IIMT University, UP B.E./B.Tech
CSE Sem 1 syllabus

Engineering Mathematics-I

ETAS-111 Engineering Mathematics-I

UNIT-1 Matrix
Matrix introduction, Special Type of Matrices, Elementary Transformations, Rank of Matrix (Echelon form, Normal form), Linear system of equations (Homogenous and Non- Homogenous), consistency and inconsistency of linear systems, Characteristic roots and vectors (Eigen values and Eigen vectors), Cayley-Hamilton Theorem, Applications of matrices.

UNIT- 2 Differential Calculus-I
Successive Differentiation, nth order differential coefficients, Leibnitz's theorem, Partial Differentiation, Partial derivatives of 1st order and higher orders, Homogenous Functions, Euler's theorem on Homogenous Functions, Relations between Second order derivatives of homogenous functions, Deductions from Euler's theorem, Composite Function, Asymptotes, Curve Tracing (Cartesian and Polar Coordinates)

UNIT- 3 Differential Calculus-II
Expansion of functions of several variables, Taylor's and Maclaurin's Theorems for two variables, Jacobian, Properties of Jacobian, Results on Jacobian, Jacobian of Implicit functions, Functional Dependence, Maxima and minima of functions of two variables, Lagrange's Methods of Multipliers.

UNIT- 4 Multiple Integrals
Multiple Integrals (double and triple), Change of order of integration, change of variables, Volumes and Surface areas by multiple integrals (Cartesian and Polar coordinates), Beta and Gamma functions, Dirichlet's integral and extension of Dirichlet's integral.

UNIT- 5 Vector Calculus

Vector Point Function, Gradient, Divergence, Curl and their physical interpretation, Vector identities, Directional Derivatives, Line, Surface and Volume Integrals, Green's, Stocke's and Gauss divergence theorem (statement and application)

Text Books:
1. Grewal B.S., Higher Engineering Mathematics, Khanna Publishers.
2. Prasad C., Engineering Mathematics for Engineers, Prasad Mudralaya.
3. Dass H.K., Engineering Mathematics Vol-I, S. Chand.

Reference Books:
1. Kreyszig E., Advanced Engineering Mathematics, Wiley Eastern.
2. Piskunov N, Differential & Integral Calculus, Moscow Peace Publishers
3. Narayan Shanti, A Text book of Matrices, S. Chand

Engineering Chemistry

ETAS-113/123 Engineering Chemistry

UNIT-1 Atomic and Molecular Structure:
Molecular orbitals of diatomic molecules. Band theory of solids. Liquid crystal and its applications. Point defects in solids. Structure and applications of Graphite and Fullerenes. Concepts of Nanomaterials and its application.

UNIT- 2 Spectroscopic techniques and Applications
Elementary idea and simple applications of Rotational, Vibrational, Ultraviolet& Visible and Raman spectroscopy.

UNIT- 3 Electrochemistry
Nernst Equation and application, relation of EMF with thermodynamic functions (ΔH, ΔF and Δ S). Lead storage battery.
Corrosion; causes, effects and its prevention.
Phase Rule and its application to water system.

UNIT- 4 Water Analysis
Hardness of water, Techniques for water softening (Lime-soda, Zeolite, Ion exchange resin and Reverse osmosis method).
Fuels: classification of fuels, Analysis of coal, Determination of calorific value (Bomb calorimeter and Dulon'smethos).

UNIT- 5 Polymer

Basic concepts of Polymer-Blend and composites, Conducting and biodegradable polymers. Preparation and application of some industrially important polymers (Buna-S, Buna-N, Neoprene, Nylon-6, nylon-6,6 and Terylene). General methods of synthesis of organometallic compounds (Grignard reagent) and their applications.

Text Books:

1. University Chemistry By B.H. Mahan
2. University Chemistry By C.N.R. Rao
3. Organic Chemistry By I.L. Finar
4. Physical Chemistry By S. Glasstone
5. Engineering Chemistry By S.S. Dara
6. Polymer Chemistry ByFre W., Billmeyer
7. Engineering ChemistryBy Satya Prakash

Engineering Physics

ETAS-112/122 Engineering Physics

UNIT-1 Relativistic Mechanics

Inertial and Non- Inertial Frames; Michelson-Morley Experiment; Postulates of Special Theory of Relativity; Galilean and Lorentz Transformation; Length Contraction and Time Dilation; Addition of Velocities; Mass Energy Equivalence and Variation of Mass with Velocity.

UNIT- 2 Electromagnetic

Gauss law;Ampre's law and displacement current; Equation of continuity; Maxwell's equations in Integral and Differential Forms; Electromagnetic Wave Propagation in Free Space and Conducting Media; Poynting Theorem

UNIT- 3 Quantum Mechanics

Wave particle duality, Matter waves, Time-dependent and time-independent Schrodinger wave equation, Born interpretation of wave function, Solution to stationary state Schrodinger wave equation for one-Dimensional particle in a box

UNIT- 4 Wave Optics

Interference: Basics of interference of light; Principle of superposition, coherent Sources, Conditions of Interference; Interference by division of wave front and amplitude (Fresnel's bi-prism, Interference due to thin film, wedge shaped films, Newton's Rings).

Diffraction: Fraunhoffer Diffraction Due Single, double and N-slit; Diffraction Grating; Rayleigh's criterion of resolution; absent spectra, dispersive Power of grating, Resolving power of Grating.

UNIT- 5 Polarization & Laser

Polarization: Phenomenon of double refraction; Ordinary and extra-ordinary rays; Nicol Prism; quarter wave plate and half wave plate; Production and analysis of Plane, Circularly and Elliptically Polarized Light; Optical Activity; Specific Rotation, Laurent half's half shade Polarimeter.

Laser: Absorption of radiation, Spontaneous and stimulated emission of radiation, Einstein's coefficients, Population inversion, Various levels of Laser, Ruby Laser, He-Ne Laser, Laser applications.

Text Books:

1. Concepts of Modern Physics - AurthurBeiser (Mc-Graw Hill)
2. Introduction to Special Theory of Relativity- Robert Resnick (Wiley)
3. Optics - Brijlal& Subramanian (S. Chand)
4. Engineering Physics: Theory and Practical- Katiyar and Pandey (Wiley India)

Reference Books:

1. Applied Physics for Engineers- Neeraj Mehta (PHI Learning, New)
2. Engineering Physics-Malik HK and Singh AK (McGrawHill)

Computer Basics & 'C' Programming

ETCS-111 Computer Basics & 'C' Programming

UNIT-1

Computer: Definition, Characteristics, Applications, Components of Computer System, Storage Devices, Memory; Classification of Computers;

Number System: Decimal, Binary, Octal, Hexadecimal and their inter-conversion.

Computer Languages: High Level, Low Level and Assembly Languages, Translators-Compiler, Interpreter, Assembler, Concept of Editor; Linker and Loader.

UNIT- 2 Introduction to C Language

Structure of C Programs, Compilation and Execution of C Programs, debugging techniques, Standard I/O in C, Data types in C, Operators in C- Unary operators, Arithmetic and Logical operators, relational

operators, shift operators, ternary operators, size of operators, type conversion, typecasting, expressions using various operators, operator precedence and associativity.

UNIT- 3

Control statements: If-Else, nested if-else, Switch statement, break, Continue, exit ( ), return ( ), go-to statement

Repetitive statement: While loop, Do-While loop, for loop, Nested loops

UNIT- 4

Functions: Built in and User defined, Function definition and declaration, actual and formal argument, call by value and call by reference, Recursive functions, Mathematical and string functions.

Arrays: Single and Multidimensional array, manipulating array elements, Structure and Union

UNIT- 5

Pointers: Introduction, Accessing address of a variable, standard C Pre-processors File Handling, String Handling

Android Fundamentals: About Android, Basic Building blocks - Activities, Services, Broadcast Receivers & Content providers, UI Components - Views & notifications, Components for communication - Intents & Intent Filters, Android API levels (versions & version names)

Text Books:

1. V. Rajaraman “Fundamentals of Computers” PHI publication, Fifth Edition.
2. E. Balaguruswamy,” Programming in C”, TMH Publication
3. Wei-Meng Lee” AndroidTM Application Development” Wiley Publication

Reference Books:

1. Pradeep K. Sinha, Priti Sinha, “Computer Fundamentals”, BPB Publication, Sixth Edition.
2. C.Xavier, Worldwide web Design with HTML, TMH Publication.
3. Yashwant Kanetkar,” Let us C”, Narosa Publication.
4. Kernighan Brian W. and Ritchie Dennis M, ‘The C Programming” Pearson Education.
5. Ed Burnette, “Hello, Android: Introducing Google's Mobile Development Platform”

English Communication

NHU-111/121 ENGLISH COMMUNICATION

Unit-1Introduction to Communication
• Nature and Process of Communication
• Levels of Communication
• Language as a tool of Communication

Unit-2 Language of Communication
• Verbal and Non-Verbal
• Spoken and Written
• Personal, Social and Business
• Barriers to Communication (Intra-personal, Inter-personal and Organizational communication)

Unit-3 Speaking Skills
• Monologue
• Dialogue
• Group Discussion (Methodology & Guidelines)
• Interview (Types & Frequently Asked Questions)
• Public Speaking (Dos & Don'ts)

Unit-4 Reading and Understanding
• Reading Comprehension
• Difference between Abstract & Summary
• Paraphrasing
• Precis Writing

Unit-5Writing Skills
• Notices, Agenda, Minutes of Meeting
• Letter writing (Formal & Informal)
• Email Writing
• Report Writing (Kinds, Structure)

Recommended Readings:
1. Fluency in English- Part II, Oxford University Press, 2006.
2. Business English, Pearson, 2008.
3. Language, Literature and Creativity, Orient Blackswan, 2013.
4. Language through Literature, Dr.GauriMishra,Dr Ranjana Kaul, Dr Brati Biswas
5. Oxford Guide to writing and speaking, John Seely, O.U.P
6. Effective Technical Communication, M.Asraf Rizvi, Tata McGraw Hill

7. English Grammar & composition,Wren & Martin
8. Technical Communication, Meenakshi Raman & Sangeeta Raman

Environmental Science

NHU-112/122 Environment Studies

UNIT-1: Introduction to environmental studies

• Multidisciplinary nature of environmental studies;
• Scope and importance; Concept of sustainability and sustainable development.

UNIT- 2: Ecosystems

• What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession. Case studies of the following ecosystems:
a) Forest ecosystem
b) Grassland ecosystem
c) Desert ecosystem
d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT-3: Natural Resources: Renewable and Non-renewable Resources

• Land resources and landuse change; Land degradation, soil erosion and desertification.
• Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.
• Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & interstate).
• Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

UNIT-4: Biodiversity and Conservation

• Levels of biological diversity: genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots
• India as a mega-biodiversity nation; Endangered and endemic species of India

• Threats to biodiversity: Habitat loss, poaching of wildlife, man--wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
• Ecosystem and biodiversity services: Ecological, economic, social,

ethical, aesthetic and Informational value.

UNIT-5: Environmental Pollution
• Environmental pollution: types, causes, effects and controls; Air, water, soil and noise pollution
• Nuclear hazards and human health risks
• Solid waste management: Control measures of urban and industrial waste.
• Pollution case studies.

UNIT-6: Environmental Policies & Practices
• Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture
• Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD).
• Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context.

UNIT-7: Human Communities and the Environment
• Human population growth: Impacts on environment, human health and welfare.
• Resettlement and rehabilitation of project affected persons; case studies.
• Disaster management: floods, earthquake, cyclones and landslides.
• Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan.
• Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.
• Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

UNIT-8: Field work
• Visit to an area to document environmental assets: river/ forest/ flora/fauna, etc.
• Visit to a local polluted site-Urban/Rural/Industrial/Agricultural.
• Study of common plants, insects, birds and basic principles of identification.
• Study of simple ecosystems-pond, river, Delhi Ridge, etc.

Suggested Readings:
1. Carson, R. 2002. Silent Spring. Houghton Mifflin Harcourt.

2. Gadgil, M., & Guha, R.1993. This Fissured Land: An Ecological History of India. Univ. of California Press.
3. Gleeson, B. and Low, N. (eds.) 1999.Global Ethics and Environment, London, Routledge.
4. Gleick, P. H. 1993. Water in Crisis. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.

5. Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll.Principles of Conservation Biology. Sunderland: Sinauer Associates, 2006.
6. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. Science, 339:36-37.
7. McCully, P. 1996. Rivers no more: the environmental effects of dams(pp. 29-64). Zed Books.
8. McNeill, John R. 2000. Something New Under the Sun: An Environmental History of the Twentieth Century.
9. Odum, E.P., Odum, H.T. & Andrews, J. 1971.Fundamentals of Ecology. Philadelphia: Saunders.
10. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. Environmental and Pollution Science. Academic Press.
11. Rao, M.N. & Datta, A.K. 1987. Waste Water Treatment. Oxford and IBH Publishing Co. Pvt. Ltd.
12. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012.Environment. 8th edition. John Wiley & Sons.
13. Rosencranz, A., Divan, S., & Noble, M. L. 2001. Environmental law and policy in India. Tripathi 1992.
14. Sengupta, R. 2003. Ecology and economics: An approach to sustainable development. OUP.
15. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. Ecology, Environmental Science and Conservation. S.b Chand Publishing, New Delhi.
16. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi.
17. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. Conservation Biology: Voices from the Tropics. John Wiley & Sons.
18. Thapar, V. 1998. Land of the Tiger: A Natural History of the Indian Subcontinent.
19. Warren, C. E. 1971. Biology and Water Pollution Control. WB Saunders.
20. Wilson, E. O. 2006.The Creation: An appeal to save life on earth. New York: Norton.
21. World Commission on Environment and Development. 1987.Our

Common Future. Oxford University Press.