Jaypee Institute of Information Technology

Integrated M.Tech. Biotechnology

Semester VI

Course Descriptions

Detailed Syllabus

Lecture-wise Breakup

Course Code	15B11BT611	Semester: Even	Semester VI Session 2018 -2019 Month from January to May
Course Name	Comparative & Functional Genomics		
Credits	4	Contact Hours	4

Faculty (Names)	Coordinator(s)	1. Dr. Vibha Rani
	Teacher(s) (Alphabetically)	1. Dr. Chakresh Kumar Jain 2. Dr. Vibha Rani

COURSE DESCRIPTION To give students comprehensive idea of genome, transcriptome, proteome, modifications, gene expression and protein expression profiling, genome and proteome annotation, protein evolution. To learn experimental and computational methods/ tools to generate and analyze the data related to genomics and proteomics technologies, and applications.

COURSE OUTCOMES		COGNITIVE LEVELS
C312.1	Explain the fundamental concepts of functional genomics, transcriptomics and proteomics	Understand Level (C2)
C312.2	Apply advanced techniques for improved diagnostics and therapeutics	Apply Level (C3)
C312.3	Categorize different bioinformatics tools related to genomics and proteomics	Apply Level (C3)
C312.4	Integrate and infer the bioinformatics data obtained through genomics studies	Analyze Level (C4)

Pre-requisite
[10B11BT511]- Introduction to Bioinformatics

Module No.	Subtitle of the Module	Topics in the module	No. of Lectures for the module
1.	Genes and Genomes	Basics structure of gene and organization in prokaryotic to eukaryotic, features of genome structure and complexity, evolutionary conservation, type of model organism, their structure number of genes sequencing status, type of maps genetic linkage maps, physical maps, techniques used to map their significance relation with human genome	5
2.	Whole Genome Sequencing Technologies	Human genome project fact sheet, techniques used for sequencing (shot gun sequencing), mapping techniques (BAC, YAC), genome assembly problems	2
3.	Genome Annotation i.e. Mining Genomic Sequence Data	Sequential annotation, structural annotations, prediction of gene and their elements like ORF finder, promoter region, LDA method, functional genomics, Dijkstra's algorithm, application in functional correlation	3
4.	Haplotyping: Concepts and Applications	Basics of haplotyping and its application in disease	2
5.	Pharmacogenomics: Concepts and Applications in Healthcare	Basics of phylogenomic, methods used and application, Basics of pharmacogenomics and relation with disease, personalized medicine	4
6.	SNP Technologies: Platforms & Analysis	SNP structure, techniques, prevalence and application in population genetics	2
7.	Gene Silencing Mechanisms	RNAi, non coding RNAs, Structure and biogenesis difference between SiRNA, MiRNAs, protein involve in RISC, prediction rule set, CRISPER	3

8.	Gene Cloning and Expression Platforms	Introduction: Gateway technology; Microarrays; SAGE; GIS	3
9.	DNA Protein Interactions	General; CHIP assay, EMSA; Library screening; DNA foot-printing; south western analysis; one hybrid assay	4
10.	Phage display	introduction; peptide display; antibody display; phage and phagemid system	4
11.	Protein-protein Interactions	Ribosome display; tandem affinity purification; Yeast two hybrid system, GST pull Down	4
12.	Quantitative proteomics	MALDI-TOF; LC-MS-MS, ICAT method; 2-D technology; Biomarkers; protein arrays	6
		Total number of Lectures	**42**

Evaluation Criteria

Components	Maximum Marks
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignment-1&2, Home Assignment, Quiz and case studies)
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.	A. M. Lesk. *Introduction to Genomics*. United Kingdom (UK): Oxford University Press, 2007.
2.	T.A. Brown. *Genomes-3*. United Kingdom (UK): Oxford University Press, 2007.
3.	D. C. Liebler and J. R. Yates. *Introduction to Proteomics*. New York, USA: Humana Press, 2002.
4.	M. R. Wilkins. *Proteome Research: New Frontiers in Functional Genomics (Principles and Practice).* New York, USA: Springer publisher, 1997.
5.	N. C. Jones and P. A. Pevzner. *Introduction to Bioinformatics Algorithms (Computational Molecular Biology)*. Massachusetts, USA: MIT Press, 2004.

Detailed Syllabus

Lab-wise Breakup

Course Code	15B17BT671	Semester EVEN	Semester VI Session 2018 -2019 Month from January to June
Course Name	Comparative and Functional Genomics Lab		
Credits	1	Contact Hours	3

Faculty (Names)	Coordinator(s)	Dr. GarimaMathur
	Teacher(s) (Alphabetically)	Dr. Sujata Mohanty Dr. Shalini Mani Dr. GarimaMathur

COURSE OUTCOMES		COGNITIVE LEVELS
C374.1	Explain the basic concept of genes and genome using various databases	Understand level (C2)
C374.2	Compare and analyze functional genomic data using computational tools	Analyze level (C4)
C374.3	Utilize the acquired knowledge of gene expression technologies	Apply level (C3)
C374.4	Apply and analyze cloning and expression of gene of interest	Analyze level (C4)

Module No.	Title of the Module	List of Experiments	CO
1.	Gene cloning	PCR primer designing for large scale gene cloning	CO1
2.	Gene amplification	PCR amplification of gene of interest	CO1
3.	Gene amplification	Analysis of PCR product	CO1
4.	Gene cloning	Transformation of pET vector in BL-21	CO3
5.	Recombinant protein expression	Induction and expression of recombinant protein	CO3

6.	Analysis of recombinant protein	Differential protein analysis using SDS-PAGE	CO4
7.	Analysis of recombinant protein	Staining of gels using Coomassie Blue	CO4
8.	Analysis of recombinant protein	Introduction to Western blotting	CO3
9.	Gene identification	To study the evolutionary closeness of bacterial species using 16s RNA gene sequences	CO2
10.	Gene identification	To study prokaryotic gene prediction using Genmark tool	CO2
11.	Protein Structure Prediction	To interpret the structure of a protein from a given amino acid sequence using different tools	CO2
12.	Protein- protein interaction study	To interpret the protein- protein interaction using STRING	CO2

Evaluation Criteria

Components	Maximum Marks
Mid-term exam	20
End term exam	20
Day to Day	60 (Performance, written test, lab records)
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.	Keith Wilson, John Walker. "Principles and Techniques of Practical Biochemistry". Cambridge University Press, 2000
2.	https://vlab.amrita.edu/?sub=3&brch=187&sim=1331&cnt=1 (Western blotting)
3.	http://vlab.amrita.edu/index.php?sub=3&brch=273&sim=1501&cnt=1 (Primer designing)
4.	http://vlab.amrita.edu/?sub=3&brch=186&sim=319&cnt=1 (Polyacrylamide gel electrophoresis)
5.	Experiment design and detail protocol are provided for each experiment.

Department of Biotechnology

Programme Name: B.Tech Biotechnology

Semester: VIth

Course Name & Code: Minor Project II (15B19BT691)

<u>Course Outcomes:</u>

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

Sl. No.	DESCRIPTION	COGNITIVE LEVEL (BLOOM's TAXONOMY)
CO351.1	Outline the specific biotechnological problem and explain the related scientific approaches	Understanding level (Level 2)
CO351.2	Summarize the literature related to the specified topic	Understanding level (Level 2)
CO351.3	Analyze and demonstrate team effort in presentation and data analysis	Analysing level (Level 4)
CO351.4	Organize the data and develop scientific report writing skills	Applying level (Level 3)

Detailed Syllabus

Lecture-wise Breakup

Course Code	16B1NBT631	Semester EVEN (specify Odd/Even)	Semester VI Session 2018 -2019 Month from January to May
Course Name	BIOECONOMICS		
Credits	4	Contact Hours	4

Faculty (Names)	Coordinator(s)	DR. ASHWANI MATHUR
	Teacher(s) (Alphabetically)	DR. ASHWANI MATHUR

COURSE OUTCOMES		COGNITIVE LEVELS
CO1	Relate and summarize biological products as economic resources	Understanding (Level 2)
CO2	Demonstrate understanding of economic pronciples for biological resources and develop the concept of sustainability	Understanding (Level 2)
CO3	Make use of neoclassic economic theories and bioeconomic principles to find a robust solution to biotechnological and sustainability issues	Applying (Level 3)
CO4	Apply the knowledge of bioeconomic principles and SWOT analysis technique for developing sustainabile solution and profit maximization from fisheries and agricultural sectors	Applying (Level 3)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction to bioeconomics	Bio-economics- Concept, Development of Economics and Bioscience (Concept of resource economics for scarcity of biological resources), Bioresource elasticity, Evolution and Development of Economics and Biology (Charles Darwin and the evolutionary paradigm)	6
2.	Bioeconomics and thermodynamics	Thermodynamic analysis and thermo economics, Exergy cost, Exergetic efficiency, Concepts of Sadi Carnot,	5

		Rudolf Clausius and Thermodynamics, John Stuart Mill's concept of steady state in nature, 1st and 2nd Laws of Thermodynamics applied to economics, economic processes and elasticity, entropy and utility, Energy analysis and economic evaluation	
3.	Bioeconomics and sustainability	Benefits and challenges of knowledge-based bioeconomy, sustainable food security (Europe and African Perspective), Development of resource (agricultural) efficient bioeconomy, Social and economic challenges for bioeconomy	6
4.	SWOT analysis of Bioeconomy	Rationale and criteria for SWOT analysis of Bioeconomies, Formulation of theory using mathematical models, Role of econometric tools in analysis.	6
5.	Generic bioeconomic mathematical models	Bioeconomic Models- Dynamic resource harvesting model, Dynamic optimization model, Demand-limited bionomic equilibrium, Growth and aging- The cohert model	6
6.	Ecological bioeconomics and bioeconomy for agriculture	Forestry model, regulation of renewable resource harvesting, investing in agriculture harvesting capacity,	7
7.	Fisheries bioeconomics and mathematical models.	Inherent characteristic of fish stocks, The multi-cohert model for fisheries, the system science approach in fisheries bioeconomics	6
8.	Introduction to bioeconomics	Bio-economics- Concept, Development of Economics and Bioscience (Concept of resource economics for scarcity of biological resources), Bioresource elasticity, Evolution and Development of Economics and Biology (Charles Darwin and the evolutionary paradigm)	6
		Total number of Lectures	32

Evaluation Criteria

Components	Maximum Marks
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignment, Class Test-1/MCQ)
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.	Sundar I. " Introduction to Bioeconomics", Global Research Publication, New Delhi, India
2.	Demirel, Y. "Nonequlibrium Thermodynamics- Transport and rate processes in Physical, Chemical and Biological Processes", Elsevier
3.	Bonaiuti, M. "From Bioeconomics to Degrowth", Routledge (Taylor and Francis Group), USA
4.	Virgin, I., and Morris, J.E. "Creating sustainable bioeconomies", (Taylor and Francis Group), USA
5.	Clark, C.W. "Mathematical bioeconomics", John Wiley & Sons, USA

Detailed Syllabus

Lecture-wise Breakup

Course Code	16B1NBT633	Semester Even (specify Odd/Even)	Semester VI Session 2018 -2019 Month from January to May
Course Name	INSTRUMENTATION TECHNIQUES IN BIOTECHNOLOGY		
Credits	4	Contact Hours	4

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Faculty (Names)	Coordinator(s)	DR. PRIYADARSHINI
	Teacher(s) (Alphabetically)	DR. PRIYADARSHINI

COURSE OUTCOMES		COGNITIVE LEVELS
C330-2.1	Explain the principles, practices and instrumentation	Apply Level (C2)
C330-2.2	Apply understanding of the principles, practices and instrumentation	Apply Level (C3)
C330-2.3	Compare and contrast techniques of different instruments for their strength, limitations and creative use for problem-solving.	Apply Level (C4)
C330-2.4	Assess sample preparation method(s) and problem solving	Apply Level (C4)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Basic laboratory Instruments	Background of instrumentation, Principle, working and applications of centrifugation, pH meter and other basic instruments	5
2.	Microscopy techniques	Principle, working and applications of simple microscope, electron microscopy (SEM & TEM), confocal, fluorescence and phase contrast microscopy.	7
3.	Spectroscopy techniques	Principle, working and applications of UV, Visible, IR, NMR, Fluorescence, circular dichroism, Atomic Absorption spectroscopy, Surface plasmon resonance, Nuclear magnetic resonance, X-ray diffraction.	7

4.	Mass spectrometry techniques	a) Introduction to Ionisation, Mass analysers, Detectors b) Structural information by tandem mass spectrometry c) Analysing protein complexes d) Computing and database analysis	7
5.	Radioisotopic techniques	a) Principles & application of radioisotope b) The nature of radioactivity c) Detection and measurement of radioactivity d) Other practical aspects of counting of radioactivity and analysis of data e) Safety aspects	6
6.	Flow cytometry	a) Principles of the Flow Cytometer b) Principles of Fluorescence c) Data Analysis d) Controls in Flow Cytometry e) Optimizing your Experiments	5
7.	Live imaging techniques.	a) Issues of maintaining cell viability during imaging b) Types of techniques and microscopy used for live-cell imaging c) Applications of Live Cell Imaging	5
		Total number of Lectures	**42**

Evaluation Criteria

Components	Maximum Marks
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignment 1, Assignment2)
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.	I. D. Campbell, Biological spectroscopy (Benjamin/Cummings Pub. Co, Menlo Park, Calif, 1984), Biophysical techniques series
2.	K. Wilson, J. M. Walker, Eds., Principles and techniques of biochemistry and molecular biology (Cambridge University Press, Cambridge, UK: New York, 7th ed., 2009).
3.	D. B. Williams, C. B. Carter, Transmission electron microscopy a textbook for materials science (Springer, New York, 2009; http://dx.doi.org/10.1007/978-0-387-76501-3).
4.	R. M. Silverstein, Spectrometric identification of organic compounds (John Wiley & Sons, Hoboken, NJ, 7th ed., 2005)
5.	Darzynkiewicz, Z., Crissman, H.A. and Robinson, J.P. (eds.) (2001) Cytometry. 3rd edition. Part A and B. Methods in Cell Biology, Volume 63 and 64, Academic Press, San Diego, USA. (ISBN 0-12-203053-2 (Part A); 0-12-203054-0 (Part B)).

Detailed Syllabus

Lecture-wise Breakup

Course Code	16B1NBT634 ELECTIVE	Semester EVEN	Semester VI Semester Session 2018 - 2019
			Month from January to June
Course Name	Genetic Disorder and Personalized Medicine		
Credits	4	Contact Hours	4

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

COURSE OUTCOMES		COGNITIVE LEVELS
C330-1.1	Apply knowledge of genetic principles to understand disease etiology, clinical features and mode of inheritance	Apply Level (C3)
C330-1.2	Explain and interpret different molecular diagnoses and genetic test results	Understand Level (C2)
C330-1.3	Analyze the role of population and quantitative genetics for genetic disorders	Analyze Level (C4)
C330-1.4	Develop the concept of Personalized Medicine and integrate information from HGP databases	Apply Level (C3)
C330-1.5	Assess the genetic counseling process and its impact from a cultural, ethical and psychosocial perspective	Evaluate Level (C5)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction to Genetic Disorder and Principles of	Introduction to Medical Genetics, Genetic Disorder and Concern, Clinical Features, Genetic Principles to Understand Disease Etiology, and Mode of Inheritance,	08

		Pedigree analysis and carrier screening	
2.	Genetic Screening and DNA Banking	Preventive Genetics; DNA Banking and Clinical DNA Testing, Cytogenetic, Molecular and Biochemical Common as well as Modern Technology based Genetic Tests and their Results Interpretation	08
3.	Population and Quantitative Genetics	Application of population genetics in genetic risk calculation within Family/Population, heritability factor estimation	06
4.	Case studies	Case studies; Epigenetics, Uniparental disomy, Mosaicism, Inborn errors of metabolism, cancer genetics etc.,	06
5.	Human Genome Projects	Human Genome Projects and Outcomes: Initial Reference Genome, 100,000, Encode, Gencode and the future prospects, Integration of genomic information in Biomedical Sciences, Related Databases	06
6.	Concept of Personalized Medicine	Personalized Medicine, Study of Genetic resources (OMIM, Gene tests, Gene clinics etc.)	04
7.	Genetic counseling	The Genetic Counseling Process and Its Impact from a Cultural, Ethical and Psychosocial Perspective	04
		Total number of Lectures	**42**

Evaluation Criteria

Components	Maximum Marks
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignment 1, Class Test, 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.	A.J.F. Griffiths, S.R. Wessler, R.C. Lewontin, S.B. Carroll, *Introduction to Genetic Analysis* ,9th Ed, WH Freeman, 2008
2.	M.R. Speicher, A.G. Motulsky, and S.E. Antonarakis (Eds)*Vogel and Motulsky's Human Genetics*.

	Berlin Heidelberg: Springer, 2010
3.	S. Gersen, M. B. Keagle (Eds), *The Principles of Clinical Cytogenetics*, Humana Press, 2010
4.	C. Szalai (Eds), *Genetics and Genomics*, 1st Edition, Tipotex, 2014
5.	E.S. Tobias, M. Connor, M.F. Smith, *Essential Medical Genetics*, 6th Ed, John Wiley & Sons, 2011
6.	*Genetic disorder and related databases (* **e.g.** *Indian Genetic Disease Database* **(http://www.igdd.iicb.res.in/IGDD/home.aspx,** *Rare Disorder by Ministry of health and family welfare(https://mohfw.gov.in/diseasealerts/rare-diseases), Clinical genomic databases(https://research.nhgri.nih.gov/CGD/)*
7.	Current research articles will be provided.

Detailed Syllabus

Lecture-wise Breakup

Course Code	19B13BT311	Semester Even (specify Odd/Even)	Semester VI Session 2018 -2019 Month fromJanuary to June
Course Name	Nanoscience in Food Technology		
Credits	2	Contact Hours	2

Faculty (Names)	Coordinator(s)	Prof. Sudha Srivastava
	Teacher(s) (Alphabetically)	Prof.Sudha Srivastava

COURSE OUTCOMES		COGNITIVE LEVELS
C305-1.1	Explain properties of nanoparticles and nanoemulsions	Understand Level (C2)
C305-1.2	Outline food processing, packaging and preservation	Understand Level (C2)
C305-1.3	Apply nanotechnology concepts to improve food quality, texture, and shelf life	Apply Level (C3)
C305-1.4	Apply concepts of nanoscience for improving agriculture yields	Apply Level (C3)
C305-1.5	Analyze food quality degradation and pathogens detection, using nanosensors	Analyze Level (C4)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction to Nanomaterials	Introduction to nanomaterials, nanoemulsions, method of synthesis and identification of nanoemulsions	5
2.	Food Packaging and Preservation	Introduction to food processing, packaging and preservation. Modified atmosphere packaging, active packaging and intelligent packaging.	6
3.	Application of nanotechnology in	Microemulsions for delivery of nutraceuticals, edible films and coating for food, Polymer nanocomposites, effect of	7

	Food and agriculture	nanomaterials on mechanical, thermal and barrier properties of polymers. Application of nanotechnology for pesticide delivery, nutrient uptake etc. Nanomaterials in Food-Health and Safety Issues	
4.	Biosensors for monitoring food quality	Time temperature indicators, pathogen detection using biosensors, Pesticide detection using biosensor.	6
		Total number of Lectures	**24**

Evaluation Criteria

Components   **Maximum Marks**
Mid Term   30
End Term40
TA   30 (Presentation, 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.	VellaichamyChelladurai, Digvir S. Jayas, 2018 Nanoscience and Nanotechnology in Foods and BeveragesCRC Press, ISBN 9781498760638
2.	Recent Research papers

Detailed Syllabus

Lecture-wise Breakup

Course Code	16B1NMA633	Semester : Even	Semester VI Session 2018 -2019 Month from January to June
Course Name	Statistics		

Credits	4		Contact Hours	3-1-0

Faculty (Names)	Coordinator(s)	Dr. Himanshu Agarwal
	Teacher(s) (Alphabetically)	Dr. Anuj Bhardwaj, Dr. Himanshu Agarwal, Dr. Pinkey Chauhan

COURSE OUTCOMES		COGNITIVE LEVELS
After pursuing the above mentioned course, the students will be able to:		
C302-1.1	make use of measures of central tendency, dispersion, skewness and, kurtosis for description and visualization of population data.	Applying Level (C3)
C302-1.2	apply correlation and regression in statistical analysis of data.	Applying Level (C3)
C302-1.3	explain sampling theory and its distributions.	Understanding Level (C2)
C302-1.4	explain the concepts and properties of estimation theory.	Understanding Level (C2)
C302-1.5	apply sampling and estimation theory to find the confidence interval.	Applying Level (C3)
C302-1.6	analyze small and large sample data by using the test of hypothesis.	Analyzing Level (C4)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Descriptive Statistics	Graphical representation such as histogram, frequency polygon, AM, GM, HM, median, mode, measures of dispersion, skewness and kurtosis such as central and non-central moments, population variance, β, γ coefficient, Box and Whisker plot.	8
2.	Correlation and Regression Analysis	Scatter diagram. Karl Pearson's and Spearman's rank correlation coefficient, regression lines, regression coefficient and their properties.	5
3.	Sampling and Sampling Distributions	Populations and Sample, random sample, statistics, sample moments, law of large numbers, central limit theorem, distribution of sample mean and sample variance, MGF, Chi-square distribution, F-distribution, Student's	7

		*t*distribution.	
4.	Parametric Point Estimation	General concept of point estimation, methods of moments and maximum likelihood for finding estimators, unbiasedness, consistency, efficiency, UMVUE, Cramer-Rao inequality, sufficiency, factorization theorem, completeness, Rao-Blackwell theorem.	10
5.	Parametric Interval Estimation	definition of confidence interval, pivotal quantity, confidence interval for mean, variance, difference of means and difference of variances for small and large samples.	5
6.	Hypothesis Testing	The basic idea of significance test. null and alternative hypothesis, type-I and type II errors, testing of small and large samples for mean, variance, difference in means, and difference in variances.	7
Total number of Lectures			**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Quiz, Assignments, Tutprials)
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.	**Biswas and Srivastava**,A Textbook, Mathematical Statistics Ist Edition, Narosa Publishing House, New Delhi.
2.	**W. Feller**, Introduction to Probability Theory and its Applications Vol. I and II. Wiley Eastern-Ltd, 1971
3.	**V. K.Rohatgi**, An Introduction to Probability Theory and Mathematical Statistics Wiley Eastern, 1984
4.	**R. V. Hogg, A. T. Craig,** Introduction to Mathematical Statistics, McMillan, 1971
5	**AM. Mood**, **F. A. Graybill, and D. C. Boes**, Introduction to the Theory of Statistics McGraw Hill, 1974
6.	**Des Raj &Chandak**, Sampling Theory, Narosa Publishing House, 1998.
7.	**Sheldon Ross**, A First Course in Probability, 6th edition, Pearson Education Asia, 2002.
8.	**Meyer, P.L**, Introductory Probability and Statistical Applications Addison-Wesley Publishing Company, 1965.

Detailed Syllabus

Lecture-wise Breakup

Course Code	16B1NPH636	Semester: Even	Semester: VI Session 2018 -2019 Month fromJanuary to June
Course Name	Medical & Industrial Applications of Nuclear Radiation		
Credits	4	Contact Hours	4

Faculty (Names)	Coordinator(s)	DrPapia Chowdhury
	Teacher(s) (Alphabetically)	DrPapia Chowdhury &DrManojTripathi

COURSE OUTCOMES		COGNITIVE LEVELS
C302-11.1	Define nuclear structure, properties and reactions; Nuclear magnetic resonance process.	Remembering (C1)
C302-11.2	Explain models of different nuclear imaging techniques; CNO cycle; principle of radioactive decays.	Understanding (C2)
C302-11.3	Apply knowledge of nuclear reaction mechanisms in atomic devices, dosimetry, radiotracers, medical imaging, SPECT, PET, tomography etc.	Applying (C3)
C302-11.4	Analyze different radiocarbon dating mechanisms and processes.	Analyzing (C4)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Nucleus, Radioactivity & Dating	Structure of matter; Nucleus:Nuclear Size, Structure and forces; Binding energy and Nuclear stability, mass defect;Nuclear reaction: Fission, Fusion, chain reaction. Nuclear fusion in stars, Formation of basic elements: proton-proton chain, CNO cycle, Hydrostatic equilibrium; Applications: atom bomb, hydrogen bomb, nuclear power	17

		plants, Nuclear reactor problems, precautions. **ii)**Radioactive decay, kinetics of radioactive decay, Types of radioactive decay and their measurement, Half life, decay constant, Population of states, Production of radionuclides. Radioactive dating, Radiocarbon dating: Formation, mechanism of dating, carbon cycle, radiocarbon clock and applications, advantages, disadvantages, precautions; Other dating techniques, protein dating, accuracy in dating;	
2.	Radiation and matter interactions	Dosimetry and applications: Interaction of Radiation of matter: Biological effects of radiations; dosimetry, working principles, Tools and radiotherapy, Doses, Radioisotopes, Radiotracers;	09
3.	NMR and MRI	Nuclear Magnetic Resonance: General Introduction to Magnetic Resonance, Reference Frame; RF Pulses, Larmor precision, Basic principles of NMR & ESR Spectroscopy, Nuclear shielding, Chemical shifts; Couplings, Nuclear Imaging; 1D,2D, 3D Images, Application of NMR in medical industry as MRI, working MRI, Types of differen MRI, Applications of NMR in quantum computation;	09
4.	Nuclear Medicine and Nuclear Imaging	Nuclear Medicine and Nuclear imaging techniques, preclinical imaging, detector designing, photon counting, Medical imaging using $\beta+\gamma$ coincidences, SPECT AND PET: Radiation tomography, applications;	05
		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.	Basic Sciences of Nuclear Medicine; Magdy M K halil, Springer
2.	Physics and Radibiology of Nuclear Medicine; Gopal B Saha, Springer

3.	A. Beiser, Concepts of Modern Physics, Mc Graw Hill International.
4.	Radionuclide Techniques in Medicine, JM McAlister (Cambridge University Press, 1979).
5.	Nuclear Physics; S.N.Ghosal

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**	Fundamentals of Solar radiation, Solar Resource Assessment, Solar Photovoltaics, Balance of PV Systems, and Solar Thermal.	10
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	16B1NHS635	**Semester:** Even	**Semester: VI Session: 2018 -2019** **Month: Jan 2019 to June 2019**
Course Name	Organizational Behavior		
Credits	3	**Contact Hours**	3(2-1-0)

Faculty (Names)	Coordinator(s)	Ms PuneetPannu (Sec 62) &DrAnshuBanwari (Sec 128)
	Teacher(s) **(Alphabetically)**	DrAnshuBanwari Ms PuneetPannu

COURSE OUTCOMES		COGNITIVE LEVELS
C304-6.1	Identify dynamic human behavior through an insight into relationships between individuals, groups and organizations	Apply (C3)
C304-6.2	Analyze individual management style as it relates to influencing and managing behavior in the organization.	Analyze (C4)
C304-6.3	Decide and justify set of strategies for meeting the special challenges in the 21st century competitive workplace	Evaluate (C5)
C304-6.4	Assess the potential effects of important developments in the external environment on behavior in organizations	Evaluate (C5)

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

No.	Module		the module
1	Introduction to OB: Challenges and Opportunities	Interdisciplinary Field, Concepts, Approaches, Responding to Globalization; Improving Quality & Productivity; Improving Customer Service; Improving People Skill; Empowering People; Stimulating Innovation & Change; Coping with Temporariness; Positive Organizational Behavior, Working in Networked Organizations; Balancing Work-Life Conflict	3
2	Managing Workforce Diversity	Major forms of Workplace Diversity, Valuing Diversity, Role of Disabilities, Discrimination, Diversity Initiatives, Diversity Awareness and Affirmative Action, Diversity Management and strategies to implement it Competitive Advantage of Diversity Management Generational Workforce	4
3.	Job Design and Flexible Job Environment	Job Design & its uses; Flexible Job Environment; Job Enrichment Model	2
4.	Leadership: Authentic Leadership	Inspirational Approach to Leadership: Authentic, Ethical & Servant Leadership Defining Authentic Leadership through Intrapersonal, Interpersonal and Developmental Aspects; Basic Model Of Authentic Leadership; Practical Approach to Authentic Leadership through the research of Terry and Bill George; Authentic Leadership: Trust and Ethics, Dimensions of Trust, Counseling & Mentoring	6
5.	Power & Politics	Concept of Power; Sources of Power Contingencies of Power; Power Tactics; Measuring Power Bases: Power Authority Obedience Organizational Politics: Types Factors contributing to Political Behavior; Consequences & Ethics of Politics	5
6.	Employee Engagement	Creating a Culture of Engagement, Models of engagement, Benefits of Employee Engagement, Gallup Study, Methods of engaging employees – from entry to exit, Managers Role in Driving Engagement	2
7.	Organizational Culture	Creating Organizational Culture	3

	&Workplace Spirituality	Approaches to Organizational Culture; How employees learn culture; Measuring Organizational Culture; Spirituality & Organizational Culture	
8.	Organizational Change & Development	Organizational Change: Meaning & Types; Technology & Change; Resistance to Change v/s Inviting Change; Approaches to Organizational Change; Planning & Implementing Change; Organizational Development; OD Interventions & Change	3
		Total number of Lectures	**28**

Evaluation Criteria

Components	Maximum Marks
T1	20
T2	20
End Semester Examination	35
TA	25 (Oral Questions, Assignment, Project)
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.	**S. Robbins, T. Judge, S. Sanghi**, *Organizational Behavior*, 13th Ed, Prentice-Hall India, 2001
2.	**P.Subba Rao**, *Organizational Behavior: Text Cases & Games*, 2nd Edition, Himalaya Publishing House , 2015
3.	**John R. Schermerhorn, Richard N. Osborne, Mary Uhl-Bien; James G. Hunt**, *Organizational Behavior*, 12th Edition, Wiley India Pvt. Ltd, 2012
4.	**Debra L.Nelson and James C. Quick**, *Organizational Behavior*, Cengage Learning, India Edition, 2009
5.	**Steven L. McShane and Mary Ann Von Glinow**, *Organizational Behavior Essentials*, Tata McGraw Hill Publishing Company Ltd, 2007
6.	**Jerald Greenberg**, *Behavior in Organizations*, 10th Ed, PHI Learning Pvt Ltd

Detailed syllabus

Lecture-wise Breakup

Subject Code	16B1NHS632	Semester: EVEN	Semester VI Session 2018-19
			Month from Jan 2019 to June 2019
Subject Name	COGNITIVE PSYCHOLOGY		
Credits	3	**Contact Hours**	2-1-0
Faculty (Names)	**Coordinator(s)**	Dr. RuchiGautam Dr. Badri Bajaj	
	Teacher(s) (Alphabetically)	Dr. Badri Bajaj Dr. RuchiGautam	

COURSE OUTCOMES		COGNITIVE LEVELS
After pursuing the above mentioned course, the students will be able to:		
304-4.1	Understand and apply the concepts of cognitive psychology in everyday life	Applying Level (C3)
304-4.2	Analyze the different models of various cognitive processes	Analyzing Level (C4)
304-4.3	Evaluate cognitive psychology issues and recommend possible solutions	Evaluating Level (C5)
304-4.4	Evaluate interventions/solutions for self-development through cognitive processes	Evaluating Level (C5)

Module No.	Subtitle of the Module	Topics in the module	No. of Lectures for the module
1.	Introduction to Cognitive Psychology	Historical Background: Emergence of modern cognitive Psychology; Approaches: Information Processing and PDP Model; Research Methods	3

3.	Perceptual Processes	Perceptual learning and development; perception of shape, space and movement.	4
3.	Attention	Selective Attention and Divided Attention: Meaning, Definition and Theories.	4
4.	Memory	Short Term Memory	3
5.	Imagery	Properties of mental images; Representation of images and cognitive maps.	3
6.	Language	Structure of language and its acquisition, speech perception, factors affecting comprehension.	4
7.	Thinking and Problem Solving	Types of thinking; Classification of problems; Problems solving approaches, Problems space theory by Newell and Simon, Creativity	4
8.	Decision Making	Logical reasoning types and errors in reasoning processes. Concept formation and categorization; Judgment and decision making	3
Total number of Hours			**28**

Evaluation Criteria

Components	Maximum Marks
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignment, 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.	Ronald T. Kellogg, Fundamentals of Cognitive Psychology, 2nd Ed., Sage Publishing, 2012
2.	Robert Solso, Otto Maclin, M. Kimberly Maclin, Cognitive Psychology, 8th Ed., Pearson Education, 2013
3.	Kathleen M. Galotti, Cognitive Psychology, 5th Ed., Sage Publishing, 2014

Detailed Syllabus

Lecture-wise Breakup

Course Code	16B1NHS636	Semester : Even	Semester VI Session 2018 -2019
			Month from Jan 2019 to June 2019
Course Name	Literature & Adaption		
Credits	3	Contact Hours	2-1-0

Faculty (Names)	Coordinator(s)	Dr. Monali Bhattacharya (Sector 62)
		Dr. Ekta Srivastava Sector (128)
	Teacher(s) (Alphabetically)	Dr. Ekta Srivastava, Dr. Monali Bhattacharya.

COURSE OUTCOMES		COGNITIVE LEVELS
C304-3.1	Understand and outline the elements and theories of adaptation and its various forms, and relate with the texts reflecting the cultural, moral and linguistic changes in the contemporary society.	Understand Level (C2)
C304-3.2	Utilize visual literacy to analyze the language and style adopted in filmed texts and examine them as reflections of Readers' and Audience' values and perceptions in the context of myriad cultures and multidisciplinary settings individually and in groups.	Apply Level (C3)
C304-3.3	Analyze texts and their adaptations beyond the surface level of narrative or character as reflections of value systems of various cultures and times individually and in a team.	Analyse Level (C4)
C304-3.4	Evaluate, interpret and document source texts and adaptations thematically and stylistically to learn the nuances of language, culture and values of the society.	Evaluate Level (C5)
C304-3.5	Compose and make an effective presentation of a literary/non literary piece in any genre and design an ethical adaptation of any literary/non literary piece in another form individually and in groups.	Create Level (C6)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction Literary Devices	Figures of speech, Character, Plotline, Conflict, Point of View	2
2.	Literature & Adaptation	Understanding Cultural Contexts Forms of Adaption Cinematography & Narratology	4
3.	Framework	Adaptation Theories; Reader Response & Audience Response Theories	4
4.	Play & adaptations	The Pygmalion: George Bernard Shaw Hamlet : William Shakespeare	6
5.	Novel & Adaptations	Pride & Prejudice: Jane Austen The Kite Runner: Khalid Hossenni The Namesake: JhumpaLahiri The Godfather: Mario Puzo	12
		Total number of Lectures	**28**

Evaluation Criteria

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

	Recommended Reading material:
1.	**Linda Hutcheon**, *A Theory of Adaptation*, Routledge, 2006

2.	**Mark William Roche**, *Why Literature matters in the 21st Century*, 1st edition, Yale University Press 2004
3.	**George Bernard Shaw**,*Pygmalion,* Electronic Version, Bartleyby.com, New York, 1999
4.	**Stanley Wills &Gary Taylor**, *The Complete Works. The Oxford Shakespeare* (Compact ed.). Oxford: Clarendon Press. , 1988.
5.	**JhumpaLahiri** , *The Namesake*, 1st Edition, Houghton Mifflin US, 2003
6.	**Jane Austen**, *Pride & Prejudice*, Reprint, Thomas Egerton, 2013
7.	**Mario Puzo***, The Godfather*, 1st Edition, G. P. Putnam's Sons, USA, 1969
8.	**Khalid Hossenni**, *The Kite Runne*r, 1st edition, Riverhead Books US,.2003

Detailed Syllabus

Lecture-wise Breakup

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Course Code	19B13HS611	Semester: Even	Semester: VI Session: 2018 -2019
			MonthFromJan 2019 to June 2019
Course Name	Morality of Everyday Living and Moral Decision Making		
Credits	2	**Contact Hours**	1-0-2

Faculty (Names)	Coordinator(s)	MsPuneetPannu, Dr Deepak Verma
	Teacher(s) (Alphabetically)	Ms PuneetPannu, Dr Ekta Srivastava, Dr Praveen Sharma, Dr Deepak Verma

COURSE OUTCOMES		COGNITIVE LEVELS
C305-3.1	Apply and Analyze morality in all facets of personal and professional life	Analyze (C4)
C305-3.2	Discover ways to address moral dilemmas by deliberating on the pros and cons to find the best possible outcome	Analyze (C4)
C305-3.3	Justify and Formulate morally correct decisions and stand by them	Evaluate (C5)
C305-3.4	Adapt and develop a character respected by peers and superior alike	Create (C6)

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

			the module
1.	The Big Questions: Origins of Morality	What is **morality? Universal aspects** of morality, Evolution of Morality, Development of Morality**, Morality Theories, Everyday Dilemmas and Decision Making**	4
2.	Compassion/ Empathy	Reason/Emotion; Where does concern for others come from? Empathy—and is more empathy necessarily a good thing? And what can we learn from the study of those who seemingly lack normal moral feelings, such as violent psychopaths?	3
3.	Moral Differences	How does culture influence our moral thought and moral action? What role does religion play? Why are some of us conservative and others liberal, and how do political differences influence our sense of right and wrong?	2
4.	Moral Circles: Family, Friends, and Strangers	Moral feelings: Family, Friends, and allies. Reciprocal Altruism, The Morality of Group Preference, Morality of racial and ethnic bias. **:** Stereotypes, How Do We Treat Strangers	2
5.	Moral Decision Making	Contemporary Everyday Ethical Issues	3
Total number of Lectures			**14**

Module No.	Title of the Module	List of Experiments/Activities	CO
1.	The Big Questions: Origins of Morality	Experiential Sharing: Morality & its significance to them Case Study: No such thing as free drink.	C305-3.1
2.	The Big	Universal Aspects of Morality: Big Questions: Why be	

	Questions: Universal Aspects of Morality	good? Universal Aspects of Morality: Big Questions: Is it permissible to lie? Universal Aspects of Morality: Big Questions: Is it good to gossip??	C305-3.1
3.	The Big Questions: Everyday Dilemmas and Decision Making	UPSC Case Study Ethical Dilemma of a Marketing Manager	C305-3.2 C305-3.3
4.	Evolution & Development of Morality	Ethical Analysis: A young Professor's Career	C305-3.1 C305-3.2 C305-3.3
5.	Compassion/ Empathy: Reason v/s Emotion	Discussion: Can we do better than the Golden Rule Discussion: Obligation to Others/ Is jealousy & Resentment always bad?	C305-3.1 C305-3.4
6	Compassion/ Empathy	EI Assessment Discussion on Reading: What's the matter with Empathy?	C305-3.1 C305-3.4
7	Moral Differences	Case Study: Difference in Morality Experiential Exercise: Country/ Org/ Home Moral Culture	C305-3.4
8	Moral Circles: Family, Friends, and Strangers	Experiential Sharing: Moral Circles and their influence on us Stereotyping in Morality	C305-3.4
9	Moral Decision Making	Contemporary Real World Scenario: Analyzing it through CATWOE	C305-3.1 C305-3.2

			C305-3.3
			C305-3.4

Evaluation Criteria

Components	Maximum Marks
Mid Term	30 (Project Presentation)
End Semester Examination	40 (End Term Written Paper)
TA	30 (Case Study Assessment, Assignment, 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.	**Martin, Clancy** "Moral Decision Making: How to approach everyday Ethics", The Great Courses, USA, 2014
2.	**Shukla T., Yadav A.& Chauhan G.S**." Human Values & Professional Ethics", Cengage Learning India Pvt Ltd, 2018
3.	**Khanka S.S**. "Business Ethics & Corporate Governance (Principles & Practices)", S. Chand, 2014
4.	**Mruthyunjaya H.C**.," Business Ethics & Value systems", PHI Learning Pvt Ltd, 2013

Detailed Syllabus

Lecture-wise Breakup

Course Code	19B12HS612	Semester : Even	**Semester** VI **Session** 2018 -2019
			Month from Jan 2019 to June 2019

Course Name	Social Media and Society		
Credits	3	**Contact Hours**	2-1-0

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

COURSE OUTCOMES		COGNITIVE LEVELS
C304-1.1	Infer the implications of digital change, and the concept of social media and e-marketing in the context of the changing marketing landscape	Apply Level(C3)
C304-1.2	Elaborate the implications of cyber branding and digitization on online marketing mix decisions	Create Level (C6)
C304-1.3	Develop specific models related to social media and social media analytics	Create Level (C6)
C304-1.4	Evaluate concepts related to Search Engine Marketing, Customer Centric Web Business models and Web Chain Analysis	Evaluate Level(C5)
C304-1.5	Illustrate the new age marketing practices	Understand Level (C2)

Mod ule No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction , Individuals Online and Rules for engagement for social media	What is social media marketing, the importance of social media for influencing target audience, Patterns of internet usage, Internet user demographics, The Behavioural Internet, E-Marketing, The Virtual world,	4

		the changing Marketing Landscape, E -Marketing-Strengths and Applications, Online Marketing Domains, Digital Marketing Optimization, The Need for Digital Engagement	
2.	The Online Marketing Mix	The Online Marketing Mix, Consumer Segmentation, Consumer Traits, Consumers and Online Shopping Issues, E-Product, E-Place, E-Price, E-Promotion, Website Characteristics affecting online purchase decision.	3
3.	The Online Consumer and Social Media	The Digital Ecosystem, Online Consumer Behavior, Cultural Implications of key web characteristics, Models of website visits, Web 2.0 and Marketing, The collaborative web, Network evolution, Network science, Marketing with networks, Metcalfe's law, Netnography, Social Media Model by McKinsey, Social Media Tools-Blogs, Wikis, Online Communities, Facebook, Twitter, You Tube , Flickr, Microblogging.	4
4.	Online Branding and Traffic Building	Cyberbranding, Online brand presence and enhancement, The Digital Brand Ecosystem, Brand Experience, Brand Customer Centricity, Brands and Emotions, The Diamond Water paradox, Internet Traffic Plan, Search Marketing Methods, Internet Cookies and Traffic Building, Traffic Volume and quality, Traffic Building Goals, Search Engine Marketing, Keyword Advertising, Keyword value, Internet Marketing Metrics, Websites and Internet Marketing.	4
5.	Web Business Models ,Social Media Strategy ,Social Media Marketing Plan	The value of a Customer Contact, Customer Centric Business Management, Web Chain of Events, Customer Value Analysis and the Internet, Business Models, Revenue Benefits, Value Uncertainty, Purchase Importance, Define a social media plan, explain the social Media marketing planning cycle, list the 8C's of strategy development.	4
6.	Market Influence analytics in a Digital Ecosystem	Engagement Marketing through Content Management, Online Campaign Management, Consumer Segmentation, Targeting, and Positioning using Online Tools, Market Influence Analytics in a Digital Ecosystem, The Digital Ecosystem, Knowledge as a value proposition, CGM and Consumer behavior, The	4

		value of the power of influence, Amplifying Social Media Campaigns.	
7.	The Contemporary Digital Revolution and its impact on society	Online Communities and Co-creation, The fundamentals of online community management strategies, The World of Facebook, The Future of Social media Marketing—Gamification and Apps, Game based marketing The world of Apps, Apps and the Indian Diaspora	3
8.	Integrating Mobile into Social Media Marketing	Types of Mobile Marketing, Progression of the mobile as a Marketing channel, some Indian mobile marketing campaigns, Impact of Social Media on government, the economy, development, and education	2
Total number of Lectures			**28**

Evaluation Criteria

Components	Maximum Marks
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignment and 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.	Social Media Marketing A Strategic Approach, Melissa Barker,DonaldBarker,Second Edition Cengage Learning ,2017.
2.	Digital Marketing ,Seema Gupta,First Edition ,Mc Graw Hill Education (India) Private Limited ,2018
3.	Digital Marketing, Vandana Ahuja, First Edition, Oxford University Press, 2015
4.	Social Media Marketing, Liana "Li" Evans,First Edition , Pearson, 2011.

Detailed Syllabus

Lecture-wise Breakup

Course Code	19B12HS611	Semester : EVEN (specify Odd/Even)	Semester : VI Session 2018 -2019 Month from: January- June
Course Name	Econometric Analysis		
Credits	03	Contact Hours	2-1-0

Faculty (Names)	Coordinator(s)	ManasRanjanBehera
	Teacher(s) (Alphabetically)	ManasRanjanBehera

COURSE OUTCOMES		COGNITIVE LEVELS
After pursuing the above mentioned course, the students will be able to:		
C304-2.1	*Demonstrate* the key concepts from basic statistics to understand the properties of a set of data.	Understanding Level –(C2)
C304-2.2	*Apply* Ordinary Least Square method to undertake econometric studies.	Apply Level – (C3)
C304-2.3	*Examine* whether the residuals from an OLS regression are well-behaved.	Analyze Level – (C4)
C304-2.4	*Evaluate* different model selection criteria for forecasting.	Evaluation Level – (C5)
C304-2.5	*Create* models for prediction from a given set of data.	Creation Level – (C6)

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

1.	Statistical Inference	Point and interval estimation; ;The Z distribution ;The Null and Alternate hypotheses ;The chi-square distribution; The F distribution; The t distribution	3
2.	Regression Analysis	Two variable regression model; The concept of the PRF; Classical assumptions of regression; Derivation of the OLS estimators and their variance; Properties of OLS estimators under classical assumptions; Gauss-Markov Theorem; Tests of Hypothesis, confidence intervals for OLS estimators; Measures of goodness of fit: R square and its limitations; Adjusted R square and its limitations	7
3.	Econometric Model Specification	Identification: Structural and reduced form; Omitted Variables and Bias; Misspecification and Ramsay RESET; Specification test; Endogeneity and Bias	5
4.	Failure of Classical Assumptions	Multi-collinearity and its implications; Auto-correlation: Consequences and Durbin-Watson test ;Heteroskedasticity: Consequences and the Goldfeld -Quandt test	2
5.	Forecasting	Forecasting with a)moving averages b) linear trend c) exponential trend CAGR; Forecasting with linear regression; Classical time series decomposition; Measures of forecast performance: Mean square error and root mean square error; Limitations of econometric forecasts	5
6.	Time Series Analysis	Univariate Time Series Models: Lag Operator, ARMA , ARIMA models, Autoregressive Distributed Lag Relartionship	3
7.	Linear Programming	Linear programming; Dual of a linear programming problem; Simplex method Transportation	3
		Total number of Lectures	**28**

Evaluation Criteria

Components	Maximum Marks
T1	20
T2	20
End Semester Examination	35
TA	25 (Quiz+ Assignment+Viva -Voce)

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.	Gujarati, D.N. (2002), Basic Econometric (4th ed.), New York: McGraw Hill.
2.	Greene, W.H. (2003), Econometric Analysis, New Jersey: Prentice Hall.
3.	Madala, G.S. (1992), Introduction to Econometrics (2nd ed.), New York: Macmillan.

Detailed Syllabus

Lecture-wise Breakup

Course Code	18B13HS612	Semester : Even	**Semester** VI Session 2018 -2019 **Month from** Jan 2019 to June 2019
Course Name	Effective tools for Career Management and Development		
Credits	2	Contact Hours	1-0-2

Faculty (Names)	Coordinator(s)	DrKanupriyaMisraBakhru
	Teacher(s) (Alphabetically)	DrKanupriyaMisraBakhru

COURSE OUTCOMES		COGNITIVE LEVELS
C305-2.1	Assess ones personal priorities, skills, interests, strengths, and values using a variety of contemporary assessment tools and reflection activities.	Evaluate Level (C 5)
C305-2.2	Apply knowledge of all the Career Stages in making informed career decisions.	Apply Level (C 3)
C305-2.3	Develop and maximize ones potential for achieving the desired career option.	Create Level (C6)
C305-2.4	Analyze the processes involved in securing and managing career by employees of different organizations.	Analyze Level (C 4)

Module No.	Title of the Module	Topics in the Module	No. of Lectures and Tutorial for the module
1.	Introduction to Career Life cycle	Introduction to Career Life Cycle of an individual-Role and importance of human resource in an organization, Evolution of Strategic Human Resource Management.	3
2.	Self Branding and strategies to do well in Recruitment and Selection	Introduction to complete cycle of Recruitment and Selection, Introduction to various tools used for assessment and testing candidates-aptitude test, personality test, graphology test etc. Introduction to Workforce planning, Importance and practical application of Job Analysis, Job Description and Job Specification.	3
3.	Personnel Development and your career	Introduction to various learning and development, Introduction to various techniques used for learning and development, measure of training effectiveness, Training techniques / delivery, Kirkpatrick Model, Introduction to Succession Planning, Transactional Analysis.	3
4.	Human Resource Evaluation and	Performance Management: Measurement Approach, Developing Job Descriptions, Key Result Areas, Key	3

	Compensation	Performance Indicators, Assessment Centre, 360 Degree feedback, Balanced Scorecard, Effective Performance Metrics. Compensation Strategy and trends- Compensation package, ESOPs, Performance based pay, Recognition, Retrial benefits, Reward management, Team rewards.	
5.	Human Resource Control and special topics	Human Resources Audit, The Human Resource Information System (HRIS), Human Resources Accounting, Competency Management, Human Resource Management Practices in India, Internationalization of Human Resource Management Commonly Used Jargons.	2
		Total number of Lectures	**14**

Module No.	Title of the Module	List of Experiments/Activities	CO
1.	Introduction to Career Life cycle	Practical Sessions on Resume and Cover Letter Writing	C305-2.1, C305-2.2
2.	Self Branding and strategies to do well in Recruitment and Selection	Practical Sessions on Job Description, Job Specification and Self-Branding	C305-2.3, CO4
3.	Personnel Development and your career	Practical Sessions on Johari Window-Knowing Thyself, Transaction Analysis-Parent, Child, Adult Ego State for effective interpersonal communication.	C305-2.1, C305-2.3
4.	Human Resource Evaluation and Compensation	Practical Sessions on HR Interview and Mock HR Interview	C305-2.2, C305-2.4
5.	Human Resource Control and special topics	Practical Sessions on Group Discussions and Mock Group Discussions	C305-2.2, C305-2.4

Evaluation Criteria	
Components	**Maximum Marks**
Mid Term	30 (Project)
End Term	40 (Written)
TA	30 (Class Mock Activities, Assignment, 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.   Pande and Basak, Human Resource Management- Text and Cases, Pearson, 2012

2.	Dessler and Varkkey, Human Resource Management, Pearson, 2011
3.	VSP Rao, Human Resource Management, Excel Books, 2007
4.	Aswathappa, Human Resource Management, McGraw-Hill, 2010
5.	Gary Dessler, Human Resource Management, Pearson/Prentice Hall, 2005

Detailed Syllabus

Lecture-wise Breakup

Course Code	18B12HS611	Semester :EVEN	Semester VI Session 2018 -2019
			Month from January to June
Course Name	Marketing Management		
Credits	3	Contact Hours	2-1-0

Faculty (Names)	Coordinator(s)	Dr Swati Sharma
	Teacher(s) (Alphabetically)	Dr. Swati Sharma

COURSE OUTCOMES		COGNITIVE LEVELS
After pursuing the above mentioned course, the students will be able to:		
C304-7.1	To illustrate the fundamentals of marketing, marketing environment and market research	Understanding Level (C2)
C304-7.2	To model the dynamics of marketing mix	Applying Level (C3)
C304-7.3	To demonstrate the implications of current trends in social media marketing and emerging marketing trends.	Understanding Level (C2)
C305-7.4	To appraise the importance of marketing ethics and social responsibility	Evaluating(C5)
C-305-7.5	To conduct environmental analysis, design business portfolios and develop marketing strategies for businesses to gain competitive advantage.	Creating (C6)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Understanding New Age Marketing	Defining Marketing For 21st Century	5

		The importance of marketing and marketing's role in business and society.	
		Introduction to Digital Marketing.	
		Online Communication Tools.	
		The Social Media-Conversations, Community and Content.	
		Affiliate Marketing and Mobile Engagement.	
		The Digital Campaigns	
2	**Marketing Environment and Market Research and insights**	Internal and external forces impacting marketers. Marketing and Customer Value. Gathering Information and Scanning the environment. Company's Micro and Macro Environment Responding to the Marketing Environment	3
3	**Strategic Planning and the marketing Process**	Explore the impact of social forces on marketing actions. Describe how technological change affects marketing. Designing the business Portfolio Discuss the Strategic Planning Process and Strategic Marketing Process.	5
4	**Consumer and Business Buyer Behavior**	Consumer Markets and consumer buyer behaviour. The buying decision process. Business Markets and business buyer behaviour. Discuss the modern ethical standards.	5
5	**Branding**	Brand Image, Identity and Association. Product brands and Branding decisions. Product line and mix decisions. Consumer Brand Knowledge. New Product Development and Product life cycle strategies.	4

6	**Pricing products: Pricing considerations and strategies**	Factors to consider when setting prices. New product pricing strategies. Product mix pricing strategies. Price adjustments and changes.	4
7	**The New Age Social Marketing**	Ethics and social responsibility in marketing. Ethical behavior in business. Ethical decision making. Social forces affecting marketing. Impact of culture on marketing. Discuss modern ethical standards. Importance of marketing in CSR and business sustainability.	2
		Total number of Lectures	**28**

Evaluation Criteria

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

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

1. Kotler, Philip and Gary Armstrong, Principles of Marketing, 17th Edition, New Delhi, Pearson Education, 2017.

2. Kotler, Philip., and Kevin Lane Keller, Marketing Management, 15th Edition, New Delhi, Pearson Education, 2014.

3. Grewal D., &Levy Michael, Marketing, 5th Edition, Mc graw Hill Education (India) Private Limited 2017.

4. Winer, Russell S ., Marketing Management, 4th Edition, Prentice Hall,2014.