ASSAM SCIENCE AND TECHNOLOGY UNIVERSITY

Guwahati

Course Structure and Syllabus
(From Academic Session 2020-21 onwards)

M.Tech
CIVIL ENGINEERING

SPECIALISATION: WATER RESOURCES ENGINEERING

1st Semester

1.

ASSAM SCIENCE AND TECHNOLOGY UNIVERSITY

Guwahati

Course Structure
(From Academic Session 2020-21 onwards)

M.Tech: Water Resources Engineering

1st Semester: Course Structure

Theory/ Practical	Sl. No.	Sub Code	Subject	Hours Per week			Credit C	Marks	
				L	T	P		CE	ESE
Core									
Theory	1	CEW202101	Advanced Hydraulic Engineering	3	0	0	3	30	70
	2	CEW202102	Water Resources Engineering	3	0	0	3	30	70
	3	CEW202103	Surface Water Hydrology	3	0	0	3	30	70
Practical	1	CEW202114	Hydraulics and Water Resources Engineering Lab	0	0	4	2	30	70
Programme Elective-I									
Theory	1	CEW202PE1*	Program Elective -1	3	0	0	3	30	70
Open Elective-I									
Theory	1	CEW202OE1*	Open Elective-1	3	0	0	3	30	70
Mandatory Learning Course									
Theory	1	MLC202106	Research Methodology and IPR	2	0	0	2	30	70
Audit Course-I									
Theory	1	MAC20211*	Audit Course-I	2	0	0	0	-	100
Total				**19**	**0**	**4**	**19**	**210**	**590**
Total contact hours per week: 23 **Total Credit**: **19**									

Program Elective-I

Sl No	Code	Subject
1	CEW202PE11	Geomatics in Water Resources
2	CEW202PE12	Environmental Hydrology
3	CEW202PE13	Hydrological Measurements and Data Analysis
4	CEW202PE1*	Any other subject offered from time to time with the approval of the University

Open Elective-I

Sl No	Code	Subject
1	CEG202OE11	Numerical Analysis and Statistical Methods
2	CEW202OE12	Optimization Theory
3	CEW202OE1*	Any other subject offered from time to time with the approval of the University

Audit Course-I

Sl No	Code	Subject
1	MAC202111	English for Research Paper Writing
2	MAC202112	Disaster Management
3	MAC202113	Sanskrit for Technical Knowledge
4	MAC202114	Value Education
5	MAC20211*	Any other subject offered from time to time with the approval of the University

Detailed Syllabus:

Course Code	Course Title	Hours per week L-T-P	Credit C
CEW202101	**Advanced Hydraulic Engineering**	**3-0-0**	**3**

MODULE 1: Classification of Open Channel Flow
Uniform flow, Gradually Varied steady and unsteady flow, rapidly varied flow, spatially varied flow.

MODULE 2: Computation of uniform and critical flow in compound cross- sections.

MODULE 3: Computation of Gradually varied steady flow. Different numerical methods of computation or solution of basic differential equation of Gradually varied flow. Gradually varied flow in compound channels.

MODULE 4: Rapidly Varied Flow
Hydraulic jump equations in sloping no-rectangular expanding rectangular channels, Hydraulic jump in density interfaces.

MODULE 5: Unsteady Open Channel Flow
Continuity and momentum equations, their classical solution by Ritter in dam- break situation, Different numerical techniques of solution of the above equation in different situations.

MODULE 6: Unsteady Conduit Flow
Continuity and momentum equations without a surge tank, numerical methods of solutions. Continuity and momentum equation with a surge tank, classical solutions and Finite difference solutions of the equations.

MODULE 7: Spatially Varied Flow
Differential equations with increasing & decreasing discharge.

MODULE 8: Hydraulic Model Studies
Fixed bed and movable river bed models.

Text/Reference Books:

1. Hydraulic Engineering by Robertson John A.
2. Flow Through Open Channels by Rajesh Srivastava
3. Open- Channel Flow by M. Hanif Chaudhury
4. Flow in Open Channels by K. Subramanya
5. Hydraulic Modelling- An Introduction: Principles, Methods and Applications by Novak Pavel

Course Code	Course Title	Hours per week L-T-P	Credit C
CEW202102	**Water Resources Engineering**	**3-0-0**	**3**

MODULE 1: Introduction
Fields of water resources engineering; problems of water resources engineering, economics in water resources engineering, Social aspects of water resources engineering, planning of water resources projects, the future of water resources engineering. Water resource in North East and its use.

MODULE 2: Engineering Economy in Water Resources Planning
Social importance, steps in an Engineering economy study, discount rate, sunk cost, intangible values, economic life, physical life and period of analysis of a project, cash flow diagram, discounting factors – single payment factors and uniform annual series factors, discounting methods, present worth method, rate of return method, annual cost method, benefit cost ratio method.

MODULE 3: Cost Allocation
Definition, separable cost, joint cost, common cost, method of cost allocation–remaining benefits method and alternative justifiable expenditure method.

MODULE 4: Planning for Water Resources Development
Levels of planning, phases of planning objectives, data required for planning, projections for planning, project formulation, project evaluation, environmental considerations in planning multipurpose project planning, requirement of uses in multipurpose projects, drawbacks in project planning.

MODULE 5: Reservoir
Purpose, physical characteristics of reservoir, storage capacity determination from the site, reservoir site selection, reservoir capacity determination, reservoir sedimentation, trap efficiency, distribution of sediment in a reservoir, useful life of reservoir, reservoir operation and operation rule curves, reservoir yield, economic height of a dam, reservoir working table.

MODULE 6: Hydropower
Types, component and general layout of hydro-power plants, governing equations.

Text/Reference Books:

1. Water Resources Engineering Irrigation Engineering & Hydraulic Structures by S. K. Garg.
2. Water Resources Engineering by Sanjay Gupta.
3. Water Resources Engineering by Wesley P James.
4. Water Resources Engineering by David A Chin.

Course Code	Course Title	Hours per week L-T-P	Credit C
CEW202103	Surface Water Hydrology	3-0-0	3

MODULE 1: Introduction
Scope of Hydrology, Water resources of the world and India, Water budget inventory.

MODULE 2: Hydrometeorology
Hydro meteorological parameters and their observation techniques; solar radiation, temperature, humidity and wind; atmospheric temperature variation, lapse rate, atmospheric circulation, condensation nuclei, cloud seeding, weather system.

MODULE 3: Precipitation
Depth-area-duration curves, graphical representation of rainfall, analysis of rainfall data.

MODULE 4: Abstractions
Losses from precipitation; evaporation- its measurement and factors affecting it; transpiration and factors affecting it; evapotranspiration and its estimation; interception and depression losses; infiltration- infiltration equations, infiltration measurement, infiltration indices, supra-rain techniques.

MODULE 5: Runoff
Instantaneous unit hydrograph, synthetic unit hydrograph, S-hydrograph.

MODULE 6: Flood Routing
Hydrologic and hydraulic routing; reservoir routing- Pul's method, coefficient method, Garret's method, Goodrich's method, method of using dimensionless parameters; channel routing- the Muskinggham method, the working value method, the lag method.

MODULE 7: Probability and Statistics
Frequency distribution, measures of central tendency measures of dispension. Probability distributions- discrete and continuum probability distributions, binomial distribution, poission distribution, normal distribution gamma distributions; Correction and regression analysis- linear-linear regression and multiple regressions.

MODULE 8: Hydrologic Models
Types of hydrologic models, conceptual models, empirical models, black box models; model efficiency.

MODULE 9: Time Series
Hydrologic time series-trend, periodicity, persistence and residuals.

Text/Reference Books:

1. Hydrology: Principles, Analysis, Design by H. M. Raghunath.
2. Ground and Surface Water Hydrology by Larry W. Mays
3. Hydrology, Ground Water and Water Conservation by S. K. Sondge.

Course Code	Course Title	Hours per week L-T-P	Credit C
CEW202114	**Hydraulics and Water Resources Engineering Lab**	**0-0-4**	**2**

List of Experiments:

1. Development of GVF profiles under steady condition.
2. Hydraulic jump and computation of energy loss.
3. Determination of velocity vector using ADV in OCF
4. Study of various river training structures in laboratory channel
5. Sediment transport analysis
6. Demonstration of various hydraulic structures.

Course Code	Course Title	Hours per week L-T-P	Credit C
CEW202PE11	**Geomatics in Water Resources**	**3-0-0**	**3**

MODULE 1: Fundamental Aspects of Geomatics

Aerial Photogrammetry:

Types of aerial photographs, scales, determination of ground coordinates, relief displacement, stereoscopic determination of heights. Interpretation keys for aerial photograph.

Remote Sensing:

Definition, Fundamental Aspects- Governing Laws, Electromagnetic Radiation, Interaction mechanism with Earth Surface Features, Ideal Remote Sensing System- its elements, Resolution- spatial, spectral, temporal, radiometric.

Data capture mechanism from satellite sensors, Satellite Sensors, Types of data products, Interpretation of hard-copy data.

Digital Analysis of Satellite Data- Hardware Requirements, Various steps- Georeferencing, Digital Enhancements, Classification methods- supervised and unsupervised, Current Trends.

MODULE 2: Geographical Information System

Principles, Data Structure, Data Management, Analysis and Decision Making.

MODULE 3: Global Positioning System

Working Principles, Capabilities and Uses.

MODULE 4: Application of Geomatics in Water Resources

Practical applications such as:

Quantification of hydrological elements through remote sensing, Studies related to River Mechanics, Rainfall- Runoff Modelling, Water Balance Budgeting, Flood Risk Zone Managing, Water logging and drainage, Irrigation Water Management etc.

Text/Reference Books:

1. GIS in Water Resources Engineering by Gajraj Singh.
2. GIS for Water Resources Science and Engineering by Leandro Andrei Beser de Deus.

Course Code	Course Title	Hours per week L-T-P	Credit C
CEW202PE12	**Environmental Hydrology**	**3-0-0**	**3**

Basic concepts of environmental hydrology; water cycle, water balance and hydrological processes; environment and water; hydrology and climate, physical and biological interactions; water-related environmental problems; hydrological characteristics of India; drinking water, drinking water regulation and standards, water testing; forest hydrology, hydrological processes in forested area; urban hydrology, urbanization and hydrological processes, runoff process and flood; storm water storage and infiltration, reconstruction of urban water cycle; domestic, industrial, commercial, agriculture, and public water uses; water rights and development; water pollution and water quality policy, point and non-point source pollution and control, self-purification; sewage treatment; groundwater pollution, background and measurements of groundwater contamination, sources and fate of contaminants, organic solvents, phosphate and nitrate, remediation.

Text/Reference Books:

1. Ward A.D. and S.W. Trimble, Environmental Hydrology. 2nd Edition. Lewis Publishers, CRC Press, 2004.
2. Watson and Burnett, Hydrology: An Environmental Approach, CRC Press, 1995.
3. Schwab G. O, Delmar D. Fangmeier, Elliot, William J., Soil and Water Management Systems. John Wiley & Sons, 1996.

Course Code	Course Title	Hours per week L-T-P	Credit C
CEW202PE13	**Hydrological Measurements and Data Analysis**	**3-0-0**	**3**

Introduction – the Hydrologic Cycle
Measurement and Processing of Hydrological Data
Measurement and Processing of Rainfall Data
Measurement and Processing of Streamflow Data
Measurement and Processing of Meteorological Data
Measurement and Processing of Water Quality Data
Ground Water and Other Data
Acquisition and management of spatial data
Hydrological databases and Dissemination of Data
Statistical Analysis of Hydrological Data
Regression, Correlation and Data Generation

Text/Reference Books:

1. Jain, S.K., and Singh, V.P. (2003). Water Resources Systems Planning and Management. Elsevier, Amsterdam.
2. McCuen, R.H. (1989). Hydrologic Analysis and Design. Prentice Hall, New Jersey.
3. Various codes of the Bureau of Indian Standards, New Delhi.
4. Manuals of World Meteorological Organization.

Course Code	Course Title	Hours per week L-T-P	Credit C
CEG202OE11	Numerical Analysis and Statistical Methods	3-0-0	3

MODULE 1: Numerical Solution of Linear Simultaneous Equations
Direct Method- Matrix Inversion Method using Cofactors and Gauss Jordan method. Cramer's Rule Gauss. Elimination Method. Triangular Decomposition Method (Cholesky or Croul Method).
Indirect Method- Jacobi Method. Gauss Siedel Method. Successive Overrelaxation Method. Merits and Demerits of Iterative Methods.
Banded Matrix. Sparsed Matrix. Skyline Storage. Concept of Frontal Solver.

MODULE 2: Numerical Solution of Non-Linear Equations and Polynomials
Plotting Successive Substitution. Bi-section, Method of False Position, Regular False Method. Newton- Raphson Method. Modified Newton-Raphson Method. Hally's Method.
For Polynormals- Graffe's Method. Bairstow's Method. Alpha Constant Method.

MODULE 3: Eigen Values and Eigen Vectors
Properties of Eigen Values and Eigen Vectors Determination of Eigen Values and Eigen Vectors- Direct Method or Characteristic Ploynomial Method (Faddeev Leverrier Method), Cordon's Method. Vector Iteration Method- Vianello Stoodola Method. Orthogonality and Normality Principle. Sweeping Technique for Symmetric and Unsymmetric Matrices. Shift Technique. Transformation Methods- Jacobi Diagonalization Method. Given's Tri- Diagonalization Method. Householder's Tri-Diagonalization Method. L. R. Transformation Method. QR Transformation Method. Applications- Frequency and Mode Shapes.

MODULE 4: Numerical Solution of Different Equations
Ordinary Differential Equation- Local and Global Error Runga Kutta Method of Order 2, 3 and 4. Milne's Predictor Corrector Method.
Boundary Value Problems- Dirichlet Condition. Newmann Condition. Cauchy Condition Partial Differential Equation- Elliptic, Parabolic and Hyperbolic. Finite Difference Method (FDM).

MODULE 5: Numerical Differentiation and Integration
Newton, Bessel, Lagrange, Gregory, Newton and Hermitian Formulae for Numerical Differentiation. Trapezoidal, Simpson, Newton Cores Open Quadrature and Gauss Quadrature Rules for Numerical Integration- Computer Implementation.

MODULE 6: Probability and Statistics
Discrete and continuum random variables, probability distributions, statistical tests for goodness of fit-chi-square test, t-test, F-test. Estimation of parameters by least square method, curve fitting and regression analysis-simple, multiple and partial co-relations. Introduction to stochastics.

Text/Reference Books:

1. Numerical Mathematical Analysis by James B. Scarborough.
2. Numerical Methods in Science and Engineering by S. Rajasekaran.
3. Numerical Methods Software and Analysis by John R. Rice.

Course Code	Course Title	Hours per week L-T-P	Credit C
CEW202OE12	**Optimization Theory**	**3-0-0**	**3**

MODULE 1: Introduction and Basic Concepts
Historical Development; Engineering applications of Optimization; Art of Modeling
Objective function; Constraints and Constraint surface; Formulation of design problems as mathematical programming problems
Classification of optimization problems
Optimization techniques – classical and advanced techniques

MODULE 2: Optimization using Calculus
Stationary points; Functions of single and two variables; Global Optimum
Convexity and concavity of functions of one and two variables
Optimization of function of one variable and multiple variables; Gradient vectors; Examples
Optimization of function of multiple variables subject to equality constraints; Lagrangian function
Optimization of function of multiple variables subject to equality constraints; Hessian matrix formulation; Eigen values
Kuhn-Tucker Conditions; Examples

MODULE 3: Linear Programming
Standard form of linear programming (LP) problem; Canonical form of LP problem; Assumptions in LP Models; Elementary operations
Graphical method for two variable optimization problem; Examples
Motivation of simplex method, Simplex algorithm and construction of simplex tableau; Simplex criterion; Minimization versus maximization problems
Revised simplex method; Duality in LP; Primal-dual relations; Dual Simplex method; Sensitivity or post optimality analysis

MODULE 4: Linear Programming Applications
Use of software for solving linear optimization problems using graphical and simplex methods
Examples for transportation, assignment, water resources, structural and other optimization problems

MODULE 5: Dynamic Programming
Sequential optimization; Representation of multistage decision process; Types of multistage decision problems; Concept of sub optimization and the principle of optimality
Recursive equations – Forward and backward recursions; Computational procedure in dynamic programming (DP)
Discrete versus continuous dynamic programming; Multiple state variables; curse of dimensionality in DP

MODULE 6: Dynamic Programming Applications
Problem formulation and application in Design of continuous beam and Optimal geometric layout of a truss
Water allocation as a sequential process
Capacity expansion and Reservoir operation

MODULE 7: Integer Programming
Integer linear programming; Concept of cutting plane method, Mixed integer programming; Solution algorithms; Examples

MODULE 8: Advanced Topics in Optimization
Piecewise linear approximation of a nonlinear function
Multi objective optimization – Weighted and constrained methods; Multi level optimization
Direct and indirect search methods
Evolutionary algorithms for optimization and search
Applications in civil engineering

Text/Reference Books:

1. S.S. Rao, "Engineering Optimization: Theory and Practice", New Age International P) Ltd., New Delhi, 2000.
2. G. Hadley, "Linear programming", Narosa Publishing House, New Delhi, 1990.
3. H.A. Taha, "Operations Research: An Introduction", 5th Edition, Macmillan, New York, 1992.
4. K. Deb, "Optimization for Engineering Design-Algorithms and Examples", Prentice-Hall of India Pvt. Ltd., New Delhi, 1995.
5. K. Srinivasa Raju and D. Nagesh Kumar, "Multicriterion Analysis in Engineering and Management", PHI Learning Pvt. Ltd., New Delhi, India, ISBN 978-81-203-3976-7, pp.288, 2010.

Course Code	Course Title	Hours per week L-T-P	Credit C
MLC202106	**Research Methodology and IPR**	**2-0-0**	**2**

Course Outcomes:

At the end of this course, students will be able to

- Understand research problem formulation.
- Analyze research related information
- Follow research ethics
- Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
- Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
- Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.

Unit 1:

Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations

Unit 2:

Effective literature studies approaches, analysis Plagiarism, Research ethics,

Unit 3:

Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee

Unit 4:

Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

Unit 5:

Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.

Unit 6: New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.

References:

- Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students'"
- Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"
- Ranjit Kumar, 2nd Edition, "Research Methodology: A Step by Step Guide for beginners"
- Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007.
- Mayall, "Industrial Design", McGraw Hill, 1992.
- Niebel, "Product Design", McGraw Hill, 1974.
- Asimov, "Introduction to Design", Prentice Hall, 1962.
- Robert P. Merges, Peter S. Menell, Mark A. Lemley, " Intellectual Property in New Technological Age", 2016.
- T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008

Course Code	Course Title	Hours per week L-T-P	Credit C
MAC202111	**English for Research Paper Writing**	**2-0-0**	**0**

Course objectives:

Students will be able to:

1. Understand that how to improve your writing skills and level of readability
2. Learn about what to write in each section
3. Understand the skills needed when writing a Title

Ensure the good quality of paper at very first-time submission

Unit 1:

Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness

Unit 2:

Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticising, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts. Introduction

Unit 3:

Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.

Unit 4:

key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature,

Unit 5:

skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusions

Unit 6:

useful phrases, how to ensure paper is as good as it could possibly be the first- time submission

Suggested Studies:

1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books)
2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press
3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman'sbook.
4. Adrian Wallwork, English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011

Course Code	Course Title	Hours per week L-T-P	Credit C
MAC202112	**Disaster Management**	**2-0-0**	**0**

Course Objectives: -Students will be able to:

1. learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
2. critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
3. develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.
4. critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in

Unit 1: Introduction

Disaster: Definition, Factors and Significance; Difference Between Hazard and Disaster; Natural and Manmade Disasters: Difference, Nature, Types and Magnitude.

Unit 2: Repercussions of Disasters and Hazards

Economic Damage, Loss of Human and Animal Life, Destruction of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts and Famines, Landslides and Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks and Spills, Outbreaks of Disease and Epidemics, War and Conflicts.

Unit 3: Disaster Prone Areas in India

Study of Seismic Zones; Areas Prone to Floods And Droughts, Landslides And Avalanches; Areas Prone To Cyclonic And Coastal Hazards With Special Reference To Tsunami; Post-Disaster Diseases And Epidemics

Unit 4: Disaster Preparedness and Management

Preparedness: Monitoring Of Phenomena Triggering A Disaster Or Hazard; Evaluation Of Risk: Application Of Remote Sensing, Data From Meteorological And Other Agencies, Media Reports: Governmental And Community Preparedness.

Unit 5: Risk Assessment

Disaster Risk: Concept And Elements, Disaster Risk Reduction, Global And National Disaster Risk Situation. Techniques Of Risk Assessment, Global Co-Operation In Risk Assessment And Warning, People's Participation In Risk Assessment. Strategies for Survival.

Unit 6: Disaster Mitigation

Meaning, Concept And Strategies Of Disaster Mitigation, Emerging Trends In Mitigation. Structural Mitigation And Non-Structural Mitigation, Programs Of Disaster Mitigation In India.

SUGGESTED READINGS:

1. R. Nishith, Singh AK, "Disaster Management in India: Perspectives, issues and strategies "'New Royal book Company.
2. Sahni, PardeepEt.Al. (Eds.)," Disaster Mitigation Experiences And Reflections", Prentice Hall Of India, New Delhi.
3. Goel S. L., Disaster Administration And Management Text And Case Studies",Deep &Deep Publication Pvt. Ltd., New Delhi.

Course Code	Course Title	Hours per week L-T-P	Credit C
MAC202113	**Sanskrit for Technical Knowledge**	**2-0-0**	**0**

Objectives

1. To get a working knowledge in illustrious Sanskrit, the scientific language in the world
2. Learning of Sanskrit to improve brain functioning
3. Learning of Sanskrit to develop the logic in mathematics, science & other subjects
4. enhancing the memory power
5. The engineering scholars equipped with Sanskrit will be able to explore the huge knowledge from ancient literature

Course Output

Students will be able to

1. Understanding basic Sanskrit language
2. Ancient Sanskrit literature about science & technology can be understood
3. Being a logical language will help to develop logic in students

Unit 1:

- Alphabets in Sanskrit,
- Past/Present/Future Tense,
- Simple Sentences

Unit 2:

- Order
- Introduction of roots
- Technical information about Sanskrit Literature

Unit 3:

- Technical concepts of Engineering-Electrical, Mechanical, Architecture, Mathematics

Suggested reading

1. "Abhyaspustakam" – Dr.Vishwas, Samskrita-Bharti Publication, New Delhi
2. "Teach Yourself Sanskrit" Prathama Deeksha-VempatiKutumbshastri, Rashtriya Sanskrit Sansthanam, New Delhi Publication
3. "India's Glorious Scientific Tradition" Suresh Soni, Ocean books (P) Ltd., New Delhi.

Course Code	Course Title	Hours per week L-T-P	Credit C
MAC202114	**Value Education**	**2-0-0**	**0**

Course Objectives

Students will be able to

1. Understand value of education and self- development
2. Imbibe good values in students
3. Let they should know about the importance of character

Unit 1:

- Values and self-development –Social values and individual attitudes. Work ethics, Indian vision of humanism.
- Moral and non- moral valuation. Standards and principles.
- Value judgements

Unit 2:

- Importance of cultivation of values.
- Sense of duty. Devotion, Self-reliance. Confidence, Concentration. Truthfulness, Cleanliness.
- Honesty, Humanity. Power of faith, National Unity.
- Patriotism. Love for nature, Discipline

Unit 3:

- Personality and Behavior Development - Soul and Scientific attitude. Positive Thinking. Integrity and discipline.
- Punctuality, Love and Kindness.
- Avoid fault Thinking.
- Free from anger, Dignity of labour.
- Universal brotherhood and religious tolerance.
- True friendship.
- Happiness Vs suffering, love for truth.
- Aware of self-destructive habits.
- Association and Cooperation.
- Doing best for saving nature

Unit 4:

- Character and Competence –Holy books vs Blind faith.
- Self-management and Good health.
- Science of reincarnation.
- Equality, Nonviolence,Humility, Role of Women.
- All religions and same message. Mind your Mind, Self-control.
- Honesty, Studying effectively

Suggested reading

1. Chakroborty, S.K. "Values and Ethics for organizations Theory and practice", Oxford University Press, New Delhi

Course outcomes

Students will be able to

1. Knowledge of self-development
2. Learn the importance of Human values
3. Developing the overall personality

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