Jaypee Institute of Information Technology

Integrated M.Tech. Biotechnology

Semester VII

Course Descriptions

Detailed Syllabus

Lecture-wise Breakup

Course Code	10B1NBT732	**Semester Odd (specify Odd/Even)**	**Semester** VII **Session** 2018 -2019 **Month from**June to December
Course Name	Clinical Database Management system		
Credits	3	**Contact Hours**	**LTP 3 0 0**

Faculty (Names)	**Coordinator(s)**	DrChakresh Kumar Jain
	Teacher(s) (Alphabetically)	DrChakresh Kumar Jain

COURSE OUTCOMES		**COGNITIVE LEVELS**
CO1	Explain clinical trials.	**Understanding** C2
CO2	Explain biostatistical methods and tools for clinical data analytics	**Understanding** C2
CO3	Apply statistics and CDBMS tools for clinical trial studies	**Applying** C3
CO4	Case studies based clinical data analysis	**Analyzing** C4

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	**Clinical Trials and field studies**	Introduction to clinical trials, phases of clinical trial, Design, Subjects, Randomization , Statistical Issues in Randomized Trials, Blinding, Intervention and Controls, Follow-up, Adherence to the Protocol and Post-Randomization, Measuring Outcomes and Adverse Effects, Measuring Outcomes and Adverse Effects, Ethics in Clinical Trials and Interim Monitoring, Pilot and Multicenter Studies, : GCP/ICH Guidelines, Overview of class; Race/ethnicity, social class, and culture, Determinants of health and health disparities, Analytic issues in assessing outcome disparities across groups, Recruitment and	**20**

		retention and community-academic partnerships, Decision Analysis: Introduction, Steps; Cost Effectiveness: Data Inputs (Costs), Epidemiology. Outcome research.	
2.	**DBMS**	Introduction, Concept of a multi-table relational database and data normalization. Rows as entities, columns as attributes. Primary and foreign keys. One-to-Many, Many-to-Many, and One-to-One relationships. The basic tables in a clinical research study: subjects, measurements, and examiners. Tables and Relationships, Data Entry Forms, Queries and Reports, Importing Data, Queries and Exporting Data, Levels of Research database.	**6**
3.	**Biostatistics for clinical trials**	Introduction, Multivariate analysis, Multiple Linear Regression, Categorical Predictors, Confounding and Mediation, Model Diagnostics, Binary Outcome Data, Multiple Logistic Regression, Dichotomous tests, Multilevel and continuous tests, Screening and prognostic tests, Combining information from multiple tests / Critically appraising studies of diagnostic tests, Quantifying the benefits and harms of treatments, Alternatives to randomized trials for estimating effects of tests and treatments, P-values and confidence intervals,	**6**
4.	**Miscellaneous**	Publishing clinical data, case studies, seminar, field visits, clinical trial practical and journal club. Hands on workshop on SAS.	**10**
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Presentation/Assignment/Quiz/case study)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	Stephen B. Hulley , "Designing Clinical Research", 3rd Edition, Wolter Kluwer Health, 2007
2.	Gerald Van Belle & Lloyd Fisher "Biostatistics: a methodology for the health sciences", Wiley Publishers, 2004
3.	Research papers: As per course website.

Department of Biotechnology

Programme Name: B.Tech Biotechnology

Semester: VII

Course Name & Code: Major Project (Part 1), 15B19BT791

Course Outcomes:

At the completion of the course, students will be able to,

Sl. No.	DESCRIPTION	COGNITIVE LEVEL (BLOOM's TAXONOMY)
C450.1	Interpret the given research problem.	Understanding Level Level II
C450.2	Organize the existing literature data to formulate the hypothesis	Applying Level Level III
C450.3	Identify the experimental methods to test for the selected research problem	Applying Level Level III
C450.4	Prepare and conclude with technical report	Create Level Level VI

Course Code	**15B19BT792**	**Semester Even (specify Odd)**	**Semester IV Session 2019 -2020 Month from July -Dec**
Course Name	Term Paper		
Credits	4	**Contact Hours**	

Faculty (Names)	**Coordinator(s)**	DrChakresh Kumar Jain
	Teacher(s) (Alphabetically)	DrChakresh Kumar Jain

COURSE OUTCOMES		**COGNITIVE LEVELS**
C460.1	Conduct literature survey to identify the research problem	**Understanding** (C2)
C460.2	Identify the gaps/inadequacies in the existing literature based on a problem	**Applying** (C3)
C460.3	Present an overview of the relevant literature for the specific research topic	**Applying** (C3)
C460.4	Conclude on the findings and compile the term paper	**Analyzing** (C4)

Department of Biotechnology

Programme Name: B.Tech Biotechnology

Semester: VII

Course Name & Code: Summer Training Viva, 15B19BT793

Course Outcomes:

At the completion of the course, students will be able to,

Sl. No.	DESCRIPTION	COGNITIVE LEVEL (BLOOM's TAXONOMY)
C455.1	Extend theoretical knowledge to real time Industry and Institutes	Understanding Level Level II
C455.2	Demonstrate a capacity for critical reasoning and independent learning	Understanding Level Level II
C455.3	Make use of Industrial Training experience to prepare a scientific report	Applying Level Level III
C455.4	Develop greater clarity about academic and career goals	Applying Level Level III

Detailed Syllabus

Lecture-wise Breakup

Course Code	16B1NBT734	**Semester Odd**	**Semester VII Session** 2018 -2019 **Month from** July to December
Course Name	Advanced cell biology		
Credits	**3+1**	**Contact Hours**	**4**

Faculty (Names)	**Coordinator(s)**	Dr. Priyadarshini
	Teacher(s) (Alphabetically)	Dr. Priyadarshini

COURSE OUTCOMES		**COGNITIVE LEVELS**
C431-3.1	Explain cellular organization, integration, migration and communication	Apply Level (C2)
C431-3.2	Illustrate membrane trafficking in cell environment	Apply Level (C3)
C431-3.3	Identify the signaling event during biogenesis	Apply Level (C4)
C431-3.4	Compare regeneration and maintenance of different tissue	Apply Level (C4)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Advance Microscopy	History of microscopy, Electron microscopy, scanning electron microscopy, confocal laser scanning microscopy, fluorescence microscopy, transmission electron microscopy.	3
2.	Organization of cell & tissue	Sub-cellular Fractionation and Characterization of Organelles, Integrating cells into tissue, cell-cell & epithelial-mesenchymal interaction	5
3.	Cell Adhesion, Migration & communication	Cell Adhesion Molecules, Integrins and Mucins and cell migration, Extracellular Matrix and cell communication	4

4.	Nuclear structure & dynamics	a) Nuclear envelop & traffic between the nucleus & cytoplasm b) Internal organization of nucleus c) Nucleolus d) Nucleus during mitosis	5
5.	Membrane trafficking	a) Moving proteins into membrane & organelles b) Vesicular traffic, secretion & endocytosis	5
6.	Tissue maintenance	a) Epidermis & its renewal by stem cells, sensory epithelia, airway and the gut b) Blood vessels & endothelial cells, blood cell formation, renewal by pleuripotent cells c) Genesis, modulation & regulation of skeletal muscle d) Fibroblast & their transformation	8
7.	Cytoskeleton dynamics & cellular movement	a) Self assembly& dynamic structure of cytoskeleton filaments b) Molecular motors c) Microtubule based motility	6
8.	Mitochondrial biogenesis	a) Mitochondrial & biogenesis exercise b) Factors regulating mitochondrial biogenesis c) Signalling event during biogenesis	6
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Class test, Assignment-1 Assignment-2)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	M. Geoffrey, Cooper & E. Robert Hausman, "The Cell: A Molecular Approach", ASM Press Publication, 2004
2.	Becker, J. Lewis, Kleinsmith& Jeff Hardin, "The World of the Cell", Pearson Education publication, 2004
3.	B. Alberts, A. Johnson, J. Lewis, M. Raff, K. Roberts & P. Watter, "Molecular Biology of the Cell",

	Garland Science Publication, 2002
4.	H. Lodish, A. Berk, P. Matsudaira, C. A-Kaiser, M. Kreiger, M. P. Scott, S. Lawrence, Zipursky& J. Darnell, "Molecular Cell Biology", WH Freeman & Company Publication, 1986
5.	Current research paper related to the course

Detailed Syllabus

Lecture-wise Breakup

Course Code	17B1NBT731	**Semester :** ODD	**Semester:** VII **Session:** 2018 -2019 **Month from:** July to December
Course Name	Food Biotechnology		
Credits	3-0-1	**Contact Hours**	4

Faculty (Names)	**Coordinator(s)**	Dr. Smriti Gaur
	Teacher(s) (Alphabetically)	Dr.Smriti Gaur

COURSE OUTCOMES		**COGNITIVE LEVELS**
C432-4.1	Explain fundamental principles of food science and chemistry.	Understand level (**C2)**
C432-4.2	Outline beneficial and harmful effects of microorganisms related to food	Understand level (**C2)**
C432-4.3	Utilize microbes for development of functional food	Apply level (**C3)**
C432-4.4	Examine methods that increase shelf life and quality parameters of food	Analyze **(C4)**

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	**Food Science and Food Chemistry**	Food Science and Food Chemistry Concepts, Proteins in food, Lipids in food, Carbohydrates in food, Vitamin and minerals, food flavors and colors.	**08**
2.	**Food Fermentations**	Microbiology of fermented food products, traditional fermented food items like beverages (cereal and fruit juice based), bakery, fermented Vegetables and dairy products	**06**
3.	**Food Processing and Preservation**	Food spoilage and food borne diseases, Principles of food preservation – methods of preservation; irradiation, drying,	**10**

		heat processing(high temperature), chilling and freezing(low temperature),preservation by food additives	
4.	**Functional Foods**	Single Cell Protein, Probiotics and prebiotics, Yeast as a food supplement.	**06**
5.	**Processed Food Industry**	Enzyme kinetics, Enzymes in food industry, Current status of Indian processed food industry, key challenges	**06**
6.	**Food safety and control**	Food adulteration, Food safety regulations, Good manufacturing practices – HACCP, Regulations, GMO and GM Foods. International rules and regulations in export and import.	**06**
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (presentation and viva)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	Food Science & Food Biotechnology, G.F.G Lopez and GVB Canovas CRC Press, Florida(2003)
2.	Bioprocess and Biotechnology for functional foods and Nutraceuticals, J.R Neeser , J.Bruce German Marcel and Dekker , New York (2004)
3.	Food Microbiology, Frazier W C, Westoff DC, Vanitha NM, Mc Graham Hill Education (2013)
4.	Essentials of food science by. Vaclavik VA and Elizabeth WC., Springer (2008)
5.	Food processing and preservation by Sivasankar B., PHI Private Limited (2008)

Detailed Syllabus

Lecture-wise Breakup

Course Code	**17B1NBT734** ELECTIVE	**Semester Odd**	**Semester VII Semester Session** 2018 -2019 **Month from** July to December
Course Name	Stem Cells and Health Care		
Credits	4	**Contact Hours**	4

Faculty (Names)	**Coordinator(s)**	Dr. Sujata Mohanty
	Teacher(s) (Alphabetically)	Dr. Sujata Mohanty

COURSE OUTCOMES		**COGNITIVE LEVELS**
CO1	Compare the unique properties of stem cells derived from different sources	Understand Level (C2)
CO2	Select niche and various isolation and reprogramming methods of stem cells	Apply Level (C3)
CO3	Apply the acquired knowledge in Regenerative medicines	Apply Level (C3)
CO4	Analyze the guidelines, political and ethical issues for stem cell research	Analyze Level (C4)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Introduction to Stem Cells	Stem cells: the promising field of research, Unique Properties: Self-renewal, Potency and proliferation Asymmetric Cell Division, History ofStem Cells	04
2.	Types and sources of Stem Cells: Embryonic Stem cells; hESCs	Characteristics of ES cells: Sources (IVF & SCNT), Isolation and Culture Techniques, Characterization, Unique features, Genetic Manipulation and Differentiation	06

3.	Types and sources of Stem Cells: Adult Stem cells; ASCs	Types of Adult Stem Cells: Umbilical Cord Blood, Placental, Hematopoietic, Cardiac, Neural, Pancreatic Stem Cells Adult Stem Cells vs Embryonic stem cells	06
4.	Cloning and Reprogramming of somatic cells: iPSCs	Cloning strategy, Reprogramming of Cells to Stem cells, ipsc, Detail strategy and properties and application of ipsc	06
5.	Therapeutic Applications of Stem Cells	Stem cell Research and application in Healthcare, Tissue Engineering, Regenerative Medicine, Opportunities and Challenges, Case studies	10
6.	Stem cell Banking	Vision, collection and storage procedure, Insurance against life threatening diseases, Existing Centres both in India and abroad	04
7.	Stem cell research: Indian and Global scenario: Ethical and legal issues	Stem cell research Centers in India and abroad and their valuable contribution, National and International guidelines for conducting stem cell research	06
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignment 1 and 2, Class Test, Presentation,)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	Robert Lanza et.al., Handbook of Stem Cells, Volume 1-Embryonic Stem Cells; 2006, Academic press
2.	Robert Lanza et.al. Handbook of Stem Cells Volume 2-Adult & Fetal Stem Cells
3.	M.J. Laughlin & H.M. Lazarus Allogeneic Stem cell Transplantation 2003 Humana Press, USA
4.	Stewart Sell, Stem Cells Handbook 2003 Humana Press, USA
5.	Robert Paul. Essentials of Stem Cell Biology 2006 Elsevier Academic

6.	Jeanne F. Loring Human Stem Cell Manual: A Laboratory Guide, Elsevier Science& Technology, 2007
7.	**Recent research articles will be discussed in the class and same will be provided.**
	Websites: http, www.isscr.org/, https://stemcells.nih.gov/

Detailed Syllabus

Lecture-wise Breakup

Course Code	**17B1NBT736**	**Semester** Odd **(specify Odd/Even)**	**Semester VII Session** 2018 -2019 **Month from** July to December
Course Name	**Techno Economic Bio Feasibility Reporting**		
Credits	4	**Contact Hours**	4

Faculty (Names)	**Coordinator(s)**	1. Prof. S Krishna Sundari
	Teacher(s) (Alphabetically)	1. Prof. S Krishna Sundari

COURSE OUTCOMES		**COGNITIVE LEVELS**
CO736.1	Demonstrate technical know-how of feasibility reporting and its relation to Biotechnology enterprise	Understand Level(C2)
CO736.2	Utilize fundamental principles of planning, estimating, budgeting and IPR to translate Biotechnology Research to Industry projects	Apply Level(C3)
CO736.3	Analyze the market and construct a techno-feasibility report in Biotechnology allied areas	Analyze Level(C4)
CO736.4	Explain Priorities, Policies, safety and regulations for Biotech Industry	Understand Level(C2)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Fundamentals of Feasibility reporting	Fundamental principles of Feasibility reporting, Technical analysis of planning, estimating, budgeting, scheduling, evaluation, and controlling Biotechnology projects	5
2.	Feasibility analysis & Principal focus	Research & Development, Business models, Strategy development, Plan of implementation, Human resources,	4

	areas	Finance, Governance	
3.	Market analysis	Overview of the market for the product / service, Competitive advantages of your product or service over the competitor – strengths and weaknesses of your competitor, SWOT, PEST analysis, assessing market potential, with respect to Biotechnology based business projects	3
4.	Financial statement	Break even analysis, assessing availability of various necessities, raw materials, Income statement showing the expected level of profit over next five years, forecasting, time series analysis.	4
5.	Entrepreneurship in Biotechnology	Potential & Pitfalls, Biotech Drug Industry & discovery Process, Biotechnology Parks etc	4
6.	Patent Literacy	Patents, trademarks, copyrights, trade secrets, different conventions in Patenting regime, National & International patents, Licensing, IPR & Biotechnology	6
7.	Biotechnology - Priorities & Policies:	Concerns of Biotechnology industry, Biotechnology policy of Govt. of India, Regulatory & ethical issues.	4
8.	Business models & Case studies in Biotechnology sector	Business models of current biotech Industries, University-Industry collaborations and their relevance in biotechnology	6
9.	Feasibility report making	In-depth study of one biotech business sector in the student's area of interest and practice in writing a professional report	6
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (…)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	"Biotechnology organizations in action: Turning knowledge into business" by JesperNorus, Elsevier publishers
2.	"A guide to business plan writing" by Susan C DiClemente, D & MD publications
3.	Feasibility reports pertaining to Biotechnology published by TIFAC, DST, Govt. of India.
4.	Study of Drug & Market Development (D & MD) reports
5.	Study of Patent files from IPO, EPO & USPTO

Detailed Syllabus

Lecture-wise Breakup

Course Code	**17B1NBT737**	**Semester Odd**	**Semester** VII **Session** 2018 -2019 **Month from** July to December
Course Name	**Enzymes in food processing**		
Credits	3-0-1	**Contact Hours**	4

Faculty (Names)	**Coordinator(s)**	DrNeerajWadhwa
	Teacher(s) (Alphabetically)	NeerajWadhwa Susinjen Bhattacharya

COURSE OUTCOMES		**COGNITIVE LEVELS**
C431-2.1	Explain role of various enzymes in food processing	**Understand Level (C2)**
C431-2.2	Identify need for Technical enzymes	**Apply Level (C3)**
C431-2.3	Examine recent technology in Food processing Industries	**Analyze Level (C4)**
C431-2.4	List quality assurance protocol and economic consideration.	**Analyze Level (C4)**

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	General characteristics of Technical Enzymes	Enzyme analysis, technical Enzyme units Enzyme kinetics principles of enzyme assay and kinetic studies; techniques for enzyme extraction; high- throughput screening; statistical analysis of enzyme kinetic data; and relevance of active sites any one example .	4
2.	Description of Enzymes and their substrates	Carbohydrate Hydrolyzing Enzymes – amylases, cellulase, Hemicellulases, Isomerase, cell wall composition Pectin degradation	4
3.	Description of Enzymes and their substrates	Proteases: Plant, animal, microbial, Fat hydrolysis: Lipases , Phospholipases	4

4.	Application of Enzymes Preparation	Enzyme in Starch and Sugar Industry , Enzyme in Brewing Industry , Analytical monitoring of mashing Process, Cold stabilization Enzymatic Alcohol production - continuous process	6
5.	Commercial enzyme production, and the processing	Beverage Industry ,Enzymes in Juice and Wine making	4
6.	Flour processing	Enzyme in Flour Processing and Baking – Flour component and enzymes	4
7.	Dairy Industry	Enzymes in Dairy Industry, cheese making and ripening aroma and flavor production, cold sterilization, Enzymes in product modification.	4
8.	Proteolysis	Debittering, Hydrolysis of Soy protein, fish protein, Milk protein, collagen, Blood protein	4
9.	Nutrition	Silage enzymes, Additives in fodder ,Chicken feed ,Pig husbandry,	4
10.	Future Development	Tailoring enzyme structure and function Alteration of technical properties, Increasing yields, Raw matter utilization, Improving preservation, flavors,	4
		Total number of Lectures	42

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignment)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	N. Tilak, T.Steve& R.Gerald,Enzymes in Food Processing3rd Edition, USA: Academic Press, 1993.
2.	J.W. Robert. &V.O.Maarten*Enzymes in Food Technology*: John Wiley and Sons: 2009.
3.	U. Helmut,*Industrial enzymes and their applications* 3rd Edition,John Wiley and Sons: 1998.
4.	W.S. Dominic, *Food enzymes: structure and Mechanism, Chapman*&Hall, USA: 1995.
5.	E. Robert, D.J. Michael ,*Enzyme assays: a practical approach*, Oxford University Press: 2002
6.	P. S. Panesar, S. Marwaha, H.C.Chopra, *Enzymes in Food Processing Fundamentals and Potential Applications* , I.K. International Publishing House Pvt Ltd , 2010

Detailed Syllabus

Lecture-wise Breakup

Course Code	**17M11BT111**	**Semester** Odd	**Semester** VII (Integrated) / I Sem(M.Tech) **Session** 2019 -2020 **Month from** July to December
Course Name	**Biomolecules and cell communication**		
Credits	3	**Contact Hours**	3

Faculty (Names)	**Coordinator(s)**	Dr. ReemaGabrani
	Teacher(s) (Alphabetically)	Dr. ReemaGabrani

COURSE OUTCOMES		**COGNITIVE LEVELS**
C110.1	Explain the signal molecules and major cell signaling pathways	Understand Level (C2)
C110.2	Analyze cell signaling pathways in normal and diseased conditions	Analyze Level (C4)
C110.3	Interpret the mechanisms and regulation of cell cycle and cell death	Understand Level (C2)
C110.4	Analyze the therapeutic drug targets for cancer	Analyze Level (C4)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Signal molecules	Cytokines and Hormones, Growth factors, neurotransmitters, extracellular matrix components as signaling molecules; autocrine, paracrine, juxtacrine and endocrine signaling	3
2.	G-protein linked signaling pathways	G Protein-Coupled Receptors, Heterotrimeric G Proteins, Second messengers, Effector enzymes, Mechanism of	8

		transduction, Switching Off and Desensitization of Receptors, Visual transduction pathway	
3.	Signaling mediated by enzyme linked cell surface receptor	Photoreceptor development in Drosphila, Ras to MAP kinase, Phosphoinositide-3-kinase and signaling through insulin receptor, JAK-STAT pathway, Signal Transduction via Integrins	7
4.	Nuclear receptor based signaling	Classification and Structure of Nuclear Receptors, Signaling by steroid hormones, Retinoids, Vitamin D3, and the T3-Hormone, Mechanisms of Transcriptional Regulation by Nuclear Receptors	4
5.	Bacterial Chemotaxis	Two-component signaling pathway, histidine kinase associated receptor, Adaptation, Chemotaxis in pathogenicity, symbiotic associations and biofilm	4
6.	Cell cycle regulation and cell death	Cyclin-CDK variation, Checkpoint signaling, Ubiquitin proteasome proteolytic system, Intrinsic and Extrinsic apoptotic pathways	8
7.	Malfunction of Signaling Pathways and Tumorigenesis	Hallmarks of cancer, Developmental pathways and cancer: Notch signalling from Drosophila to humans, Wnt signalling, Hedgehog pathway; Epigenetic changes in cancer, Signalling pathways as therapeutic targets, Analysis of signalling events via case studies	8
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Presentation, Assignments)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	Ernst J. M. Helmreich, "The biochemistry of cell signaling," Indian Ed., Oxford University Press, 2005
2.	B. Gomberts, "Signal transduction", Academic Press, 2009
3.	John T. Hancock, "Cell signaling", 2nd Ed. Indian Ed. Oxford University Press, 2006
4.	Alberts, Johnson, Lewis, Morgan, Raff, Roberts and Walter, "Molecular Biology of the Cell" Sixth Edition , Garland Science Publication, 2014
5.	Refereed papers from scientific journals for case studies

Detailed Syllabus

Lecture-wise Breakup

Course Code	17M12BT115	**Semester Odd (specify Odd/Even)**	**Semester VII Session** 2018 -2019 **Month from** July to Dec
Course Name	Environmental Biotechnology		
Credits	3	**Contact Hours**	3

Faculty (Names)	**Coordinator(s)**	Dr. Susinjan Bhattacharya
	Teacher(s) (Alphabetically)	Dr. Susinjan Bhattacharya

COURSE OUTCOMES		**COGNITIVE LEVELS**
CO113.1	Interpret conventional and modern methods to understand dynamics of microbial communities	Understanding Level (C2)
CO113.2	Apply and analyze environmental issues associated with industry and agriculture	Applying Level (C3)
CO113.3	Prioritize, and recommend environmentally safe practices for sustainable environmental management	Evaluating Level (C5)
CO113.4	Compare environmental laws, regulations, enviornmental impact assessment for project implementation and report	Understanding Level (C2)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Significance of Global environmental problems and solutions from Biotechnology	Global environmental issues and remedies from genetic manipulation of plants & microbes, Global warming, Green house gases and carbon sequestering	3
2.	Pollution of natural	Water pollution, land pollution, sources of pollution, risks	5

	resources, causes & concerns	of bioaccumulation, implications on biotic life & human health Biodegradable and non – biodegradable matter, toxicity testing, Biosensors, Bioindicators of pollution	
3.	Land degradation & Biotechnologies for land restoration	Land restoration and soil health, Engineering stress tolerant & herbicide & disease/pest resistant crops, Biotechnology of nitrogen fixation, Composting, Biofertilizers	5
4.	Bioremediation & Phytoremediation	Bioremediation & Microbes, Degrees of biodegradation, Factors needed for biodegradation and adaptation, types of bioremediation (*in situ / ex situ*), GMOs superbugs, Biosorption, Biostimulation, Bioaggumentation, , Oil spills - degradation of xenobiotics application of bioremediation in various environments/ecosystems; Effluent and water treatment; Phytoremediation and its applications	4
5.	Management of waste and Industrial refuse	Waste management (solid & liquid wastes), treatment of urban wastes, industrial wastes, Hospital wastes, Power plant wastes, Electronic waste, mineral wastes & radiological wastes.	4
6.	Alternate energy sources and other applications	Renewable Bioenergy, Biofuels, Biomass applications, Applications of Biotechnology in various industries: paper & pulp, tanneries, distilleries, food processing & diary industry, Biofilters, Bioplastics, Biofilms in industry & environment, Case studies.	5
7.	Metagenomics - Invisible microbial Communities	Limitations of Pure Culture, Microbial Diversity and Variation in different extreme environments including human systems, Molecular tools to study diversity, Microarray techniques, application of genomics, transcriptomics and metabolomics to understand functional diversity of microbes	4
8.	Procedures in Metagenomics studies	Methods of Obtaining meta DNA from diverse environments, Habitat Selection 16S rRNA based amplification and Phylogenetics, Functional Sequencing, whole genome sequencing methods, use of phylogenetic markers for diversity analyses, Significance of Bioinformatics in understanding and analysis of Genomic Data, Databases and Software available for analysis of Metagenomic Data	4
9.	Metagenomics & Environmental Biotechnology	Function-Based Analyses of Microbial Communities, Acid Mine Drainage project, Sargasso Sea Metagenomic Survey, applying function based metagenome analysis to	4

		remediation etc.	
10.	Environmental laws & Regulations	Environmental regulations for industry, EPA, ISO standards for environmental management	4
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	"Environmental Biotechnology" by A. Sragg, Oxford University Press, Second edition Reprint 2005, ISBN 0-19-926867-3
2.	"Enviornmental Biotechnology and Application" by G. Evans, J.C. Furlong, John Wiley and Sons Ltd.
3.	"Environmental Biotechnology: Basic concepts and Applications" by InduShekhar Thakur, IK International, 2006
4.	"Principles of Gene manipulation and Genomics", by SB Primrose & RM Twyman, Seventh edition, Blackwell publishing
5.	"The New Science Of Metagenomics Revealing The Secrets Of Our Microbial Planet", The National Academies Press, Washington, Dc
6.	Refereed papers from scientific journals

Detailed Syllabus

Lecture-wise Breakup

Course Code	15B1NBT832	**Semester** Odd **(specify Odd/Even)**	**Semester** VII **Session** 2018-2019 **Month from** July to December
Course Name	Biostatistics and Its applications		
Credits	4	**Contact Hours**	4

Faculty (Names)	**Coordinator(s)**	Shalini Mani
	Teacher(s) (Alphabetically)	Shalini Mani

COURSE OUTCOMES		**COGNITIVE LEVELS**
C430-3.1	Explain the various statistical methods to design a biological studies and data representation.	Understand Level (C2)
C430-3.2	Apply different statistical methods and approaches to study the significance of a study.	Apply level (C3)
C430-3.3	Examine the relationship between different parameters of a study.	Analyze level (C4)
C430-3.4	Choose appropriate statistical methods, tools and resources including prediction, validation and evaluation of the biological studies.	Evaluate level (C5)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Introduction	Application and use of Biostatistics as a science, scope.	**1**
2.	Study design in various fields of research	general principles of study design and its implications for valid inference	**1**
3.	Sampling theory	Sampling scheme, simple/ systematic/ stratified/ cluster	**2**

		sampling, Sources of data collection	
4.	Data presentation	Graphical, tabular, Mathematical, finding the central tendency, measure of variations	**3**
5.	Overview of different statistical methods used in the field of biological sciences.	Hypothesis testing, T-test, Chi square test, ANOVA, Sign Test, Wilcoxon Signed Rank Test, Wilcoxon Rank Sum Test, odds ratio, Binomial/normal/Poisson distribution of probabilities, determination of power of study and sample size calculation, regression analysis, correlation analysis,	**13**
6.	Analysis of data source	Assess data sources and data quality for the purpose of selecting appropriate data for specific research questions	**3**
7.	Selection of statistical methods	Identifying the appropriate statistical methods to be applied in a given research setting, applying the selected methods and analysis.	**4**
8.	Application of Biostatistical analysis.	Designing various studies of medical/ health/ Microbial/Agricultural/Genetics/Pharamaceutical science related studies. Data analysis using different methods Result interpretation	**7**
9.	Case studies	Based on various research studies and systematic reviews.	**4**
10.	SPSS, Stats at the bench	Introduction to SPSS, Entering data in SPSS editor. Solving the compatibility issues with different types of files. SPSS and working with **descriptive statistics.**	4
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35

TA	25 (assignment, class test, quiz)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	Marcello Pagano, KinberleeGauvreau, Principle of Biostatistics.
2.	Stephen W Looney, Biostatistical methods, Humana Press
3.	Alan J Cann, Maths from Scratch for Biologist, John Willey and Sons Limited Press.
4.	M Bremer, R W Doerge, Statistics at the Bench, Cold Spring harbor Lab Press.
5.	B K Mahajan, Methods in Biostatistics, VII edition, Jaypee Bothers Medical Publishers, 2010.

Department of Biotechnology

ProgrammeName:B.Tech Biotechnology

Semester: VII

Course Name &Code:Major Project (Part 1), 15B19BT791

Course Outcomes:

At the completion of the course, students will be able to,

Sl. No.	DESCRIPTION	COGNITIVE LEVEL (BLOOM's TAXONOMY)
C450.1	Explain and Interpret the given research problem.	Understanding Level Level II
C450.2	Organize the existing literature data to formulate the hypothesis	Applying Level Level III
C450.3	Identify the experimental methods to test for the selected research problem	Applying Level Level III
C450.4	Prepare and conclude with technical report	Create Level Level VI

Course Code	15B19BT792	**Semester Even (specify Odd)**	**Semester** VII **Session** 2018-2019 **Month from** July to December
Course Name	Term Paper		
Credits	4	**Contact Hours**	**LTP - - -**

Faculty (Names)	**Coordinator(s)**	DrChakresh Kumar Jain
	Teacher(s) (Alphabetically)	DrChakresh Kumar Jain

COURSE OUTCOMES		**COGNITIVE LEVELS**
C401-14.1	Conduct literature survey to identify the research problem	**Understand Level (C2)**
C401-14.2	Identify the gaps/inadequacies in the existing literature based on a problem	**Apply Level(C3)**
C401-14.3	Present an overview of the relevant literature for the specific research topic	**Apply Level(C3)**
C401-14.4	Conclude on the findings and compile the term paper	**Analyze Level(C4)**

Department of Biotechnology

Programme Name: B.Tech Biotechnology

Semester: VII

Course Name & Code: Summer Training Viva, 15B19BT793

Course Outcomes:

At the completion of the course, students will be able to,

Sl. No.	DESCRIPTION	COGNITIVE LEVEL (BLOOM's TAXONOMY)
C455.1	Extend theoretical knowledge to real time Industry and Institutes	Understanding Level Level II
C455.2	Demonstrate a capacity for critical reasoning and independent learning	Understanding Level Level II
C455.3	Make use of Industrial Training experience to prepare a scientific report	Applying Level Level III
C455.4	Develop greater clarity about academic and career goals	Applying Level Level III

Detailed Syllabus

Lecture-wise Breakup

Subject Code	**16B1NBT731**	**Semester: Odd**	**Semester VII Session 2018-2019** **Month from** July to December
Subject Name	**Epigenetics**		
Credits	**3**	**Contact Hours**	**3**

Faculty (Names)	**Coordinator(s)**	1. DrShalini Mani
	Teacher(s) (Alphabetically)	1. DrShalini Mani

COURSE OUTCOMES		**COGNITIVE LEVELS**
CO1	Explain the epigenetics itsdetailed mechanism and difference between nuclear and mitochondrial epigenetcis	**Understand Level (C2)**
CO2	Identify the significance of the epigenetic changes in different biological functions, embryonic development and human health & disease	**Apply Level(C3)**
CO3	Analyze the effect of different environmental factors on epigenetic changes.	**Analyze Level (C4)**
CO4	Choose different advanced techniques to study the epigenetic changes and their interpretation	**Evaluate Level(Level 5)**

Module No.	Subtitle of the Module	Topics in the module	No. of Lectures for the module
1.	Introduction to Epigenetics	What is epigenetics, Difference in genetics and epigenetics, How environment shapes our gene, CpG islands, The Basis of the Transcription Process, DNA Packaging and Chromatin Architecture	3
2.	Epigenetic Mechanisms	DNA methylation, Chromatin remodeling, siRNA; genomic imprinting	6
	Mitochondrial epigenetics	Mechanism, difference from nuclear genome epigenetics, effect of mitochondrial epigenetic changes	4
3.	Significance of epigenetic changes	Maintenance of genomic integrity, Gene silencing, , X chromosome inactivation, Autosomal imprinting, Epigenetic Control of the Mitotic Cell Cycle, Epigenetic Control of Cellular Differentiation Ageing and epigenetics	8
4.	Environmental Factors affecting epigenetic modifications	Susceptible windows of epigenetic programming Endocrine disruptor Tobacco smoke Polyaromatic hydrocarbon	5

		Infectious pathogen	
5.	Epigenetics in health and diseases	Epigenetic Predisposition to Disease and Imprinting-Based Disorders Epigenetics of Memory Neurodegeneration, and Mental Health Epigenetics of Cancer	8
6	Techniques to study DNA methylation	MSP, Bisulfite sequencing, ChiP, microarray	8
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (assignment, class test, quiz, case study)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	C David Allis, Thomas Jenuwein, Danny Reinberg. **Epigenetics**. Cold Spring Harbor Press, 2007.
2.	TrygveTollefsbol. **Hand book of Epigenetics.** Elsevier, Academic Press, 2010.
3.	**Epigenetics in Human disease**. TrygveTollefsbol, Academic Press, 2012

Detailed Syllabus

Lecture-wise Breakup

Course Code	16B1NBT733	**Semester** ODD **(specify Odd/Even)**	**Semester** VII **Session** 2018-2019 **Month from** July to December
Course Name	Waste Management		
Credits	4	**Contact Hours**	3-1

Faculty (Names)	**Coordinator(s)**	Dr. GarimaMathur
	Teacher(s) (Alphabetically)	Dr. GarimaMathur

COURSE OUTCOMES		**COGNITIVE LEVELS**
C432-3.1	Explain the fundamental concepts related to waste management	Understand level (C2)
C432-3.2	Apply basic environmental legislation and Environmental Management System for effective waste management	Apply level (C3)
C432-3.3	Analyze the emerging waste management technologies for sustainable solution	Analyze level (C4)
C432-3.4	Assess the environmental, social and economic aspects in integrated waste management	Evaluate level (C5)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	**An introduction to Waste management**	Definition of waste, sources, general categories of waste in context of Indian legislations, waste generation aspects, waste collection, storage and transport	**4**
2.	**Biological and chemical waste treatment technologies**	Waste incineration and waste to energy (WTE), fundamentals of thermal processing – combustion, pyrolysis, gasification, energy recovery system, aerobic and anaerobic digestion, composting, biogasification and mechanical biological treatment of wastes.	**7**

3.	**Waste handling and disposal**	Health considerations in the context of operation of facilities, handling of materials and impact of outputs on the environment, Landfills**:** Design and operation including: site selection, Geo-environmental investigations, engineered sites, liners and covers, management of landfill leachate and the mining of old landfills, gas recovery and control, including utilization of recovered gas (energy), and landfill monitoring and reclamation, Natural attenuation process and its mechanisms, integrated waste management	**7**
4.	**Source Reduction and waste Recycling**	Unit operations for separation and processing, size reduction, separation, density separation.	**8**
5.	**Product recovery and biorefinery**	Recovery of Biological Conversion Products: Composts and Biogas, recovery technologies to deliver added-value products	**5**
6.	**Hazardous Waste: Management and Treatment**	Specific waste streams including healthcare (biomedical wastes), food wastes, mineral and mining wastes, electronic waste, hazardous wastes and producer responsibility wastes.	**6**
7.	**Legal aspects and policy guidelines**	Regulatory requirements for identification, characterization and disposal of hazardous, nonhazardous and domestic wastes, International treaties addressing waste issues	**3**
8	**Environmental and Economic considerations of waste management**	Economics of the on-site v/s off site waste management options	**2**
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (class test, Assignment-1, Assignment-2)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	Waste Treatment and Disposal 2nd edition Paul T Williams, Wiley, 2005
2.	Integrated Solid Waste Management - Engineering Principles and Management Issues, Tchobanoglous/Theisen/Vigil, McGraw Hill (1993)
3.	Handbook of Solid Waste Management- George Tchobanoglous and Frank Kreith , McGraw Hill handbooks (2002)

Detailed Syllabus

Lecture-wise Breakup

Course Code	10B1NPH732	**Semester :** Odd	**Semester:** VII **Session:** 2018 -2019 **Month:** from July to December
Course Name	Nanoscience and Technology		
Credits	3	**Contact Hours**	3

Faculty (Names)	**Coordinator(s)**	Dr. NavenduGoswami and Dr. Sandeep Chhoker
	Teacher(s) (Alphabetically)	Dr. NavenduGoswami and Dr. Sandeep Chhoker

COURSE OUTCOMES		**COGNITIVE LEVELS**
C401-4.1	Define the Nanoscience and Technology and to know about various other terminologies and developments involved with Nanoscience and Technology	Remembering (C1)
C401-4.2	Classify the nanomaterials depending on the nature of dimensionalities, type of materials classes and explain the basic concepts of nanomaterials	Understanding (C2)
C401-4.3	Apply the concepts of Nanoscience for solving the theoretical and numerical problems	Applying (C3)
C401-4.4	Determine the properties of nanomaterials through suitable characterization tools	Analyzing (C4)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Introduction	Development of nanoscience and nanotechnology, naturally occurring nanomaterials, Crystallinity of nanomaterials,Metallic nanostructures, Semiconductor nanostructures Magnetic nanomaterials, Chemically assisted nanostructures,Growth in 2-D nanostructures,Carbon nanomaterials	10
2.	Properties of Nanomaterials	Surface to volume ratio, Surface states and energy,Nanoscale oscillators, Confinement in nanostructures, Density of States and number of states of 0-, 1-, 2-, 3- dimensional systems,Change in Band structure and gap, Energy levels, confinement energy and emission in nano, Fluorescence by QDs, Concept of Single electron	5

		transistor	
3.	Nanomaterials Synthesis	Introduction to synthesis techniques, Top down and bottom up approach, Biological methods,Sol-gel method,Nucleation and growth,Ball Milling technique,Chemical vapor deposition, Physical Vapor deposition: Concept of Epitaxy and sputtering,Basics of Photolithography and its limitations,Soft Lithography and Nanolithography	10
4.	Characterization of Nanomaterials	Resolving power (Rayleigh and other criteria) of microscopes and their limitations for nanostructure measurements, Concept of Far and Near field and modification by NSOM,Basic principle, Design of setup, Theory and working, Characterization procedure, result analysis, Merits/demerits of SEM, TEM,STM, AFM	5
5.	Application of Nanomaterials	Nanoelectronics, Nanobiotechnology, Catalysis by nanoparticles, Quantum dot devices, Quantum well devices, High $T_c$nano-Superconductors, Nanomaterials for memory application, CNT based devices, MEMS and NEMS	10
		Total number of Lectures	**40**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 [2 Quiz (10 M), Attendance (10 M) and Cass performance (5 M)]
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	*Nanostructures and nanomaterials: synthesis properties and application*, Guozhong Cao, Imperial college press, London.
2.	*Introduction to nanotechnology,* Charles Poole *et al* J John Wiley & Sons, Singapore.
3.	*The Handbook of Nanotechnology: Nanometer Structures, Theory, Modeling, and Simulation*, A.

	Lakhtakia, Spie Press USA.
4.	*Springer Handbook of Nanotechnology*, Edited by B. Bhushan, Springer Verlag.

Detailed Syllabus

Lecture-wise Breakup

Course Code	16 B19EC691	**Semester Even (specify Odd/Even)**	**Semester** 7th **Session** 2018 -2019 **Month from** January to June
Course Name	Renewable Energy		
Credits	2	**Contact Hours**	2

Faculty (Names)	**Coordinator(s)**	Vinay A. Tikkiwal
	Teacher(s) (Alphabetically)	MandeepNarula, Vinay A. Tikkiwal

COURSE OUTCOMES		**COGNITIVE LEVELS**
CO1	Explain the need of renewable sources of energy, impact of renewable energy on environment, challenges in the electric grid, Smart Grid.	Understanding (Level II)
CO2	Analyze basics of Solar radiation and Solar photovoltaics, Balance of PV systems	Analysis (Level IV)
CO3	Analyze wind energy resource and designing of Wind Energy Generators	Analysis (Level IV)
CO4	Illustrate different biomass energy resources, and extraction of biomass energy	Understanding (Level II)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	**Introduction**	Overview of energy use and related issues, major energy options, issues of supply and demand, energy conversions, global climate change issues, effects on ecology and biodiversity, status of renewable energy in India.	4
2.	**Solar Energy**		10

		Fundamentals of Solar radiation, Solar Resource Assessment, Solar Photovoltaics, Balance of PV Systems, and Solar Thermal.	
3.	**Wind Energy**	Wind resource, Basics of aerodynamics, Maximum power extraction from wind resource fundamental power equations, Basic design concepts of Wind Energy Generators	8
4.	**Biomass Energy**	Biomass resource, extracting biomass energy, landfill gas, waste to energy, energy balances and economics.	6
5.	**Electric Grid**	Basic operations, performance related issues, new developments and challenges in the electric grid.	2
		Total number of Lectures	**30**

Evaluation Criteria

Components	**Maximum Marks**
Mid-Term	30
End Semester Examination	40
TA	30
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	Solanki, C.S., *Solar Photovoltaics: Fundamental, technologies and applications*, 3rd ed., Delhi: Prentice Hall of India, 2015
2.	Momoh, J., *Smart Grid: Fundamentals of Design and Analysis*, Wiley-IEEE Press, 2012.

3.	Ahmed S., *Wind Energy: Theory and Practice*, 3rd ed., Delhi: Prentice Hall of India, 2016
4.	Earnest J., *Wind Power Technology*, 2nd ed., Delhi: Prentice Hall of India, 2015
5.	Kothari, D.P., Singal, K.C. andRanjan, R., *Renewable Energy Sources and Emerging Technologies*, 2nd ed., Delhi: Prentice Hall of India, 2016.

Detailed Syllabus

Lecture-wise Breakup

Course Code	15B1NHS731	**Semester** ODD	**Semester 7th Session** 2018 -2019 **Month from** July 2018 to December 2018
Course Name	DISASTER MANAGEMENT		
Credits	3	**Contact Hours**	3-0-0

Faculty (Names)	**Coordinator(s)**	Dr Nilu Choudhary
	Teacher(s) (Alphabetically)	Dr Nilu Choudhary

COURSE OUTCOMES		**COGNITIVE LEVELS**
C4O1-2.1	Understand disasters, their hazards and natural and social phenomena related to them.	Understanding level(C2)
C4O1-2.2	Analyse information on risks and relief	Analyzing level(C4)
C4O1-2.3	Make use of disaster management principles and community involvement methods in Disaster Risk Reduction.	Apply level(C3)
C4O1-2.4	Evaluate the role of different approaches and Humanitarian Assistance needed to manage pre and post- disaster periods	Evaluate level(C5)
C4O1-2.5	Formulate strategies for mitigation in future scenarios by applying technological innovations and learning lessons from past.	Creating level(C6)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	**Introduction to Disasters**	Concepts and definitions of Disaster, Hazard, Vulnerability, Resilience, Risks	4
2.	**Disasters: Types Of Disaster**	Natural and manmade disasters, their Impacts, Hazards.	4
3.	**Disaster :Caste,**	Caste and disaster, Disaster discrimination, Social class,	5

	Class and Gender	Differential impacts of disaster - in terms of caste, class, gender, age location, Role of Women's in Disaster.	
4.	**Approaches to Disaster Risk reduction**	Disaster cycle - its analysis, Phases, Culture of safety, prevention, mitigation and preparedness, community based DRR, Structural - nonstructural measures roles and responsibilities of community	5
5.	**Inter-relationship between Disasters and Development:**	Factors affecting Vulnerabilities, differential impacts, impact of appropriate technology and local resources.	5
6.	**Disaster Risk Management in India**:	Hazard and Vulnerability profile of India Components of Disaster Relief: Water, Food, Sanitation, Shelter, and Health	5
7.	**Risk Society**	Risk Society in 1992,Ulrick Beck,Processes of Modernization,The new paradigm of risk society	4
8	**Disaster Management Act(2005)**	DM Act and Policy, Other related policies, plans, programmes and Legislation).	2
9	**Global trends in disasters, Urban Disaster, Pandemics, Climatic Change and Complex Emergencies**	MDG and Disaster, Agenda 21: For Local actions, Global trends in disasters, urban disasters, pandemics, Epidemics, complex emergencies, Climate change.	4
10	**Disaster, Environment and Development**	Environment Management, Importance of Waste Management, Types of Disaster Waste, Sources of Waste	4
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Quiz, Oral Questions)

Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	National Disaster Management Policy. Government of India, 2009.
2.	Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi. 2011
3.	Indian Journal of Social Work. Special Issue on Psychosocial Aspects of Disasters, Volume 63, Issue 2, April. 2002
4.	Alexander David, Introduction in "Confronting Catastrophe", Oxford University Press, 2000
5	Coppola P Damon, Introduction to International Disaster Management, Elsevier. 2007

Detailed Syllabus

Lecture-wise Breakup

Course Code	18B12HS412	**Semester Odd**	**Semester VII Session** 2018 -2019 **Month from July 2018 - December 2018**
Course Name	HUMAN RESOURCE ANALYTICS		
Credits	3	**Contact Hours**	3-0-0

Faculty (Names)	**Coordinator(s)**	Dr Kanupriya Misra Bakhru
	Teacher(s) (Alphabetically)	Dr Kanupriya Misra Bakhru

COURSE OUTCOMES		**COGNITIVE LEVELS**
C401-20.1	Understand different analytical techniques used for solving HR related problems**.**	Understand Level (C 2)
C401-20.2	Apply descriptive and predictive analysis techniques to understand trends and indicators in human resource data.	Applying Level (C 3)
C401-20.3	Analyze key issues related tohuman resource management using analytical techniques.	Analyze Level (C 4)
C401-20.4	Critically asses and evaluate the outputs obtained from analytical tools and recommend HR related decisions.	Evaluate Level (C 5)
C401-20.5	Create hypotheses, propose solutions and validate using appropriate analytical tehcniques	Create Level (C6)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Introduction to Human Resource (HR) Analytics	Understanding the need for mastering and utilizing HR analytic techniques, Human capital data storage and 'big (HR) data' manipulation, Predictors, prediction and predictive modeling, Current state of HR analytic	8

		professional and academic training, HR's Contribution to Business Value, the Changing Nature of HR.	
2.	Human Resource information systems and data	Understanding HR metrics and data, Data collection, tracking, entry, Data availability in the entire Employment Lifecycle, Approaches and costs of collecting HR related data, Analysis software options, Using SPSS, Preparing the data.	8
3.	Analysis Strategies	From descriptive reports to predictive analytics, Statistical significance, Data integrity, Types of data, Categorical variable types, Continuous variable types, Using group/team-level or individual-level data, Dependent variables and independent variables, Introduction of tools for HR data analysis: Correlation, Regression, Factor Analysis, Cluster Analysis, Structural equation modeling.	10
4.	Application of Human Resource Analytics	Workforce Planning Analytics, Diversity Analytics, Talent Sourcing Analytics, Talent Acquisition Analytics, Talent Engagement Analytics, Training and Intervention Analytics, Analytical Performance Management, Retention Analytics.	10
5.	Future of Human Resource Analytics	Rise of Employee Behavioral Data, Automated Big Data Analytics, Big Data Empowering Employee Development, Quantification of HR, Artificial Intelligence in HR.	6
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Project, Quiz)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	Bhattacharyya, HR Analytics: Understanding Theories and Applications, Sage, 2017
2.	Pease, Byerly and Jac Fitz-enz, Human Capital Analytics: How to Harness the Potential of Your Organization's Greatest Asset, Wiley, 2012
3.	Isson, Harriott and Jac Fitz-enz, People Analytics in the Era of Big Data: Changing the Way You Attract,

	Acquire, Develop, and Retain Talent, Wiley, 2016
4.	Guenole, Ferrar and Feinzig, The Power of People: How Successful Organizations Use Workforce Analytics To Improve Business Performance, First Edition, Pearson, 2017
5.	Sesil, Applying Advanced Analytics to HR Management Decisions: Methods for Selection, Developing, Incentive and Improving Collaboration, Pearson, 2014

Detailed Syllabus

Lecture-wise Breakup

Course Code	17B1NHS731	**Semester: Odd**	**Semester** VII **Session** 2018 -2019 **Month from** July 2018 to Dec **2**018
Course Name	Customer Relationship Management		
Credits	3	**Contact Hours**	3-0-0

Faculty (Names)	**Coordinator(s)**	Dr. Shirin Alavi
	Teacher(s) (Alphabetically)	Dr. Shirin Alavi

COURSE OUTCOMES		**COGNITIVE LEVELS**
C401-17.1	Apply the financial, social and electronic aspects of the Customer Relationship in business situations.	Apply Level (C3)
C401-17.2	Appraise the role of customer share and customer centricity in organizations.	Apply Level (C3)
C401-17.3	Develop the skills to understand customization, innovation and co-creation in organizations and apply them in business contexts.	Analyze Level (C4)
C401-17.4	Analyze the role of interactive technology for customer engagement, customer retention and customer experience management in organizations.	Analyze Level (C4)
C401-17.5	Evaluate the technological solutions and their applications for effective Customer Relationship Management across different functions in organizations.	Evaluate Level (C5)
C401-17.6	Develop specific models for response modelling and consumer profiling in organizations.	Create Level (C6)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	CRM-The Strategic Imperatives	Introduction, CRM in Marketing and IT, CRM for Business Leadership, Criticality of customer relationships, Why businesses should adopt CRM, Implementing CRM.	3
2.	Conceptual Foundations of CRM, Building Customer Relationships	Evolution of CRM, Benefits, Schools of thought on CRM, Defining CRM. Customer Retention and Customer Acquisition, Customer Profitability is Skewed, Service Benefits of CRM, Transaction Marketing vs. Relationship Marketing, Relationship Building as a process, Bonding for Customer Relationships-Financial, Social, customization and Structural bonds, Ladder of Loyalty Zero Customer Defection, CRM Framework.	7
3.	Relationship Marketing and Economics of CRM	Internal and external relationships, Electronic Relationships, Operational, Analytical and Collaborative CRM, Market Share vs. Share of Customer, Customer Lifetime Value, and Activity based costing for CRM	6
4.	CRM in B2C ,B2B Markets , Customer Experience Management	CRM in Product and Service Markets, Case Studies, Characteristics of Business Markets, Participants in the business buying process, Key Account Management, Using KAM for Customer Segmentation, Customer Retention Strategy, KAM as a growth and Development Strategy, Customer Value Management in Business Markets, Importance of CRM in B2B Markets, Customer Emotion, Customer Knowledge, Reciprocity, Voice of the Customer, Participation.	7
6.	Components of e CRM solutions (Overview) and Role of Digital Technologies	Data warehousing, Datamining and CRM, Market Basket Analysis and Retail sector, Campaign Management, Sales Force Automation, Customer Service and Support, Corporate Blogs, Online communities, Twitter, Wikis. The Experience ecosystem. CEM, Consumer engagement, segmentation and differentiation.	7
7.	Product offerings in the CRM Marketplace(Overv	Evaluating Technological solutions for CRM, Comparison of Siebel, Oracle, MySAP.com and People Soft Enterprise solutions, Comparison of Talisma, Sales logix, Microsoft	7

	iew) and CRM Roadmap	and Sales notes for small and medium enterprises, Defining a CRM strategy, CRM Implementation Roadmap, Developing a relationship orientation, Customer centric marketing and processes, Building organizational capabilities through internal marketing, Issues in implementing a technology solution for CRM.	
8.	Operational issues in implementing CRM,Social CRM	Process view of CRM, Budgeting for attraction vs. retention, Learning from customer defections, Customer Retention Plans, Evaluating Retention programs, Social Customer Relationship Management, Social Customer Insights, Social CRM Strategy, and Social Customer Analytics.	5
Total number of Lectures			**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Project: Report and Viva)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	Customer Relationship Management-A strategic perspective, G. Shainesh, Jagdish Sheth, Reprinted Macmillan Publishers India Limited, 2009.
2.	Mukerjee, K., Customer Relationship Management-A Strategic approach to Marketing,Third Edition Prentice Hall of India, 2007.
3.	Customer Relationship Management Concepts and Technologies-Francis Buttle ,Third Edition Taylor and Francis,2015.
4.	Berry, Michael, J. A, Linoff, Gordon S., Datamining Techniques for Sales, Marketing and CRM, Second Edition, Wiley Publications, 2007.

Detailed Syllabus

Lecture-wise Breakup

Course Code	16B1NHS831	**Semester**: Odd	**Semester**: VII **Session** 2018 -2019 **Month** from July 2018-Dec 2018
Course Name	Gender Studies		
Credits	3	**Contact Hours**	3-0-0

Faculty (Names)	**Coordinator(s)**	Ms Puneet Pannu
	Teacher(s) (Alphabetically)	Ms Puneet Pannu

CO Code	**COURSE OUTCOMES**	**COGNITIVE LEVELS**
C 401-19.1	Demonstrate knowledge of the construct of gender and the way it intersects with other social and cultural identities of race, class, ethnicity and sexuality	Understand(C2)
C 401-19.2	Apply feminist and gender theory in an analysis of gender including an examination of the social construct of femininity and masculinity	Apply (C3)
C 401-19.3	Analyze the ways in which societal institutions and power structures such as the family, workplace impact the material and social reality of women's lives	Analyze (C4)
C 401-19.4	Assess the need for Gender Sensitization and Gender Inclusivity and its practice in contemporary settings	Evaluate (C5)
C 401-19.5	Evaluate and interpret information from a variety of sources including print and electronic media, film, video and other information technologies	Evaluate (C5)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	**Introducing Gender Issues**	• Sex and Gender • Types of Gender • Gender Roles and Gender Division of Labor • Gender Stereotyping and Gender Discrimination • The Other and Objectification	8

2.	**Gender Perspectives of Body & Language**	• Biological, Phenomenological and Socio-Cultural Perspectives of body • Body as a Site and Articulation of Power Relations • Cultural Meaning of Female Body and Women's Lived Experiences • The Other and Objectification	8
3.	**Social Construction of Femininity&Feminism**	• Bio-Social Perspective of Gender • Gender as Attributional Fact • Feminine & Feminist • Major Theorists of Feminism Challenging Cultural Notions of Femininity • Feminism Today: Radical, Liberal, Socialist, Cultural, Eco feminism & Cyber feminism • Images of Women in Sports, Arts, Entertainment, Media and Fashion Industry ;Cultural Feminism & Celebrating Womanhood • Analysis of role women have played across cultures	9
4.	**Social Construction of Masculinity**	• Definition and Understanding of Masculinities • Sociology of Masculinity& its Types • Social Organization of Masculinity and Privileged Position of Masculinity • Politics of Masculinity and Power • Major Theorists of Masculinity • Masculine Identities in Literature, Cinema & Media.	9
5.	**Gender Sensitization** **Empowerment &Gender Inclusivity**	• Women , Law & Women Rights In India • From Women's Studies to Gender Studies: A Paradigm Shift • Gender Studies & Media: Creating New Paradigms in Gender & Culture	8
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignment, Poster Presentation, Attendance)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1	**Davis K., et al**, "*Handbook of Gender and Women's Studies*. London: Sage. (2006)

2	**Helgeson, Vicki S**., "*The Psychology of Gender",* Pearson(2012)
3	**Friedan B.,** "*The Feminine Mystique"*, Penguin. (1971/1992)
4	**Debeauvoir S**. , "*The Second Sex"*, Vintage (1953/1997)
5	**Wharton Amy S.,** "*The Sociology of Gender: An Introduction to Theory & Research*", Wiley-Blackwell (2005)
6	**Pachauri G**.," *Gender, School & Society*", R.Lall Publishers(2013)
7	**Connell R.W**, "*Masculinities*", Cambridge: Polity. (1985)
8	**MacInnes J**., "The *End of Masculinity"*. Buckingham: Open University Press. (1998)
9	**Kaul A.& Singh M**., *"New Paradigms for Gender Inclusivity*", PHI Pvt Ltd (2012)

Detailed Syllabus

Lecture-wise Breakup

Course Code	**17B1NHS732**	**Semester :** Even	**Semester** VII **Session** 2018 -2019 **Month from** July 2018 to Dec 2018
Course Name	Indian Financial System		
Credits	3	**Contact Hours**	3-0-0
Faculty (Names)	**Coordinator(s)**	Dr. Mukta Mani(Sec62), Dr. Sakshi Varshney(Sec128)	
	Teacher(s) (Alphabetically)	Dr. Mukta Mani(Sec62), Dr. Sakshi Varshney(Sec128)	

COURSE OUTCOMES		**COGNITIVE LEVELS**
After pursuing the above mentioned course, the students will be able to:		
C401-1.1	Understand the inter-linkage of components of financial system and financial instruments of Money market and Capital market.	Understanding Level (C2)
C401-1.2	Analyze ways of fund raising in domestic and international markets	Analyzing Level (C4)
C401-1.3	Understand functioning of Stock market and evaluate securities for investment.	Evaluating Level (C5)
C401-1.4	Apply the knowledge of Mutual Funds and Insurance in personal investment decisions	Applying Level (C3)
C401-1.5	Apply knowledge of Income tax for calculation of tax liability of individual.	Applying Level (C3)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Introduction	Meaning, Importance, and functions of Financial system. Informal and Formal financial system, Financial markets, Financial Institutions, Financial services and Financial instrument	4
2.	Money Market	Features of money market Instruments: Treasury bills, commercial bills, commercial papers, certificates of deposit, call and notice money, Functions of money market, Linking of	5

		money market with Monetary policy in India	
3.	Capital Market	Features of Capital market instrument: Equity shares, Bonds. Fund raising through Initial Public Offering, Rights issue, Preferential allotment and Private Placement. Process of IPO-Intermediaries in IPO, Book building process and allotment of shares	6
4.	Foreign investments in India	Fund raising from foreign market through: Foreign direct investment and foreign institutional investment, ADR, GDR, ECB, and Private equity.	5
5.	Stock Market	Trading in secondary market- Stock exchanges, regulations, demutualisation, broker, listing of securities, dematerialisation, trading, short selling, circuit breaker, stock market indices-methods of calculation of indices.	5
7.	Stock Valuation and Analysis	Investing basics: Consideration of Risk and Return, Stock Valuation and Analysis-Fundamental analysis: Economy, industry and company analysis; Technical Analysis of stocks using technical charts	6
8.	Investing in Mutual Funds and Insurance	Mutual Funds: Basics, Types of funds, risk and return considerations in selection of funds; Insurance: Basics, Life insurance and health insurance, types of policies	4
9.	Overview of Income Tax	Basics of Income tax- Concept of previous year, assessment year, person, income. Calculation of Income tax liability for individuals: Income from salaries- basic, DA, HRA, leave salary pension and other allowances; Income from House Property- self occupied house, rented house; Income from Capital Gain, Deductions under section 80C to 80U.	7
Total number of Lectures			**42**
Evaluation Criteria			

Components	Maximum Marks
T1	20
T2	20
End Semester Examination	35
TA	25 (Quiz, Assignments, class test)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	Pathak Bharti V, *Indian Financial System*, 3rd Ed.,Pearson Education, 2013
2.	Madura Jeff, *Personal Finance*, 5th Ed, Pearson Education, 2013.
3.	Machiraju H R, *Indian Financial System*, 4th Ed, Vikas Publication, 2010
4.	Bhole L M, *Financial Institutions and Markets*, 4th ed. Tata McGraw Hill Publication, 2006.
5.	Singhania & Singhania, Students Guide to Income Tax, Taxmann Publication, 2013.

Detailed Syllabus

Lecture-wise Breakup

Course Code	17B1NHS734	**Semester** Odd	**Semester** VII **Session** 2018 -2019 **Month from** July 2018 to Dec 2018
Course Name	Managerial and Communication Skills		
Credits	3	**Contact Hours**	3-0-0
Faculty (Names)	**Coordinator(s)**	Dr. Anshu Banwari	
	Teacher(s) (Alphabetically)	Dr. Anshu Banwari	

COURSE OUTCOMES		**COGNITIVE LEVELS**
C401-3.1	Demonstrate understanding of basic aspects of business communication and realize the importance of it	Understand Level (C2)
C401-3.2	Assess one's and other's communication skills and adapt oneself in order to meet challenges at the competitive workplace	Evaluate Level (C5)
C401-3.3	Apply the appropriate conflict handling style for effective conflict management	Apply Level (C3)
C401-3.4	Demonstrate understanding about the opportunities and challenges of intercultural communication and recognizing cultural variations	Understand Level (C2)
C401-3.5	Apply the appropriate steps for better decision making by interpreting information	Apply Level (C3)
C401-3.6	Develop an understanding of professional ethics	Apply Level (C3)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for**

			the module
1.	Communication Skill Assessment (CSA) & Development Plan	Build an overall understanding and expectations of the professional environment, Introspection and SWOT analysis of self, Gap Analysis, Guidelines for developing necessary skills and required knowledge to help students in their professional life, Strategies in the Job- Search process, Work on their personality profile and communication skills to make them ready to face the professional world	5
2.	Fundamentals and Functions of Business Communication	Definition and Importance of Business Communication, Communication requirements and characteristics of Managerial Communication, Interpersonal & Intrapersonal Business Communication	5
3.	Building Active Communication Skills	Writing for effect in business messages, Listening, Formal Speaking, Defensive and Non-Defensive Communication, Corporate Body language, Audio and Visual communication, Business Etiquettes and Mannerism	5
4.	Conflict Resolution and Negotiation skills	Origins of Conflict, Guidelines for Effective conflict management, Effective Negotiation in professional environment, Gaining leverage through Persuasion, Impasse and Alternative Dispute Resolution (ADR)	5
5.	Corporate communication	Meeting Management: Need and Importance of Meetings, Conduct of Meeting, Public Relations : Meaning, Functions of PR Department, Roles and responsibilities of an Internal and External PR team, Corporate Social Responsibility	5
6.	Group Discussion and Interview Preparation and, Psychometric Tests	Introduction to the Job recruitment process, Criteria and methods of selection, Interview and GD concepts. Types of Interviews – Selection, Appraisal, Grievance, Exit, Preparing for an Interview, mock group discussion sessions, Psychometric Tests: Importance, Pattern & Practice sessions	5
7.	Data Interpretation and Decision making	Importance of Data Interpretation, Decision Making Techniques, Case Study: Approaches to solve , Reasoning: Interpretation Techniques	5
8.	Communicating	Understanding the opportunities and challenges of Intercultural communication, Enhancing Intercultural sensitivity, Improving	5

	Interculturally	intercultural communication skills	
9.	Ethics of Business Communication	Ethics, Fairness & Trust in Business Communication	2
Total number of Lectures			**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignments, Discussion Questions)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	**R.V. Lesikar, & M.E. Flatley,** Basic Business Communication Skills for Empowering the Internet Generation, 10th Ed,Tata McGraw Hill Publishing Company, 2005
2.	**S. Sengupta,** Business and Managerial Communication, Prentice Hall of India, 2011.
3.	**A.C. Krizan, P. Merrier, J. Logan, & K. Williams**, Business Communication, 7th Ed, Thomson South-Western, 2008.
4.	**C.L.Bovee, J.V.Thill** , Business Communication Today,8th Ed, Pearson Education, 2008

Detailed Syllabus

Lecture-wise Breakup

Subject Code	**17B1NHS733**	**Semester : ODD**	**Semester: VII Session 2018-19 Month from July- Dec**
Subject Name	**Human Rights and Social Justice**		
Credits	**3**	**Contact Hours**	*(3-0-0)*

Faculty (Names)	**Coordinator(s)**	
	Teacher	

CO Code	COURSE OUTCOMES	COGNITIVE LEVELS
C401-18.1	Interpret anthropological and sociological approaches to the provision of human rights for peoples and cultures	Understand (C2)
C401-18.2	Appraise human rights practice within the context of local, national and global civil society;	Evaluate(C5)
C401-18.3	Explain social justice framework to evaluate conflicts between rights	Understand (C2)
C401-18.4	Apply organizational and management theories within the context of civil society;	Apply (C3)

Module	Subtitle of the	Topics in the module	No. of

No.	Module		Hours for the module
1.	Conceptual understanding of Human Rights and Social Justice	• Meaning and Concept of Human Rights & Social Justice • Notion and Classification of Rights : Natural, Moral and Legal Rights, • Concept of Civil Rights • Three Generations of Human Rights (Civil and Political Rights; Economic, Social and Cultural Rights; Collective/Solidarity Rights) • Distinction between CPR & ESCR	12
2.	Evolution of Human Rights	• Human Rights in Middle Ages: Magna Carta • Modern Movement for Human Rights: The United States Declaration of Independence; The French Declaration of the Rights of Man and the Citizen; United States Bill of Rights; Geneva Convention of 1864 • International Norms and Standard Setting: Universal Declaration of Human Rights, 1948. • International Bill of Rights: International Covenant on Civil and Political Rights; and the International Covenant on Economic, Social and Cultural Rights • Universal Values of Human Rights: Human Dignity and Justice; Equality, Liberty and Fraternity	14
3.	Contemporary Issues in Human Rights and Social Justice	• Barriers to social inclusion: Social Hierarchy and social prejudices and exploitation; Socially approved racial and communal discrimination • Internally Displaced Person (IDP) and Human Rights: -Protection during and after Displacement: Humanitarian Assistance Movement-Related Rights- Life- Food- Water and Sanitation- Basic Shelter and Adequate Housing- Health- Recognition, Issuance, and Replacement of Documentation- Property and Possession- Employment- Economic Activities- Social Protection- Electoral Rights Education • Women and Human Rights: Gender Bias, harassment and offences against women, Special laws and institutional mechanisms for the protection of Women's rights.	16

		• Minorities and Human Rights: International Convention on Elimination of All Forms of Racial Discrimination, Multiculturalism and Minority Rights: Protection and Promotion of Human Rights in Diverse societies • Human Dignity and Human Rights: International Concerns Regarding Self-Rule and the Rights of Self-Determination, Concept of the Violations of Human Rights as an International Crime, International Criminal Court: War Crimes Including Genocide and War Tribunals	
Total number of Hours			**42**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	Donnelly,J. (2013).*Universal Human Rights and Practices*. Ithaca: Cornell University Press
2.	Sen, A. (1999). Development as Freedom. Oxford: Oxford University Press
3.	Easterly, W. (2014). The tyranny of experts: Economists, dictators, and the forgotten rights of the poor. New York: Basic Books

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (5- attendance, 20- assignment)
Total	**100**