Shop: 1. Study of tools & operations and carpentry joints. 2. Simple exercise using jack plane. 3. To prepare half-lap corner joint, mortise & tennon joints. 4. Simple exercise on woodworking lathe.

2. Fitting (Bench Working) Shop: 1. Study of tools & operations 2. Simple exercises involving fitting work. 3. Make perfect male-female joint. 4. Simple exercises involving drilling/tapping/dieing.

3. Black Smithy Shop: 1. Study of tools & operations 2. Simple exercises based on black smithy operations such as upsetting, drawing down, punching, bending, fullering & swaging.

4. Welding Shop: 1.Study of tools & operations of Gas welding & Arc welding 2. Simple butt and Lap welded joints. 3. Oxy-acetylene flame cutting.

5. Sheet-metal Shop: 1. Study of tools & operations. 2. Making Funnel complete with 'soldering'.
3. Fabrication of tool-box, tray, electric panel box etc.

6. Machine Shop: 1. Study of Single point cutting tool, machine tools and operations. 2. Plane turning. 3. Step turning 4. Taper turning. 5. Threading

7. Foundry Shop: 1. Study of tools & operations 2. Pattern making. 3. Mould making with the use of a core. 4. Casting

Introduction Drawing Instruments and their uses, BIS conventions, Lettering, Dimensioning line conventions and free hand practicing,

AUTO CAD, layout of the software, standard tool bar/menus and description of most commonly used tool bars, navigational tools. Co-ordinate system and reference planes. Definitions of HP, VP, RPP & LPP. Creation of 2D/3D environment. Selection of drawing size and scale. Commands and creation of Lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints. **2 - Sheets**

Orthographic Projections

Introduction, Definitions - Planes of projection, reference line and conventions employed, Projections of points in all the four quadrants, Projections of straight lines (located in First quadrant/first angle only), True and apparent lengths, True and apparent inclinations to reference planes **2 - Sheets**

Orthographic Projections of Plane Surfaces (First Angle Projection Only)

Introduction, Definitions–projections of plane surfaces–triangle, square, rectangle, rhombus, pentagon, hexagon and circle, planes in different positions by change of position method only. **1 - Sheet**

Projections of Solids (First Angle Projection Only)

Introduction, Definitions – Projections of right regular tetrahedron, hexahedron (cube), prisms, pyramids, cylinders and cones in different positions. **2-Sheets**

Sections And Development of Lateral Surfaces of Solids

Introduction, Section planes, Sections, Section views, Sectional views, Apparent shapes and True shapes of Sections of right regular prisms, pyramids, cylinders and cones resting with base on HP. **1 - Sheet**

Isometric Projection (Using Isometric Scale Only)

Introduction, Isometric scale, Isometric projection of simple plane figures, Isometric projection of tetrahedron, hexahedron(cube), right regular prisms, pyramids, cylinders, cones, spheres, cut spheres. **1-Sheet**

Text Books

1. Engineering Drawing - N.D. Bhatt & V.M. Panchal, 48th edition, 2005-Charotar Publishing House, Gujarat.
2. Computer Aided Engineering Drawing - S. Trymbaka Murthy, -I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition- 2006.

Reference Books

1. Engineering Graphics - K.R. Gopalakrishna, 32nd edition, 2005- Subash Publishers Bangalore.
2. Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production-Luzadder Warren J., Duff John M., Eastern Economy Edition, 2005-Prentice-Hall of India Pvt. Ltd., New Delhi.
3. Engineering Drawing – M.B. Shah, B.C.Rana, 2nd Edition,2