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. COMMUNICATION SYSTEMS

REGULATION - 2021

First Year – First Semester

Course Category		Course Name	L	T	P	C	Maximum Marks		
							CA	ES	Total
Theory Course									
FC	2101CO101	Applied Engineering Mathematics for Communication System	3	2	0	4	40	60	100
PCC	2102CO102	Antenna Design and Analysis	3	0	0	3	40	60	100
PEC	2103CO001	Program Elective – I (Electromagnetic Interference and Compatibility in System Design)	3	0	0	3	40	60	100
PEC	2103CO006	Program Elective – II (Network Routing Algorithms)	3	0	0	3	40	60	100
RMC	2101RMX01	Research Methodology and IPR	3	0	0	3	100	00	100
AC		Audit Course – I	2	0	0	0	100	00	100
Laboratory Course									
PCC	2102CO103	Communication System Laboratory	0	0	4	2	50	50	100
PCC	2102CO104	RF System Design Laboratory	0	0	2	1	50	50	100
Total			**17**	**0**	**6**	**19**	**560**	**340**	**900**

2101CO101	APPLIED ENGINEERING MATHEMATICS FOR COMMUNICATION SYSTEM	L	T	P	C
		2	2	0	3

COURSE OBJECTIVES:	1. To expose the students to solve ordinary differential equations by various techniques.	
	2. To understand basic concepts of Advanced techniques in Matrix operations, linear equations.	
	3. To acquire the knowledge of interest in Special functions	
MODULE I	**LINEAR PROGRAMMING**	**9 Hours**
Formulation – Graphical solution – Simplex method – Two phase method - Transportation and Assignment Models		
MODULE II	**ADVANCE MATRIX THEORY**	**9 Hours**
Diagonalization of symmetric matrices - Quadratic forms - Singular values decomposition - Change of basis, Cramer‟s rule, Matrix factorizations.		
MODULE III	**ORDINARY DIFFERENTIAL EQUATIONS**	**9 Hours**
Runge-Kutta Methods for system of IVPs, numerical stability, Adams-Bash forth multistep method, solution of stiff ODEs, shooting method, BVP: Finite difference method, orthogonal collocation method, orthogonal collocation with finite element method, Galerk in finite element method.		
MODULE IV	**RANDOM PROCESSES**	**9 Hours**
Classification – Auto Correlation – Cross Correlation – Stationary random process – Markov process –Markov Chain – Poisson process – Gaussian process.		
MODULE V	**SPECIAL FUNCTIONS**	**9 Hours**
Bessel‟s equation – Bessel functions – Legendre‟s equation – Legendre‟s polynomials – Rodrigue‟s formula – Recurrence relations – Generating functions and orthogonal property for Bessel‟s functions– Strum - Liouville problem – Error functions.		
	Total:	**30 + 15 Hours**

COURSE OUTCOMES:	
	After completion of the course, Student will be able to
	1. Have knowledge in the fields of linear algebra and linear programming
	2. Provide the students with outstanding educational skills that will enable them to integrate under graduate fundamentals with advanced knowledge to solve complex problems
	3. Recall combination of theoretical knowledge and independent mathematical thinking using special functions

REFERENCES:

1. Elsgolts. L, **Differential Equation and Calculus of variations**, MIR Publishers, 1996
2. Grewal B S, **Higher Engineering Mathematics**, Fortieth Edition, Khanna Publications, New Delhi 2014.
3. Howard A. Anton, "**Elementary Linear Algebra**",JohnWiley &Sons, Ninth Edition,2008.
4. David C. Lay, Steven R Lay and Judy J McDonald "**Linear Algebra and it Applications**", Global Edition Pearson Education Ltd, 2015
5. Raisinghania. M. D, **Ordinary and partial differential equations**, S. Chand & Co, New Delhi, 2006.
6. Seymour Lipschutz, Marc Lipson,"**Schaum's Outline of Linear Algebra**", McGraw Hill, Fifth Edition, 2013
7. Taha H.A. ―Operations Research: An introduction‖ Ninth Edition, Pearson Education, Asia, New Delhi 2012

2102CO102	ANTENNA DESIGN AND ANALYSIS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1. To learn fundamental concepts of antennas
2. To explore the types of radiation from antennas and antenna arrays.
3. To design micro strip antennas and measure the antenna parameters

MODULE I	ANTENNA FUNDAMENTALS	9 Hours

Review of Electromagnetic Theory, Vector Potential Approach, Antenna fundamental parameters Solution Procedure Hertzian Dipole Short Dipole, Radiation Resistance and Directivity, Half-wave Dipole, Monopole, Small Loop Antenna.

MODULE II	APERTURE ANTENNAS	9 Hours

Aperture Antennas: Introduction, Magnetic Current and its Fields, Uniqueness Theorem Field Equivalence Principle, Huygens Principle - Radiation Equation – Directivity - Rectangular Aperture - TE10 - Mode - Circular Aperture - TE11 – Mode - Design Considerations - Fourier Transforms in Aperture Antenna Theory, E-Plane Sectoral Horn - applications.

MODULE III	ANTENNA SYNTHESIS	9 Hours

Linear array and Planar array - Characteristics, synthesis techniques - Fourier Transform method, and Taylor Line Source synthesis and Dolph - Chebyshev distributions. Circular array antennas.

MODULE IV	ANALYSIS AND DESIGN OF MICROSTRIP PATCH ANTENNAS	9 Hours

Configurations - Excitations and radiation mechanism of micro strip patch antennas - Radiation resistance - Power and input impendence. Modeling of rectangular and circular micro strip patch antennas - Transmission line model and cavity model method. Circular polarization and bandwidth of micro strip patch antennas. Simulation of micro strip antennas using Simulation Software-Case studies.

MODULE V	ANTENNAS FOR SPECIAL APPLICATIONS	9 Hours

Introduction, Antenna design considerations for satellite communication, architecturally acceptable antennas, ILS antennas, LEO satellite link antennas, UWB antennas fir digital applications, Plasma antenna.

	Total:	45 Hours

COURSE OUTCOMES:

After completion of the course, Student will be able to

1. Compute the far field distance, radiation pattern and gain of an antenna for given current distribution.
2. Estimate the radiation pattern from aperture antennas.
3. Synthesis the antenna arrays using different techniques.
4. Design micro strip antennas and feed networks for micro strip antennas.
5. Design and Analyze the antennas for specific applications

REFERENCES:

1. Balanis. A, 'Antenna Theory Analysis and Design', John Wiley and Sons, New York, 1982
2. John D Kraus, 'Antennas for all applications', Third Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi.
3. Hubregt. J. Visser 'Antenna Theory and Applications' 1st Edition, John Wiley & Sons Ltd, Newyork,2012.
4. Zhijun Zhang, 'Antenna Design for Mobile Devices', 1st Edition, John Wiley & Sons (Asia) Ltd, Newyork,2011
5. Xavier Begaud, 'Ultra-Wide Band Antennas', 1st Edition, ISTE Ltd and John Wiley & Sons Ltd, Newyork,2013.
6. I.J. Bahl and P. Bhartia, "Microstrip Antennas", Artech House,Inc.,1980

2101RMX01	RESEARCH METHODOLOGY AND IPR	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:	1. Problem formulation, analysis and solutions.	
	2. Technical paper writing / presentation without violating professional ethics	
	3. Patent drafting and filing patents.	
MODULE I	**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 II	**LITERATURE REVIEW**	**7 Hours**
Effective literature studies approaches, analysis, plagiarism, and research ethics.		
MODULE III	**TECHNICALWRITING /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 IV	**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 V	**INTELLECTUAL PROPERTY RIGHTS (IPR)**	**11 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.		
	Total:	**45 Hours**
FURTHER READING:	-	
COURSE OUTCOMES:		
	After completion of the course, Student will be able to	
	1. Ability to formulate research problem	
	2. Ability to carry out research analysis	
	3. Ability to follow research ethics	
	4. Ability to understand that today's world is controlled by Computer, Information Technology,but tomorrow world will be ruled by ideas, concept, and creativity	
	5. Ability 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 Guidefor beginners" 2010

2102CO103	COMMUNICATION SYSTEM LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:	1. To understand underlying concepts in signal, speech and image processing
	2. To provide a comprehensive analysis of digital modulation techniques.
	3. To learn about the adaptive filtering algorithms.
	4. To understand the mechanism of multirate systems, source control coding, error control coding and OFDM.

LIST OF EXPERIMENTS:

1. Implementation of LMS, RLS adaptive filters to remove noise to the estimation of Channel.
2. Implementation of Digital Modulation Techniques
3. Compare Gaussian minimum shift keying (GMSK) and minimum shift keying (MSK) modulation schemes
4. Simulation of Linear, Convolutional and Cyclic Codes
5. Design and simulation of Multirate systems
6. Design and Analysis of spectrum estimators (Barlett,Welch)
7. Simulation and analysis of speech and image compression algorithms
8. Design and implementation of source coding technique
9. Implementation of Pulse Coded Modulation using Simulink
10. Implementation of OFDM physical link using Simulink

MINI PROJECT:

- Signal enhancement using spectral subtraction
- Image denoising
- Audio compression
- Adaptive Echo/Noise canceller
- Radar Tracking System
- GSM

Total: 30 Hours

COURSE OUTCOMES:

After completion of the course, Student will be able to

1. Able to learn about signal processing concepts and to implement the adaptive filteringalgorithms
2. Able to understand the image and speech processing algorithms
3. Able to analyze the various modulation, coding techniques and multirate systems

2102CO104	RF SYSTEM DESIGN LABORATORY	L	T	P	C
		0	0	4	2
COURSE OBJECTIVES:	1. To provide experience in Simulation & Implementation of the Micro strip antennas and planar array antenna				
	2. To provide experience in design, Implementation and testing of a Micro strip coupler and coplanar waveguides using simulation software				
LIST OF EXPERIMENTS:					
1. Characteristics of RF diodes, transistors					
2. Determination of S - parameter for MIC components					
3. Design and simulation of Micro strip filters and switches					
4. Design and implementation of Micro strip Couplers					
5. Design and simulation of Phase shifters					
6. Design parameters of planar waveguides					
7. Design and simulation of wired and Micro strip antenna					
8. Design and simulation of Micro strip antenna arrays					
Mini Project 9. Design and implementation of RF circuits like amplifiers, mixers and oscillators					
10. Analysis and testing the performance of thin film resistances					
11. Design and analysis of antenna arrays					
		Total:			**30 Hours**
COURSE OUTCOMES:					
	After completion of the course, Student will be able to				
	1. Understanding of various MIC technologies				
	2. Knowledge of microstrip transmission lines and their parameters				
	3. Discussion about passive and non-passive reciprocal devices and their analysis				
	4. Learn the various coplanar MICs and their applications				
	5. Design of various microwave circuits like amplifiers, oscillators and mixers				

PROGRAM ELECTIVE – I

2103CO001	ELECTROMAGNETIC INTERFERENCE AND COMPATIBILITY IN SYSTEM DESIGN	L	T	P	C
		3	0	0	3
COURSE OBJECTIVES:	1. To explore the concepts of EMI Environment and EMI Coupling Principles				
	2. To focus on popular EMI / EMC Standards and Measurements				
	3. To study the control techniques involved in Electromagnetic Interference				
MODULE I	**EMI ENVIRONMENT**				**9 Hours**
EMI/EMC concepts and definitions, Sources of EMI, conducted and radiated EMI, Transient EMI, Time domain Vs Frequency domain EMI, Units of measurement parameters, Emission and immunity concepts, ESD					
MODULE II	**EMI COUPLING PRINCIPLES**				**9 Hours**
Conducted, Radiated and Transient Coupling, Common Impedance Ground Coupling, Radiated Common Mode and Ground Loop Coupling, Radiated Differential Mode Coupling, Near Field Cable to Cable Coupling, Power Mains and Power Supply coupling					
MODULE III	**EMI/EMC STANDARDS AND MEASUREMENTS**				**9 Hours**
Civilian standards - FCC, CISPR, IEC, EN, Military standards - MIL STD 461D/462, EMI Test Instruments /Systems, EMI Shielded Chamber, Open Area Test Site, , Military Test Method and Procedures (462).					
MODULE IV	**EMI CONTROL TECHNIQUES**				**9 Hours**
Shielding, Filtering, Grounding, Bonding, Isolation Transformer, Transient Suppressors, Cable Routing, Signal Control, Component Selection and Mounting					
MODULE V	**EMC DESIGN OF PCBS**				**9 Hours**
PCB Traces Cross Talk, Impedance Control, Power Distribution Decoupling, Zoning, Motherboard Designs and Propagation Delay Performance Models, Electrical, Magnetic and Thermal analysis of circuits for EMC					
					Total: 45 Hours
FURTHER READING : TEM Cell, Sensors/Injectors/Couplers, Test beds for ESD and EFT					
COURSE OUTCOMES:					
	After completion of the course, Student will be able to				
	1. Recall electromagnetic concepts and its measuring parameters				
	2. understand the EMI coupling principle and its types				
	3. know the design and architecture of Micro machined Antennas				
	4. Explain Mems phase shifters and its applications				
	5. Demonstrate Designing of PCBs				

REFERENCES:

1. Henry W.Ott, Noise Reduction Techniques in Electronic System, John Wiley and Sons, 2008
2. C.R. Paul, Introduction to Electromagnetic Compatibility, John Wiley and Sons, Inc, 2005
3. V.P.Kodali., Engineering EMC Principles, Measurements and Technologies, IEEE Press, 1996
4. Bernhard Keiser, Principles of Electromagnetic Compatibility, Artech house, 1986

PROGRAM ELECTIVE – II

2103CO006	NETWORK ROUTING ALGORITHMS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1. To expose the students to the layered architecture for communication networks and the specific functionality of the network layer
2. To enable the student to understand the basic principles of routing and the manner this is implemented in conventional networks and the evolving routing algorithms based on Internetworking requirements, optical backbone and the wireless access part of the network
3. To enable the student to understand the different routing algorithms existing and their performance characteristics

MODULE I	INTRODUCTION	9 Hours

ISO OSI Layer Architecture, TCP/IP Layer Architecture, Functions of Network layer, General Classification of routing, Routing in telephone networks, Dynamic Non hierarchical Routing (DNHR), Trunk status map routing (TSMR), real-time network routing (RTNR), Distance vector routing, Link state routing, Hierarchical routing.

MODULE II	INTERNET ROUTING	9 Hours

Interior protocol : Routing Information Protocol (RIP), Open Shortest Path First (OSPF), Bellman Ford Distance Vector Routing. Exterior Routing Protocols: Exterior Gateway Protocol (EGP) and Border Gateway Protocol (BGP). Multicast Routing: Pros and cons of Multicast and Multiple Unicast Routing, Distance Vector Multicast Routing Protocol (DVMRP), Multicast Open Shortest Path First (MOSPF), MBONE, Core Based Tree Routing.

MODULE III	ROUTING IN OPTICAL WDM NETWORKS	9 Hours

Classification of RWA algorithms, RWA algorithms, Fairness and Admission Control, Distributed Control Protocols, Permanent Routing and Wavelength Requirements, Wavelength Rerouting-Benefits and Issues, Light path Migration, Rerouting Schemes, Algorithms- AG, MWPG.

MODULE IV	MOBILE - IP NETWORKS	9 Hours

Macro-mobility Protocols, Micro-mobility protocol: Tunnel based : Hierarchical Mobile IP, Intra domain Mobility Management, Routing based: Cellular IP, Handoff Wireless Access Internet Infrastructure (HAWAII).

MODULE V	MOBILE AD –HOC NETWORKS	9 Hours

Internet-based mobile ad-hoc networking communication strategies, Routing algorithms – Proactive routing: destination sequenced Distance Vector Routing (DSDV), Reactive routing: Dynamic Source Routing (DSR).

Total: 45 Hours

COURSE OUTCOME:

After completion of the course, Student will be able to

1. Classify routing
2. Construct internet routing protocols.
3. Design routing in optical WDM networks
4. Show macro and micro mobility protocols
5. Design internet based mobile ad-hoc network.

REFERENCES:

1. William Stallings, _ High speed networks and Internets Performance and Quality of Service II[nd] Edition, Pearson Education Asia. Reprint India 2002
2. M. Steen Strub, _ Routing in Communication network, Prentice –Hall International, Newyork,1995
3. S. Keshav, _An engineering approach to computer networking,, Addison Wesley 1999
4. William Stallings, _High speed Networks TCP/IP and ATM Design Principles, Prentice- Hall, New York, 1995
5. C.E Perkins, _Ad Hoc Networking,,, Addison – Wesley, 2001
6. Ian F. Akyildiz, Jiang Xie and Shanti devMohanty, ― A Survey of mobility Management in Next generation All IP- Based Wireless Systems‖,
7. A.T Campbell et al., ― Comparison of IP Micro mobility Protocols, IEEE Wireless Communications Feb.2002, pp 72-82

AUDIT COURSES

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.

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:

4. Goel S. L., Disaster Administration And Management Text And Case Studies",Deep & Deep Publication Pvt. Ltd., New Delhi,2009.

5. NishithaRai, Singh AK, "Disaster Management in India: Perspectives, issues and strategies "'NewRoyal book Company,2007.

6. 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 SanskritSansthanam, 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:

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
3. Role and entitlement to civil and economic rights as well as the emergence nation hood in the early years of Indian nationalism.
4. To address the role of socialism in India after the commencement of the Bolshevik Revolutionin1917and 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 thatinformed 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,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.

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. 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: Amass 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 ofbreathing 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 Tarining-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