

E.G.S. PILLAY ENGINEERING COLLEGE

(Autonomous)

Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai

Accredited by NAAC with „A' Grade| Accredited by NBA

NAGAPATTINAM – 611002



M.E. ENVIRONMENTAL ENGINEERING

REGULATION -2021

First Year – First Semester

Course Category	Course Code	Course Name	L	T	P	C	Maximum Marks		
							CA	ES	Total
Theory Course									
FC	2101EV101	Statistics For Environmental Engineers	3	2	0	4	40	60	100
PCC	2102EV102	Environmental Microbiology	3	0	0	3	40	60	100
PCC	2102EV103	Principles and Design of Physico-Chemical Treatment Systems	3	0	0	3	40	60	100
PCC	2102EV104	Environmental Chemistry	3	0	0	3	40	60	100
PEC	2103EV001	Transport of water and wastewater (Program Elective–I)	3	0	0	3	40	60	100
RMC	2101RMX01	Research Methodology and IPR	3	0	0	3	40	60	100
AC		Audit Course-I	2	0	0	0	100	0	100
Laboratory Course									
PCC	2102EV105	Environmental Chemistry Laboratory	0	0	4	2	50	50	100
Total			20	02	04	21	390	410	800

2101EV101	STATISTICS FOR ENVIRONMENTAL ENGINEERS	L	T	P	C
		3	2	0	4
MODULE I	PROBABILITY AND RANDOM VARIABLE	9 + 3 Hours			
Probability concepts – Random Variables – Moment generating function – Standard distributions – Binomial - Poisson - rectangular or Uniform – Normal - Exponential distributions - Functions of random variables –Two dimensional random variables.					
MODULE II	STOCHASTIC PROCESSES	9 + 3 Hours			
Classification – Stationary and Random process – Markov process – Markov chains – Transition probability – Classification of Markov chain – Limiting distribution – First passage time – Poisson process – Birth and death process.					
MODULE III	ESTIMATION THEORY	9 + 3 Hours			
Estimation: Point and Interval estimates for population parameters of large sample and small samples, determining the sample size- unbiased Estimators- Maximum Likelihood Estimation-Curve Fitting by Principle of Least square					
MODULE IV	TESTING OF HYPOTHESIS- PARAMETRIC TESTS	9 + 3 Hours			
Hypothesis testing: one sample and two sample tests for means and proportions of large samples z-test, one sample and two sample tests for means of small sample t-test, F-test for two sample standard deviations. ANOVA one and two way classification.					
MODULE V	NON PARAMETRIC TESTS	9 + 3 Hours			
Chi-square test for single sample standard deviation. Chi-square tests for independence of attributes and goodness of fit. Sign test for paired data. Rank sum test. Comparing two populations. Mann – Whitney U test and Kruskal Wallis test.					
					Total: 45 + 15 Hours
REFERENCES:					
1. Jay L. Devore, “Probability and Statistics For Engineering and the Sciences”, Thomson and Duxbury, 2002.					
2. Richard Johnson. ”Miller & Freund“s Probability and Statistics for Engineer”, Prentice – Hall, Seventh Edition, 2007.					
3. Gupta S.C. and Kapoor V.K.”Fundamentals of Mathematical Statistics”, Sultan an Sons, 2001.					
4. Dallas E Johnson , “Applied Multivariate Methods for Data Analysis”, Thomson an Duxbury press, 1998.					
5. Jay L. Devore, “Probability and Statistics For Engineering and the Sciences”, Thomson and Duxbury, 2002.					

2102EV102	ENVIRONMENTAL MICROBIOLOGY	L	T	P	C
		3	0	0	3
MODULE I	CLASSIFICATION AND CHARACTERISTICS	5 Hours			
Classification of microorganisms – prokaryotic, eukaryotic, cell structure, characteristics, Preservation of microorganisms, DNA, RNA, replication, Recombinant DNA technology.					
MODULE II	MICROBES AND NUTRIENT CYCLES	10 Hours			
Distribution of microorganisms – Distribution / diversity of Microorganisms – fresh and marine, terrestrial – microbes in surface soil, Air – outdoor and Indoor, aerosols, biosafety in Laboratory – Extreme Environment – archaebacteria – Significance in watersupplies – problems and control. Transmissible diseases. Biogeochemical cycles Hydrological - Nitrogen, Carbon, Phosphorus, Sulphur, Cycle – Role of Micro Organism in nutrient cycle.					
MODULE III	METABOLISM OF MICROORGANISMS	10 Hours			
Nutrition and metabolism in microorganisms, growth phases, carbohydrate, protein, lipid metabolism – respiration, aerobic and anaerobic-fermentation, glycolysis, Krebs's cycle, hexose monophosphate pathway, electron transport system, oxidative phosphorylation, environmental factors, enzymes, Bioenergetics.					
MODULE IV	PATHOGENS IN WASTEWATER	10 Hours			
Introduction to Water Borne pathogens and Parasites and their effects on Human, Animal and Plant health, Transmission of pathogens – Bacterial, Viral, Protozoan, and Helminths, Indicator organisms of water – Coliforms - total coliforms, E-coli, Streptococcus, Clostridium, Concentration and detection of virus. Control of microorganisms; Microbiology of biological treatment processes – aerobic and anaerobic, α -oxidation, β -oxidation, nitrification and de-nitrification, eutrophication. Nutrients Removal – BOD, Nitrogen, Phosphate. Microbiology of Sewage Sludge.					
MODULE V	TOXICOLOGY	10 Hours			
Ecotoxicology – toxicants and toxicity, Factors influencing toxicity. Effects – acute, chronic, Test organisms – toxicity testing, Bioconcentration – Bioaccumulation, biomagnification, bioassay, biomonitoring, bioleaching.					
Total:					45 Hours
References:					
1. S.C.Bhatia, Hand Book of Environmental Microbiology, Part 1 and 2, Atlantic Publisher					
2. Gabriel Bitton, Wastewater Microbiology, 2nd Edition ,					
3. Raina M. Maier, Ian L. Pepper, Charles P. Gerba, Environmental Microbiology, Academic Press.					
4. S.V.S. Rana, Essentials of Ecology and Environmental Science, 3rd Edition, Prentice Hall of India Private Limited					
5. Stanley E. Manahan, Environmental Science and Technology, Lewis Publishers.					
6. Hurst, C.J. (2002) Manual of Environmental Microbiology. 2nd Ed. ASM PRESS, Washington, D.C. ISBN 1- 55581 - 199 -X.					
7. Frank C. Lu and Sam Kacew, LU's Basic Toxicology, Taylor & Francis, London (4th Ed), 2002					

2102EV103	PRINCIPLES AND DESIGN OF PHYSICO-CHEMICAL TREATMENT SYSTEMS	L	T	P	C
		3	0	0	3
MODULE I	INTRODUCTION	9 Hours			
Pollutants in water and wastewater – characteristics, Standards for performance - Significance of physico- chemical treatment – Need for Transport of water and wastewater-Planning of Water System –Selection of pipe materials, Water transmission main design- gravity and pumping main; Selection of Pumps- characteristics- economics; Specials, Jointing, laying and maintenance, water hammer analysis; water distribution pipe networks Design, analysis and optimization – appurtenances –corrosion prevention – minimization of water losses – leak detection Storage reservoirs.					
MODULE II	TREATMENT PRINCIPLES	9 Hours			
Physical treatment - Screening – Mixing, Equalization – Sedimentation – Filtration – Evaporation – Incineration – gas transfer – mass transfer coefficient Adsorption – Isotherms – Membrane separation, Reverse Osmosis, Nano filtration, ultra filtration and hyper filtration electro dialysis, distillation – stripping and crystallization – Recent Advances. Principles of Chemical treatment – Coagulation flocculation – Precipitation – flotation solidification and stabilization – Disinfection, Ion exchange, Electrolytic methods, Solvent extraction – advanced oxidation /reduction – Recent Trends					
MODULE III	DESIGN OF MUNICIPAL WATER TREATMENT PLANTS	9 Hours			
Planning factors – Design of sanitary sewer; partial flow in sewers, economics of sewer design; Wastewater pumps and pumping stations- sewer appurtenances; material, construction, inspection and maintenance of sewers ;Selection of Treatment – Design of municipal water treatment plant Modules – Aerators – chemical feeding – Flocculation – clarifier – tube settling – filters – Rapid sand filters, slow sand filter, pressure filter, dual media Disinfection - Displacement and gaseous type - Flow charts – Layouts – Hydraulic Profile, PID - construction and O&M aspects – case studies, Residue management – Up gradation of existing plants – Recent Trends.					
MODULE IV	DESIGN OF INDUSTRIAL WATER TREATMENT PLANTS	9Hours			
Design of Industrial Water Treatment Modules- Selection of process – Design of softeners – Demineralizers – Reverse osmosis plants –Flow charts – Layouts –Hydraulic Profile, PID - construction and O&M aspects – case studies, Residue management – Up gradation of existing plants – Recent Trends.					
MODULE V	DESIGN OF WASTEWATER TREATMENT PLANTS	9 Hours			
Design of municipal wastewater treatment Modules-screens-detractors-grit chamber-settling tanks- sludge thickening-sludge dewatering systems-sludge drying beds - Design of Industrial Wastewater Treatment Modules- Equalization- Neutralization-Chemical Feeding Devices-mixers- floatation Modules-oil skimmer Flow charts – Layouts –Hydraulic Profile, PID, construction and O&M aspects – case studies, Retrofitting - Residue management – Up gradation of existing plants – Recent Trends.					
Total:					45 Hours
REFERENCES:					
1. Metcalf and Eddy, Wastewater Engineering, Treatment and Reuse, Tata McGraw Hill, New Delhi, 2003.					
2. Qasim, S.R., Motley, E.M. and Zhu.G. Water works Engineering – Planning, Design and Operation, Prentice Hall, New Delhi, 2002.					
3. Lee, C.C. and Shundar Lin, Handbook of Envrm EnggCalculations, Mc Graw Hill, NewYork, 1999.					

2102EV104	ENVIRONMENTAL CHEMISTRY	L	T	P	C
		3	0	0	3
MODULE I	INTRODUCTION	9 Hours			
Stoichiometry and mass balance-Chemical equilibria, acid base, solubility product(Ksp) ,heavy metal precipitation, amphoteric hydroxides, CO ₂ solubility in water and species distribution – Chemical kinetics , First order- 12 Principles of green chemistry.					
MODULE II	AQUATIC CHEMISTRY	11 Hours			
Water quality parameters- environmental significance and determination; Fate of chemicals in aquatic environment, volatilization, partitioning, hydrolysis, photochemical transformation – Degradation of synthetic chemicals- Metals, complex formation, oxidation and reduction , pE – pH diagrams, redox zones – sorption- Colloids, electrical properties, double layer theory, environmental significance of colloids, coagulation.					
MODULE III	ATMOSPHERIC CHEMISTRY	7 Hours			
Atmospheric structure –chemical and photochemical reactions – photochemical smog. Ozone layer depletion – greenhouse gases and global warming, CO ₂ capture and sequestration – Acid rain- origin and composition of particulates. Air quality parameters- effects and determination.					
MODULE IV	SOIL CHEMISTRY	9 Hours			
Nature and composition of soil-Clays- cation exchange capacity-acid base and ion-exchange reactions in soil – Agricultural chemicals in soil-Reclamation of contaminated land; salt by leaching-Heavy metals by electrokinetic remediation.					
MODULE V	ENVIRONMENTAL CHEMICALS	9 Hours			
Heavy metals-Chemical speciation –Speciation of Hg &As- Organic chemicals- Pesticides, Dioxins, PCBs, PAHs and endocrine disruptors and their Toxicity- Nano materials, CNT, titania, composites, environmental applications.					
				Total:	45 Hours
References:					
1. Sawyer, C.N., MacCarty, P.L. and Parkin, G.F., Chemistry for Environmental Engineering and					
2. Science, Tata McGraw – Hill, Fifth edition, New Delhi 2003.					
3. Colin Baird „Environmental Chemistry“, Freeman and company, New York, 1997.					
4. Manahan, S.E., Environmental Chemistry, Eighth Edition, CRC press, 2005.					
5. Ronbald A. Hites ,Elements of Environmental Chemistry, Wiley, 2007.					

2101RMX01	RESEARCH METHODOLOGY AND IPR	L	T	P	C
COURSE OBJECTIVE	<ul style="list-style-type: none"> • Problem formulation, analysis and solutions. • Technical paper writing / presentation without violating professional ethics • Patent drafting and filing patents. 	3	0	0	3
MODULE 1	RESEARCH PROBLEM FORMULATION	9 Hours			
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					
MODULE 2	LITERATURE REVIEW	9 Hours			
Effective literature studies approaches, analysis, plagiarism, and research ethics.					
MODULE 3	TECHNICAL WRITING /PRESENTATION	9 Hours			
Effective technical writing, how to write report, paper, developing a research proposal, format of research proposal, a presentation and assessment by a review committee.					
MODULE 4	INTRODUCTION TO INTELLECTUAL PROPERTY RIGHTS (IPR)	9 Hours			
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.					
MODULE 5	INTELLECTUAL PROPERTY RIGHTS (IPR)	9 Hours			
Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications. New Developments in IPR: Administration of Patent System, IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.					
OUTCOME	CO1 : To formulate research problem CO2 : To carry out research analysis CO3 : To follow research ethics CO4 : To understand that today's world is controlled by computer, information technology, but tomorrow world will be ruled by ideas, concept, and creativity CO5 : To understand about IPR and filing patents in R & D.				
REFERENCES	1. Asimov, "Introduction to Design", Prentice Hall, 1962. 2. Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007. 3. Mayall, "Industrial Design", McGraw Hill, 1992. 4. Niebel, "Product Design", McGraw Hill, 1974. 5. Ranjit Kumar, 2nd Edition, "Research Methodology: A Step by Step Guide for beginners" 2010				

2102EV105	ENVIRONMENTAL CHEMISTRY LABORATORY	L	T	P	C
		0	0	4	2
List of Experiments:					
1. Good Laboratory Practices, Quality control, calibration of Glassware					3 Hours
2. Sampling and Analysis of water (pH, alkalinity, hardness chloride, Sulphate, turbidity EC, TDS, nitrate, fluoride)					12 Hours
3. Wastewater analysis (BOD, COD, Phosphate, TKN, Oil & Grease, Surfactant and heavy metals).					12 Hours
4. Sampling and analysis of air pollutants Ambient & Stack (RSPM, SO ₂ and NO _x)					9 Hours
5. Sampling and characterization of soil (CEC & SAR, pH and K).					9 Hours
Total:					45 Hours
References:					
1. APHA, Standard Methods for the Examination of Water and Wastewater, 21st Ed.					
2. Washington, 2005.					
3. Laboratory Manual for the Examination of water, wastewater soil Rump, H.H. and Krist, H.					
4. Second Edition, VCH, Germany, 1992.					

PROGRAM ELECTIVE-I

2103EV001	TRANSPORT OF WATER AND WASTEWATER	L	T	P	C
		3	0	0	3
COURSE OBJECTIVES:					
1. To educate the students in detailed design concepts related to water transmission mains, water Distribution system, sewer networks and storm water drain					
2. To educate the students in computer application on design.					
MODULE I	GENERAL HYDRAULICS AND FLOW MEASUREMENT	8 Hours			
Fluid properties; fluid flow – continuity principle, energy principle and momentum principle; frictional head loss in free and pressure flow, minor heads losses, Carrying Capacity–Flow measurement.					
MODULE II	WATER TRANSMISSION AND DISTRIBUTION	10 Hours			
Need for Transport of water and wastewater-Planning of Water System –Selection of pipe materials, Water transmission main design- gravity and pumping main; Selection of Pumps- characteristics-economics; Specials, Jointing, laying and maintenance, water hammer analysis; water distribution pipe networks Design, analysis and optimization – appurtenances – corrosion prevention – minimization of water losses – leak detection Storage reservoirs.					
MODULE III	WASTEWATER COLLECTION AND CONVEYANCE	10 Hours			
Planning factors – Design of sanitary sewer; partial flow in sewers, economics of sewer design; Wastewater pumps and pumping stations- sewer appurtenances; material, construction, inspection and maintenance of sewers; Design of sewer outfalls-mixing conditions; conveyance of corrosive wastewaters.					
MODULE IV	STORM WATER DRAINAGE	7 Hours			
Necessity- - combined and separate system; Estimation of storm water run-off Formulation of rainfall intensity duration and frequency relationships- Rational methods.					
MODULE V	CASE STUDIES AND SOFTWARE APPLICATIONS	10 Hours			
Use of computer software in water transmission, water distribution and sewer design – EPANET2.0, LOOP version 4.0, SEWER, BRANCH, Canal ++ and GIS based softwares.					
				Total:	45 Hours
References:					
1. Bajwa, G.S. Practical Handbook on Public Health Engineering, Deep Publishers, Shimla, 2003					
2. “Manual on water supply and Treatment”, CPHEEO, Ministry of Urban Development, Government of India, New Delhi, 1999.					
3. “Manual on Sewerage and Sewage Treatment”, CPHEEO, Ministry of Urban					

AUDIT COURSE – I

2101AU001	ENGLISH FOR RESEARCH PAPER WRITING	L	T	P	C
		2	0	0	0
COURSE OBJECTIVES:					
	1. Teach how to improve writing skills and level of readability				
	2. Tell about what to write in each section				
	3. Summarize the skills needed when writing a Title				
	4. Infer the skills needed when writing the Conclusion				
	5. Ensure the quality of paper at very first-time submission				
MODULE I	INTRODUCTION TO RESEARCH PAPER WRITING	6 Hours			
Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness					
MODULE II	PRESENTATION SKILLS	6 Hours			
Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticizing, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts, Introduction					
MODULE III	TITLE WRITING SKILLS	6 Hours			
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, Methods, Results, Discussion, Conclusions, The Final Check					
MODULE IV	RESULT WRITING SKILLS	6 Hours			
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					
MODULE V	VERIFICATION SKILLS	6 Hours			
Useful phrases, checking Plagiarism, how to ensure paper is as good as it could possibly be the first- time submission					
				Total:	30 Hours
FURTHER READING:	-				
COURSE OUTCOMES:					
CO1	Understand that how to improve your writing skills and level of readability				
CO2	Learn about what to write in each section				
CO3	Understand the skills needed when writing a Title				
CO4	Understand the skills needed when writing the Conclusion				
CO5	Ensure the good quality of paper at very first-time submission				
REFERENCES:					
1. R. Nishith, Singh AK, “Disaster Management in India: Perspectives, issues and strategies ““New Royal book Company.					
2. Sahni, Pardeep Et. 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.					

2101AU002	DISASTER MANAGEMENT			L	T	P	C
				2	0	0	0
COURSE OBJECTIVES:							
	1. Summarize basics of disaster						
	2. Explain a critical understanding of key concepts in disaster risk reduction and humanitarian response.						
	3. Illustrate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.						
	4. Describe an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.						
	5. Develop the strengths and weaknesses of disaster management approaches						
MODULE I	INTRODUCTION					6 Hours	
Disaster: Definition, Factors and Significance; Difference between Hazard And Disaster; Natural and Manmade Disasters: Difference, Nature, Types and Magnitude							
MODULE II	REPERCUSSIONS OF DISASTERS AND HAZARDS					6 Hours	
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.							
MODULE III	DISASTER PRONE AREAS IN INDIA					6 Hours	
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							
MODULE IV	DISASTER PREPAREDNESS AND MANAGEMENT					6 Hours	
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 CommMODULEy Preparedness.							
MODULE V	RISK ASSESSMENT					6 Hours	
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							
						Total:	30 Hours
FURTHER READING: -							
COURSE OUTCOMES:							
CO1	Ability to summarize basics of disaster						
CO2	Ability to explain a critical understanding of key concepts in disaster risk reduction and humanitarian response.						
CO3	Ability to illustrate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.						
CO4	Ability to describe an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.						
CO5	Ability to develop the strengths and weaknesses of disaster management approaches						
REFERENCES:							
1. Goel S. L., Disaster Administration And Management Text And Case Studies”,Deep & Deep Publication Pvt. Ltd., New Delhi,2009.							
2. NishithaRai, Singh AK, “Disaster Management in India: Perspectives, issues and strategies “”NewRoyal book Company,2007.							
3. Sahni, PardeepEt.Al. ,” Disaster Mitigation Experiences And Reflections”, Prentice Hall OfIndia, New Delhi,2001.							

2101AU003	SANSKRIT FOR TECHNICAL KNOWLEDGE			L	T	P	C	
				2	0	0	0	
Course Objectives:								
	1. Illustrate the basic sanskrit language							
	2. Recognize sanskrit, the scientific language in the world.							
	3. Appraise learning of sanskrit to improve brain functioning.							
	4. Relate sanskrit to develop the logic in mathematics, science & other subjects enhancing the memory power.							
	5. Extract huge knowledge from ancient literature.							
MODULE I	ALPHABETS						6 Hours	
Alphabets in Sanskrit								
MODULE II	TENSES AND SENTENCES						6 Hours	
Past/Present/Future Tense - Simple Sentences								
MODULE III	ORDER AND ROOTS						6 Hours	
Order - Introduction of roots								
MODULE IV	SANSKRIT LITERATURE						6 Hours	
Technical information about Sanskrit Literature								
MODULE V	TECHNICAL CONCEPTS OF ENGINEERING						6 Hours	
Technical concepts of Engineering-Electrical, Mechanical, Architecture, Mathematics								
						Total:	30 Hours	
Further Reading:	-							
Course Outcomes:								
CO1	Understanding basic Sanskrit language							
CO2	Write sentences							
CO3	Know the order and roots of Sanskrit.							
CO4	Know about technical information about Sanskrit literature							
CO5	Understand the technical concepts of Engineering							
References:								
1. "Abhyaspustakam" – Dr. Vishwas, Samskrita-Bharti Publication, New Delhi								
1. "Teach Yourself Sanskrit" Prathama Deeksha-Vempati Kutumbshastri, Rashtriya Sanskrit Sansthanam, New Delhi Publication								
2. "India's Glorious Scientific Tradition" Suresh Soni, Ocean books (P) Ltd., New Delhi, 2017.								

2101AU004	VALUE EDUCATION			L	T	P	C	
				2	0	0	0	
Course Objectives:								
1. Understand value of education and self-development								
2. Imbibe good values in students								
3. Let the should know about the importance of character								
MODULE I							6 Hours	
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								
MODULE II							8 Hours	
Importance of cultivation of values. Sense of duty. Devotion, Self-reliance. Confidence, Concentration. Truthfulness, Cleanliness. Honesty, Humanity. Power of faith, Nationaly Patriotism. Love for nature, Discipline								
MODULE III							8 Hours	
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 brother hood and religious tolerance. True friendship. Happiness Vs suffering, love for truth. Aware of self-destructive habits. Association and Cooperation. Doing best for saving nature								
MODULE IV							8 Hours	
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.								
						Total:	30 Hours	
FURTHER READING:		-						
COURSE OUTCOMES:								
CO1	Knowledge of self-development							
CO2	Learn the importance of Human values							
CO3	Developing the overall personality.							
References:								
1. Chakroborty, S.K.“Values and Ethics for organizations Theory and practice”, Oxford University Press, New Delhi								

2101AU005	CONSTITUTION OF INDIA				L	T	P	C
					2	0	0	0
Course Objectives:								
	2. Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective							
	3. To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional							
	4. Role and entitlement to civil and economic rights as well as the emergence nation hood in the early years of Indian nationalism.							
	5. 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.							
MODULE I	HISTORY OF MAKING OF THE INDIAN CONSTITUTION:					5 Hours		
History, Drafting Committee, (Composition & Working)								
MODULE II	PHILOSOPHY OF THE INDIAN CONSTITUTION:					5 Hours		
Preamble, Salient Features								
MODULE III	CONTOURS OF CONSTITUTIONAL RIGHTS AND DUTIES:					5 Hours		
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.								
MODULE IV	ORGANS OF GOVERNANCE:					5 Hours		
Parliament, Composition, Qualifications and Disqualifications, Powers and Functions, Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions.								
MODULE V	LOCAL ADMINISTRATION:					5 Hours		
District's Administration head: Role and Importance Municipalities: Introduction, Mayor and role of Elected Representative, CEO, Municipal Corporation. Pachayati raj: Introduction, PRI: Zila Pachayat. Elected officials and their roles, CEO Zila Pachayat: Position and role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy.								
MODULE VI	ELECTION COMMISSION:					5 Hours		
Election Commission: Role and Functioning. Chief Election Commissioner and Election Commissioners - Institute and Bodies for the welfare of SC/ST/OBC and women.								
						Total:	30 Hours	
FURTHER READING:		-						
COURSE OUTCOMES:								
CO1	Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.							
CO2	Discuss the intellectual origins of the framework of argument that informed the conceptualization							
CO3	of social reforms leading to revolution in India.							
CO4	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.							
CO5	Discuss the passage of the Hindu Code Bill of 1956.							
REFERENCES:								
1. The Constitution of India, 1950 (Bare Act), Government Publication.								
2. Dr.S.N.Busi, Dr.B. R.Ambedkar framing of Indian Constitution, 1 st Edition, 2015.								
3. M.P. Jain, Indian Constitution Law, 7 th Edn., Lexis Nexis, 2014.								
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.								

2101AU006	PEDAGOGY STUDIES			L	T	P	C	
				2	0	0	0	
Course Objectives:								
1. Review existing evidence on there view topic to inform programmed design and policy								
2. Making under taken by the Dfid, other agencies and researchers.								
3. Identify critical evidence gaps to guide the development.								
MODULE I	INTRODUCTION AND METHODOLOGY:						6 Hours	
Aims and rationale, Policy background, Conceptual framework and terminology - Theories of learning, Curriculum, Teacher education - Conceptual framework, Research questions - Overview of methodology and Searching.								
MODULE II	THEMATIC OVERVIEW						6 Hours	
Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries - Curriculum, Teacher education.								
MODULE III	EVIDENCE ON THE EFFECTIVENESS OF PEDAGOGICAL PRACTICES						6 Hours	
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.								
MODULE IV	PROFESSIONAL DEVELOPMENT						6 Hours	
Professional development: alignment with classroom practices and follow up support - Peer support - Support from the head teacher and the commMODULEy - Curriculum and assessment - Barriers to learning: limited resources and large class sizes								
MODULE V	RESEARCH GAPS AND FUTURE DIRECTIONS						6 Hours	
Research design – Contexts – Pedagogy - Teacher education - Curriculum and assessment - Dissemination and research impact.								
						Total:	30 Hours	
FURTHER READING: -								
COURSE OUTCOMES:								
CO1	What pedagogical practices are being used by teachers informal and informal classrooms in developing countries?							
CO2	What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?							
CO3	How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?							
References:								
1. Ackers J, HardmanF (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. Akyeamong K (2003) Teacher training in Ghana-does it count? Multi-site teacher education research project (MUSTER) country report 1.London:DFID.								
4. Akyeamong 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								

2101AU007	STRESS MANAGEMENT BY YOGA			L	T	P	C	
				2	0	0	0	
COURSE OBJECTIVES:								
1. To achieve overall health of body and mind								
2. To overcome stress								
MODULE I							10 Hours	
Eight parts of yoga.(Ashtanga)								
MODULE II							10 Hours	
Yam and Niyam - Do`s and Don`t`s in life - i) Ahinsa, satya, astheya, bramhacharya and aparigraha,								
MODULE III							10 Hours	
Asan and Pranayam - Various yog poses and their benefits for mind & body - Regularization of breathing techniques and its effects-Types of pranayam								
						Total:	30 Hours	
FURTHER READING:	-							
COURSE OUTCOMES:								
CO1	Develop healthy mind in a healthy body thus improving social health also							
CO2	Improve efficiency							
References:								
1. Yogic Asanas for Group Training-Part-I”.Janardan Swami Yoga bhyasi Mandal, Nagpur								
2. Rajayoga or conquering the Internal Nature” by Swami Vivekananda, Advaita Ashrama (Publication Department), Kolkata								

2101AU008	PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS			L	T	P	C	
				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								
MODULE I							10 Hours	
Neetisatakam-holistic development of personality - 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)								
MODULE II							10 Hours	
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.								
MODULE III							10 Hours	
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								
							Total:	30 Hours
FURTHER READING: -								
COURSE OUTCOMES:								
CO1	Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life							
CO2	The person who has studied Geeta will lead the nation and mankind to peace and prosperity							
CO3	Study of Neet is hatakam will help in developing versatile personality of students.							
REFERENCES:								
1. Gopinath, Rashtriya Sanskrit Sansthanam P, Bhartrihari’s Three Satakam, Niti- sringar-vairagya, New Delhi,2010								
2. Swami Swarupananda , Srimad Bhagavad Gita, Advaita Ashram, Publication Department,Kolkata, 2016.								

2101AU009	UNNAT BHARAT ABHIYAN	L	T	P	C
		2	0	0	0
COURSE OBJECTIVES:					
	1. Unnat Bharat Abhiyan is inspired by the vision of transformational change in rural development processes by leveraging knowledge institutions to help build the architecture of an Inclusive India.				
	2. The Mission of Unnat Bharat Abhiyan is to enable higher educational institutions to work with the people of rural India in identifying development challenges and evolving appropriate solutions for accelerating sustainable growth.				
	3. It also aims to create a virtuous cycle between society and an inclusive academic system by providing knowledge and practices for emerging professions and to upgrade the capabilities of both the public and the private sectors in responding to the development needs of rural India				
MODULE 1					10 Hours
Introduction. Holistic development of a village – Economic, Social, Human, Governance, Basic Amenities, Environmental aspects. Vision and mission of UBA. Activities of Unnat Bharat Abhiyan. Expediting the process of indigenous, sustainable rural development with effective support from professional institutes of higher education. Building capacity in institutes of Higher Education for research, training and development of technologies relevant to national needs, especially those of rural India. Creating the Requisite Structure to Cope with the Challenge.					
MODULE 2					10 Hours
National Steering Committee for UBA (NSC - UBA). The Coordinating Institution for UBA (CI-UBA) and its Responsibilities. Identification and Role of Mentoring Institutions (MI - UBA). Identification and Role of Subject Expert Groups (SEG - UBA). UBA Participating Institutions in General (PIs - UBA).					
MODULE 3					10 Hours
Methodology of Intervention and Monitoring. Expected outcomes from UBA. Mechanism for Providing the Base-level funding from MHRD. Various Sources of Funding for the Actual Cluster Development Work. Status of Steps Already Completed towards Setting up the Structural Network of UBA. Major activities so far. Action Plans.					
				Total:	30 Hours
References:					
1. https://www.rcisgbau.in/pdf/UBA_concept_note.pdf					
2. https://unnatbharatabhiyan.gov.in/documents					
3. https://unnatbharatabhiyan.gov.in:8443/introduction					
4. https://unnatbharatabhiyan.gov.in:8443/new_website/https://unnatbharatabhiyan.gov.in:8443/app/webroot/files/general-documents/Unnat%20Bharat%20Abhiyan-%20Brochure%202016.pdf					