ASSAM SCIENCE AND TECHNOLOGY UNIVERSITY

Guwahati

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

M.Tech
CIVIL ENGINEERING

SPECIALIZATION: WATER RESOURCES ENGINEERING

2nd Semester

ASSAM SCIENCE AND TECHNOLOGY UNIVERSITY

Guwahati

Course Structure
(From Academic Session 2020-21 onwards)

M.Tech: Civil Engineering
Specialization: Water Resources Engineering
2nd Semester: Course Structure

Theory/ Practical	Sl. No.	Sub Code	Subject	Hours Per week			Credit	Marks	
				L	T	P	C	CE	ESE
Core									
Theory	1	CEW202201	Flood and Erosion Management	3	0	0	3	30	70
	2	CEW202202	Water Resources System Planning and Management	3	0	0	3	30	70
	3	CEW202203	River Engineering	3	0	0	3	30	70
Practical	1	CEG202214	Software Lab	0	0	4	2	30	70
Program Elective-2									
Theory	1	CEW202PE2*	Program Elective-2	3	0	0	3	30	70
Program Elective-3									
Theory	1	CEW202PE3*	Program Elective-3	3	0	0	3	30	70
Audit Course-2									
Theory	1	MAC20222*	Audit Course-2	2	0	0	0	-	100
Total				**17**	**0**	**4**	**17**	**180**	**520**
Total contact hours per week: 21 **Total Credit**: **17**									

Program Elective-2

Sl No	Code	Subject
1	CEW202PE21	Watershed Management
2	CEW202PE22	Urban Water Management
3	CEW202PE23	Water Power Engineering
4	CEW202PE2*	Any other subject offered from time to time with the approval of the University

Program Elective-3

Sl No	Code	Subject
1	CEW202PE31	Ground Water Hydrology
2	CEW202PE32	Design of Hydraulic and Hydropower Structures
3	CEW202PE33	Environmental Management of Water Resources
4	CEW202PE3*	Any other subject offered from time to time with the approval of the University

Audit Course-2

Sl No	Code	Subject
1	MAC202221	Constitution of India
2	MAC202222	Pedagogy Studies
3	MAC202223	Stress Management by Yoga
4	MAC202224	Personality Development through Life Enlightenment Skills
5	MAC20222*	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
CEW202201	**Flood and Erosion Management**	**3-0-0**	**3**

MODULE 1: Introduction
Definition and causes of flood, Importance of flood management study, Major river systems of India with special reference to north east India, Types of flood.

MODULE 2: Flood Estimation
Design flood and its estimation, flood frequency analysis - advanced statistical methods.

MODULE 3: Flood Management
Flood Modification – physical control and protection works, Flood abutment through land use modification, weather modification.

Flood Damage Susceptibility Modification - land use regulation and flood plain zoning, flood proofing, flood forecasting and flood warning, flood insurance and emergency measures.

Loss burden Modification – Evacuation, Flood fighting, Public Health Measures, Loss redistribution.

MODULE 4: Flood Damage Assessment
Importance, methodology for data collection, estimation of crop damages, loss of lives, private and public property damages, indirect damages.

MODULE 5: Flood Forecasting
Basic data, forecasting techniques and procedure, limitations of flood forecasting, flood forecasting models.

MODULE 6: River Bank Erosion
Fluvial and geomorphological set up of rivers of north east India, Types of bank erosion, mechanics of bank failure.

MODULE 7: Erosion Protection
Anti-Erosion/Bank Protection Measures, Design of Anti Erosion/Bank Protection structures

Introduction to River Modelling: Modelling approach, governing equations, input data, method of solution, case studies, river modelling software like HEC RAS, MIKE11, MIKE 21C etc.

Application of RS & GIS in bank erosion study.

Text/Reference Books:

1. Handbook of Flood Management by Arun Kumar.
2. Flood Hazards Management by Kishor Dandapat.
3. Flood Risk Assessment and Management by A. H. Schumann.

Course Code	Course Title	Hours per week L-T-P	Credit C
CEW202202	**Water Resources System Planning and Management**	**3-0-0**	**3**

MODULE 1: Introduction
Basic concept of systems, need for system approach in water resources, system design techniques, application of optimization in water resources, art of modeling, problem formulation.

MODULE 2: Optimization Techniques
LP, NLP, DP, genetic algorithms, sensitivity analysis.

MODULE 3: Simulation
Types, necessity, advantages, limitations, components of a simulation model, difficulties in simulation, application.

MODULE 4: Modeling Techniques
Deterministic and stochastic river basin models, multi-objective planning, capacity expansion, reservoir operation problems.

MODULE 5: Management of Water Resources
National water policies, public involvement, social impact, economic analysis.

Text/Reference Books:

1. Water Resources System Planning and Management: An Introduction to Methods, Models and Applications by Daniel P. Loucks, Eelco van Beek.
2. Optimization Techniques for Design and Water Use Planning by Ahmed Fentaw Abegaz.

Course Code	Course Title	Hours per week L-T-P	Credit C
CEW202203	River Engineering	3-0-0	3

MODULE 1: Introduction
Problems associated with sediments; origin, formation and deposition of sediments; fundamental and bulk properties of sediments.

MODULE 2: Incipient Motion of Sediment Particles
Competent velocity, lift concept, tractive force concept; critical tractive force and approaches toward tractive force; theoretical and semi-theoretical analysis- Shield's analysis, White's analysis.

MODULE 3: Regimes of Flow
Description of regimes of flow; ripple and dune regime, anti-dune regime; characterization of ripples, dunes and anti-dunes.

MODULE 4: Bed Load Transport and Saltation
Bed load equations- Du-Boy's equation, empirical equation, Meyer-Peter and Muller equation. Shield's equation, Einstein's equation, Rottner's approach, Kalinske's equation; general comments on bed load equation; saltation-mechanism of saltation, saltation in air, transport rates in saltation.

MODULE 5: Suspended Load Transport
Mechanism of suspension, general equation of diffusion, integration of sediment distribution equation, assumptions in derivation of sediment distribution equation. Prediction of reference concentration; relation between sediment discharge and water discharge; wash load.

MODULE 6: Stream Bed Variation of Alluvial Streams
Equilibrium depth of scour in channel connection, change of stream bed in floods, degration, aggradation; silting in reservoir scour-nature and limits of scour, scour rate, scour at bridge piers and activities, scour prevention measures.

MODULE 7: Sediment Measuring Devices and Techniques
Bed load measuring devices, suspended load measuring devices, total load measuring devices; characterization of sound measuring**,** electro-acoustic measurements of velocity and flow depth, electro-optical measurements of particle concentration and fluid velocity.

MODULE 8: River Measuring and Bank Protection
Objectives of river training and bank protection; general considerations for stabilization of river courses; river training for flood control, navigation guiding the flow and sediment control

MODULE 9: Alluvial Stream Models
Similarity, governing relationships, approaches based on sediment transport laws, empirical approach, rational approach, Indian approach.

Text/Reference Books:

1. Garde, R.J. and K.G. Ranga Raju. *Mechanics of Sediment Transportation and Alluvial Stream Problems*. Wiley Eastern Limited, New Delhi. 1977.

2. Shen, H.W. *River Mechanics.* Volume I and Volume II. Colorado State University Publishing House, Fort Collins, USA. 1973.
3. Punmia, B.C. and Pandey B. B. Lal. 2010. *Irrigation and Water Power Engineering.* Laxmi Publications, New Delhi. 2010.
4. Das, Madan Mohan and Mimi Das Saikia. *Hydrology*. Prentice Hall of India Pvt. Limited, New Delhi. 2010.

Course Code	Course Title	Hours per week L-T-P	Credit C
CEG202214	**Software Lab**	**0-0-4**	**2**

Students have to learn the application of the following softwares:

1. MIKE 21C
2. HEC RAS
3. QGIS/ArcGIS
4. SWAT/ GeoHEC HMS

Course Code	Course Title	Hours per week L-T-P	Credit C
CEW202PE21	**Watershed Management**	**3-0-0**	**3**

MODULE 1: Watershed Basics
Definition and concept, watershed characteristics, codification, geomorphology of watershed, integrated watershed approach, watershed management principles, micro watershed concept, issues for watershed policies

MODULE 2: Watershed Management Planning
Site selection criteria, bench mark survey, people's participation concept, project evaluation and monitoring

MODULE 3: Measures for Watershed Development
Soil and water conservation: mechanical measures, biological measures and drainage line treatment, rainwater harvesting techniques

MODULE 4: Watershed Modeling
Standard modeling approaches and classifications, system concept for watershed modeling, modeling of rainfall-runoff process, subsurface flows and groundwater flow.

Text/Reference Books:

1. Tideman, E.M., Watershed Management – Guidelines for Indian Conditions, Omega Scientific Publishers, New Delhi, 1996.
2. Allam, Gamal Ibrahim Y., Decision Support System for Integrated Watershed Management, Colorado State University, 1994.
3. American Socy. of Civil Engr., Watershed Management, American Soc. of Civil Engineers, New York, 1975.
4. Black Peter E., Watershed Hydrology, Prentice Hall, London, 1991.
5. Michael A.M., Irrigation Engineering, Vikas Publishing House, 1992.
6. Murty, J.V.S. "Watershed Management", New Age Intl., New Delhi 1998.
7. Murthy, J.V.S., Watershed Management in India, Wiley Eastern, New Delhi, 1994.
8. Purandare, A.P., Jaiswal A.K., Waterhed Development in India, NIRD, Hyderabad, 1995.
9. Vir Singh, Raj, Watershed Planning and Management, Yash Publishing House, Bikaner, 2000.

Course Code	Course Title	Hours per week L-T-P	Credit C
CEW202PE22	**Urban Water Management**	**3-0-0**	**3**

Trends of urbanisation and industrialization, Urban water supply demand forecast, Urban hydrological cycle, Master drainage plans, Estimation of urban storm water quantity, Wastewater collection systems, Design of storm sewer network systems, Storage facilities. Interaction between urban drainage and solid waste management, Storm water Management, Operation and maintenance of urban drainage system.

Text/Reference Books:

1. Geiger, W.F., Marsalek, J. Z., and Rawls, G.J., Manual on Drainage in Urban Areas, 2 Volumes, UNESCO, Paris, 1987.
2. Hall, M.J., Urban Hydrology, Elsevier Applied Science Publishers, 1984.
3. Stahre, P., and Urbonas, B., Storm Water Detention for Drainage, Water Quality and CSO Management, Prentice Hall, New Jersey, 1990.
4. Wanielista, M.P., and Yousef, Y.A., Storm Water Management, John Wiley and Sons, Inc., New York, 1993.

Course Code	Course Title	Hours per week L-T-P	Credit C
CEW202PE23	Water Power Engineering	3-0-0	3

MODULE 1: Introduction
Water availability on earth, available water and technologically utilizable water, fields of water resources engineering, responsibilities of water resources engineers (estimation of water demands, estimation of water availability, identification of water user, investigation of water quality, investigation of geology, environmental & social acceptability, economic feasibility), planning of water resources projects, hydropower development and potential in India and North East, comparison between hydropower & thermal power.

MODULE 2: Reservoir
Definition, purpose, types, physical characteristics of reservoir, zones of storage in a reservoir, storage capacity determination from the site, reservoir site selection, life storage capacity by mass curve method, reservoir sedimentation, trap efficiency, distribution of sediment in a reservoir, useful life of reservoir, reservoir operation, reservoir sedimentation control, reservoir yield, economic height of a dam, reservoir working table, reservoir operation rule curves, planning data requirement, environmental considerations in planning, project target reliability, compatibility of hydro-power water use.

MODULE 3: Types of Hydropower Plants
High, medium and low head plants; runoff river plants, storage plants, diversion canal plants, pumped storage plants, tidal power plants; base load and peak load plants; concentrated fall and divided fall developments, components of hydropower schemes, general layout of hydropower plan with all its components, notable hydropower projects in North East, preparation of detailed project report.

MODULE 4: Estimation of Available Power
Work, Energy and Power, Water energy, Flow and power duration curves, firm power, secondary power, dump power, load distribution–load factor, capacity factor and plant use factor. Power potential study: Nonsequential or flow-duration curve, Sequential stream flow routing (SSR) and Economic analysis.

MODULE 5: Dams
General, Classification of dams, Selection of site and choice of dams, Gravity dam – forces acting, stability analysis, Embankment dam, Arch dam and Buttress dam.

MODULE 6: Water Conveyance
Intakes – types, trash rack, control gates; canals, fore bay, tunnels, pipes.

MODULE 7: Penstock
Design criteria, economic diameter, anchor blocks, water hammer analysis

MODULE 8: Surge Tanks
Functions, types, design criteria

MODULE 9: Turbines

Types, functions, characteristics, working principles, Pelton wheel, Francis turbine, Kaplan turbine, Turbine characteristics – specific speed, characteristic curves, selection of type and numbers of turbines; scroll case, draft tubes, governing of turbines

MODULE 10: Power House

Components, general layout – surface and underground power houses.

MODULE 11: Introduction to System Analysis

Definition of system, system modeling, broad system classification, system analysis, optimization model, types of optimization, basic elements of a model, application of optimization in water resources, simulation, types of simulation, necessity of simulation, advantages of simulation, limitations of simulation, components of a simulation model, difficulties in simulation, art of modeling (problem definition, model construction, model solution, model validity, implementation).

Text/Reference Books:

1. Hydropower Structures – R.S. Varshney – N. C. Jain, Roorkee
2. Irrigation and Water Power Engineering – M. M. Das & M. D. Saikia – PHI Learning Pvt. Ltd., New Delhi.
3. Water Power Engineering – M. M. Dandekar & K. N. Sharma – Vikash Publishing House Pvt. Ltd., Noida, UP.

Course Code	Course Title	Hours per week L-T-P	Credit C
CEW202PE31	**Ground Water Hydrology**	**3-0-0**	**3**

The continuum approach to transport in subsurface hydrology; Darcy's law and its generalization; flow through saturated and unsaturated porous formations; well hydraulics, analysis of pumping test data, ground water recharge, water logging and salinity; infiltration and exfiltration from soils in absence and presence of a water table; modeling contaminant transport through porous media: dispersion, adsorption and decay, volatilization; applications of numerical models (GMS, FEFLOW, PMWIN, etc.) in hydrogeology; model conceptualization, discretization and calibration, initial and boundary conditions, use of Dirichlet and Neumann boundaries, modeling strategy, pitfalls and limitations; Management of groundwater resources, Development of management model, incorporation of simulation \model with the optimization model; Applications: pollution control, mining and construction dewatering, saltwater intrusion, wetland protection from dewatering.

1. Background
    - Hydrologic Cycle
    - Water Budgets
2. Groundwater
    - Darcy's Law and Hydraulic Potential
    - The Steady-state Groundwater Flow Equation
    - Streamlines and Flow Nets
    - Regional Flow and Geologic Controls on Flow
    - Transient Flow, Aquifer Storage and Compressibility
    - Unconfined Flow
    - Groundwater Interaction with Streams and Lakes
    - Numerical Methods
    - Flow in Fractured Rock
3. Well Hydraulics
    - Thiem and Theis Equations
    - Pump Tests and Slug Tests
4. Contaminant Transport
    - Advection and Dispersion
    - Sorption and Diffusive Mass Transfer
    - Aquifer Remediation
5. Vadose Zone Hydrology
    - Unsaturated Flow, Retention Curves and Richard's Equation
    - Infiltration and Evapotranspiration
6. Couples Flow and Transport
    - Density Driven Flow, Freshwater/Saltwater Interaction
    - Heat Transport and Groundwater Flow
7. The Role of Groundwater in Large-scale Water and Chemical Budgets
8. Applications of numerical models (GMS, FEFLOW, PMWIN, etc.) in hydrogeology

Course Prerequisites

1. Hydraulics (Fluid Mechanics I and/or II).
2. Hydrology (Water Resources Engineering I and/or II)

MODULE 1: Introduction
Ground water utilization & historical background, ground water in hydrologic cycle, ground water budget, ground water level fluctuations & environmental influence, literature/ data/ internet resources.

MODULE 2: Occurrence and Movement of Ground Water
Origin & age of ground water, rock properties affecting groundwater, groundwater column, zones of aeration & saturation, aquifers and their characteristics/classification, groundwater basins & springs, Darcy's Law, permeability & its determination, Dupuit assumptions, heterogeneity & anisotropy, Ground water flow rates & flow directions, general flow equations through porous media.

MODULE 3: Advanced Well Hydraulics
Steady/ unsteady, uniform/ radial flow to a well in a confined/ unconfined /leaky aquifer, well flow near aquifer boundaries/ for special conditions, partially penetrating/horizontal wells & multiple well systems, well completion/ development/ protection/ rehabilitation/ testing for yield.

MODULE 4: Pollution and Quality Analysis of Ground Water
Municipal/ industrial/agricultural/miscellaneous sources & causes of pollution, attenuation/ underground distribution/ potential evaluation of pollution, physical /chemical /biological analysis of ground water quality, criteria & measures of ground water quality, ground water salinity & samples, graphical representations of ground water quality

MODULE 5: Surface/ Sub-Surface Investigation of Ground Water
Geological /geophysical exploration/ remote sensing / electric resistivity /seismic refraction based methods for surface investigation of ground water, test drilling & ground water level measurement, sub-surface ground water investigation through geophysical / resistivity /spontaneous potential /radiation / temperature / caliper / fluid conductivity / fluid velocity /miscellaneous logging.

MODULE 6: Artificial Ground Water Recharge
Concept & methods of artificial ground water recharge, recharge mounds & induced recharge, wastewater recharge for reuse, water spreading.

MODULE 7: Saline Water Intrusion in Aquifers
Ghyben-Herzberg relation between fresh & saline waters, shape & structure of the fresh & saline water interface, upcoming of saline water, fresh-saline water relations on oceanic islands, seawater intrusion in Karst terrains, saline water intrusion control.

MODULE 8: Modeling and Management of Ground Water
Ground water modeling through porous media /analog / electric analog / digital computer models, ground water basin management concept, hydrologic equilibrium equation, ground water basin investigations, data collection & field work, dynamic equilibrium in natural aquifers, management potential & safe yield of aquifers, stream-aquifer interaction.

Texts:

1. D. K. Todd and L. F. Mays, "Groundwater Hydrology", John Wiley and sons.
2. J. Bear., Hydraulics of Groundwate , McGRAW-HILL Publications, 1972.
3. K. R. Karanth, "Hydrogeology", TataMcGraw Hill Publishing Company.
4. S. Ramakrishnan, "Ground water", S. Ramakrishnan.

Course References:

1. Fetter, C.W., Contaminant Hydrogeology, Prentice Hall, 1999.

References:

1. Bear, J. and Verruijt, A., Modeling Groundwater Flow and Pollution, Reidel Publishing Company, 1990.
2. Fetter, C.W., Applied Geohydrology, Prentice Hall, 2001.

Course Code	Course Title	Hours per week L-T-P	Credit C
CEW202PE32	**Design of Hydraulic and Hydropower Structures**	**3-0-0**	**3**

1. Storage, Diversion, Conveyance and Distribution structures: An Introduction.
2. Reservoirs behind dams and pond area behind barrages: determination of capacities (influence of sedimentation), Dead and Live storages.
3. Design of storage structures: Gravity dam: Spillway and Non-overflow sections and their design.
4. Other types of concrete dams like Arch dam.
5. Types of spillways (adaptations for concrete and embankment dams).
   Flow characteristics of gated/ungated spillways / breast-walled gates.
6. Types of energy dissipators (Hydraulic Jump / Ski-Jump / Rollerbucket).
7. Typical sections of earth and rockfill dams (homogeneous / zoned).
8. Analysis and design of embankment dams.
9. Diversion structures: Barrages and weirs on permeable foundations.
10. Canal structures: Head regulator, Cross regulator and Falls.
11. Aqueducts; Super passage; Syphon Aqueducts.
12. Principal components of a hydropower station: Intakes and Trash racks, Water conductor system, Tunnels, Surge tanks, Penstocks, Anchor blocks, Turbine foundation.

Text/Reference Books:

1. Hydraulic Structures, *P. Novak, A. I. B. Moffat, C. Nalluri and R. Narayanan, Taylor and Francis, U. K.*
2. Hydraulics of Spillways and Energy Dissipators, *R. M. Khatsuria, Marcel Dekker Publishing, New York.*
3. Manual on Barrages and Weirs on Permeable Foundation, *Publication 179, (Volumes I and II), Central Board of Irrigation and Power, New Delhi.*

Course Code	Course Title	Hours per week L-T-P	Credit C
CEW202PE33	**Environmental Management of Water Resources**	**3-0-0**	**3**

Environmental management- principles, problems and strategies; Review of political, ecological and remedial actions; future strategies; multidisciplinary environmental strategies, the human, planning, decision-making and management dimensions; environmental impact assessment (EIA), definitions and concepts, rationale and historical development of EIA, sustainable development, Initial environmental examination, environmental impact statement, environmental appraisal, environmental impact factors and areas of consideration, measurement of environmental impact, organization, scope and methodologies of EIA, status of EIA in India; Environmental audit, definitions and concepts, environmental audit versus accounts audit, compliance audit, methodologies and regulations; introduction to ISO and ISO 14000; Life cycle assessment; Triple bottom line approach.

Texts:

1. L. W. Canter, Environmental Impact Assessment, 2nd Ed., McGraw-Hill, 1997.
2. N. P. Agarwal, Environmental Reporting and Auditing, Raj Pub., 2002.
3. P. Judith and G. Eduljee, Environmental Impact Assessment for Waste Treatment and Disposal Facilities, John Wiley & Sons, 1994.

References:

1. G. Burke, B. R. Singh and L. Theodore, Handbook of Environmental Management and Technology, 2nd Ed., John Wiley & Sons, 2000.
2. C. H. Eccleston, Environment Impact Statements: A Comprehensive Guide to Project and Strategic Planning, John Wiley & Sons, 2000.
3. J. G. Rau and D. C. Wooten, Environmental Impact Analysis Handbook, McGraw-Hill, 1980.
4. R. F. Fuggle and M. A. Rabie, Environmental Management in South Africa, Juta & Co. Ltd., 1991.
5. R. M. Harrison, Pollution, Causes, Effects and Control, 2nd Ed., Whitstable Lithop Ltd., 1990.
6. K. Whitelaw and Butterworth, ISO 14001: Environmental System Handbook, 1997.

Course Code	Course Title	Hours per week L-T-P	Credit C
MAC202221	**Constitution of India**	**2-0-0**	**0**

Course Objectives:

Students will be able to:

1. Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
2. To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
3. To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

Unit 1: History of Making of the Indian Constitution (4Lectures)

History, Drafting Committee, (Composition & Working)

Unit 2: Philosophy of the Indian Constitution (4 Lectures)

Preamble, Salient Features

Unit 3: Contours of Constitutional Rights & Duties (4 Lectures)

- Fundamental Rights
- Right to Equality
- Right to Freedom
- Right against Exploitation
- Right to Freedom of Religion
- Cultural and Educational Rights
- Right to Constitutional Remedies Directive Principles of State Policy
- Fundamental Duties

Unit 4: Organs of Governance (4 Lectures)

- Parliament
- Composition
- Qualifications and Disqualifications
- Powers and Functions
- Executive
- President
- Governor
- Council of Ministers
- Judiciary, Appointment and Transfer of Judges, Qualifications
- Powers and Functions

Unit 5: Local Administration (4 Lectures)

- District's Administration head: Role and Importance,
- Municipalities: Introduction, Mayor and role of Elected Representative CEO of Municipal Corporation.
- Pachayati raj: Introduction, PRI: ZilaPachayat.
- Elected officials and their roles, CEO ZilaPachayat: Position and role.
- Block level: Organizational Hierarchy (Different departments),
- Village level: Role of Elected and Appointed officials
- Importance of grass root democracy

Unit 6: Election Commission (4 Lectures)

- Election Commission: Role and Functioning.
- Chief Election Commissioner and Election Commissioners.
- State Election Commission: Role and Functioning.
- Institute and Bodies for the welfare of SC/ST/OBC and women

Suggested reading

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
3. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

Course Outcomes:

Students will be able to:

1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
4. Discuss the passage of the Hindu Code Bill of 1956.

Course Code	Course Title	Hours per week L-T-P	Credit C
MAC202222	**Pedagogy Studies**	**2-0-0**	**0**

Course Objectives:

Students will be able to:

1. Review existing evidence on the review topic to inform programme design and policy making undertaken by the DfID, other agencies and researchers.
2. Identify critical evidence gaps to guide the development.

Unit 1: Introduction and Methodology (4 Lectures)

- Aims and rationale, Policy background, Conceptual framework and terminology Theories of learning, Curriculum, Teacher education.
- Conceptual framework, Research questions**.**
- Overview of methodology and Searching

Unit 2: (2 Lectures)

- Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries.
- Curriculum, Teacher education.

Unit 3: (4 Lectures)

- Evidence on the effectiveness of pedagogical practices
- Methodology for the in depth stage: quality assessment of included studies.
- How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?
- Theory of change.
- Strength and nature of the body of evidence for effective pedagogical practices.
- Pedagogic theory and pedagogical approaches.
- Teachers' attitudes and beliefs and Pedagogic strategies.

Unit 4: (4 Lectures)

- Professional development: alignment with classroom practices and follow-up support
- Peer support
- Support from the head teacher and the community.
- Curriculum and assessment
- Barriers to learning: limited resources and large class sizes

Unit 5: Research gaps and future directions (2 Lectures)

- Research design
- Contexts
- Pedagogy
- Teacher education
- Curriculum and assessment
- Dissemination and research impact

Suggested reading

1. Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31 (2): 245-261.
2. Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal of Curriculum Studies, 36 (3): 361-379.
3. Akyeampong K (2003) Teacher training in Ghana - does it count? Multi-site teacher education research project (MUSTER) country report 1. London: DFID.
4. Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning of basic maths and reading in Africa: Does teacher preparation count? International Journal Educational Development, 33 (3): 272–282.
5. Alexander RJ (2001) Culture and pedagogy: International comparisons in primary education. Oxford and Boston: Blackwell.
6. Chavan M (2003) Read India: A mass scale, rapid, 'learning to read' campaign.
7. www.pratham.org/images/resource%20working%20paper%202.pdf.

Course Outcomes:

Students will be able to understand:

1. What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
2. What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
3. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy

Course Code	Course Title	Hours per week L-T-P	Credit C
MAC202223	**Stress Management by Yoga**	**2-0-0**	**0**

Course Objectives

1. To achieve overall health of body and mind
2. To overcome stress

Unit 1: Definitions of Eight parts of yog. (Ashtanga) **(8 Lectures)**

Unit 2: Yam and Niyam **(2 Lectures)**

Do`s and Don't's in ife.

i) Ahinsa, satya, astheya, bramhacharya and aparigraha

ii) Shaucha, santosh, tapa, swadhyay, ishwarpranidhan

Unit 3: Asan and Pranayam **(2 Lectures)**

i) Various yog poses and their benefits for mind & body

ii) Regularization of breathing techniques and its effects-Types of pranayam

Course Code	Course Title	Hours per week L-T-P	Credit C
MAC202224	**Personality Development through Life Enlightenment Skills**	**2-0-0**	**0**

Course Objectives:

1. To learn to achieve the highest goal happily
2. To become a person with stable mind, pleasing personality and determination
3. To awaken wisdom in students

Unit 1: Neetisatakam-Holistic development of personality (8 Lectures)

- Verses- 19,20,21,22 (wisdom)
- Verses- 29,31,32 (pride & heroism)
- Verses- 26,28,63,65 (virtue)
- Verses- 52,53,59 (dont's)
- Verses- 71,73,75,78 (do's)

Unit: 2 (8 Lectures)

- Approach to day to day work and duties.
- Shrimad Bhagwad Geeta : Chapter 2-Verses 41, 47,48,
- Chapter 3-Verses 13, 21, 27, 35, Chapter 6-Verses 5,13,17, 23, 35,
- Chapter 18-Verses 45, 46, 48.

Unit 3: (8 Lectures)

- Statements of basic knowledge.
- Shrimad Bhagwad Geeta: Chapter2-Verses 56, 62, 68
- Chapter 12 -Verses 13, 14, 15, 16,17, 18
- Personality of Role model. Shrimad Bhagwad Geeta: Chapter2-Verses 17, Chapter 3-Verses 36,37,42,
- Chapter 4-Verses 18, 38,39
- Chapter18 – Verses 37,38,63

SUGGESTED READING:

1. "Srimad Bhagavad Gita" by Swami Swarupananda Advaita Ashram (Publication Department), Kolkata
2. Bhartrihari's Three Satakam (Niti-sringar-vairagya) by P.Gopinath, Rashtriya Sanskrit Sansthanam, New Delhi

Course Outcome:

Students will be able to

1. Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life
2. The person who has studied Geeta will lead the nation and mankind to peace and prosperity
3. Study of Neetishatakam will help in developing versatile personality of students.

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