JAYPEE INSTITUE OF INFORMATION AND TECHNOLOGY

B. TECH BIOTECHNOLOGY

SEMESTER VII

Course Code	17B1NBT731	**Semester :** ODD	**Semester:** VII **Session:2022-2023** Month from: **July to December.**
Course Name	Food Biotechnology		
Credits	4	**Contact Hours**	4
Faculty (Names)	**Coordinator(s)**	Dr. Smriti Gaur	
	Teacher(s) (Alphabetically)	Dr. Smriti Gaur	

COURSE OUTCOMES		**COGNITIVE LEVELS**
CO1	Explain fundamental principles of food science and chemistry.	**C2**
CO2	Outline beneficial and harmful effects of microorganisms related to food	**C2**
CO3	Utilize microbes for development of functional food	**C3**
CO4	Examine methods that increase shelf life and quality parameters of food	**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, heat processing(high temperature), chilling and freezing(low temperature),preservation by food additives	10
4.	Functional Foods	Single Cell Protein, Probiotics and prebiotics, Yeast as a food supplement.	06
5.	Processed Food Industry	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	**10**

Project based learning: Each student in a group of 2 will opt a food industry. They will discuss the various products manufactured by the industry, product processing, manufacturing applications, market information, job prospects etc. This will enhance the student's understanding about various food industries. This would help their employability into the food sector.

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)

Course Code	**15B1NBT832**	**Semester Odd (specify Odd/Even)**	**Semester VIII Session 2022-2023 Month from July to December**	
Course Name	**Biostatistics and Its applications**			
Credits	**4**	**Contact Hours**	**4**	
Faculty (Names)	**Coordinator(s)**	**Dr. Shalini Mani**		
	Teacher(s) (Alphabetically)	**Dr. Shalini Mani**		

COURSE OUTCOMES		**COGNITIVE LEVELS**
C430-3.1	Explain the various statistical methods to design a biological studies and data representation.	Understanding (Level 2)
C430-3.2	Apply different statistical methods and approaches to study the significance of a study.	Apply (Level 3)
C430-3.3	Examine the relationship between different parameters of a study.	Analyze (Level 4)
C430-3.4	Choose appropriate statistical methods, tools and resources including prediction, validation and evaluation of the biological studies.	Evaluate (Level 5)

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 sampling, Sources of data collection	2
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,	12
6.	Analysis of data source	Assess data sources and data quality for the purpose of selecting appropriate data for specific research questions	4
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

Project Based learning: Students will learn to represent the data of various fields using various statistical methods. Students will also be able to select the appropriate statistical tool for analysis of different data set and interpret the outcome of any study.

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, Kinberlee Gauvreau, 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.

Course Code	16B1NBT734	**Semester Odd**		**Semester VII Session 2022-2023** 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	Understanding Level (C2)
C431-3.2	Illustrate membrane trafficking in cell environment	Apply Level (C3)
C431-3.3	Identify the signaling event during biogenesis	Analyze Level (C4)
C431-3.4	Compare regeneration and maintenance of different tissue	Analyze 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) Apoptosis b) Epidermis & its renewal by stem cells, sensory epithelia, airway and the gut c) Blood vessels & endothelial cells, blood cell formation, renewal by pleuripotent cells d) Genesis, modulation & regulation of skeletal muscle e) 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**

Project based learning: Students in each team researches a particular human disease based on menbrane trafficking, tissue maintenance and cytoskeleton. They will present information about the cellular structure or process affected by the disease, the cellular biology of the disease, and recent research focused on understanding the cellular mechanisms of the disease process. To support effective teamwork and to help students develop collaboration skills useful for their future careers, current research problems will be discussed in small groups.

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

Course Code	**17B1NBT734** ELECTIVE	**Semester Odd**	**Semester VII Session** 2022-2023 **Month from** July to December
Course Name	Stem Cells and Health Care		
Credits	4	**Contact Hours**	4

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

COURSE OUTCOMES		COGNITIVE LEVELS
C430-1.1	Compare the unique properties of stem cells derived from different sources	Understand Level (C2)
C430-1.2	Select niche and various isolation and reprogramming methods of stem cells	Apply Level (C3)
C430-1.3	Apply the acquired knowledge in Regenerative medicines	Apply Level (C3)
C430-1.4	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 2 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.	Mehmet R. TOPCUL and Idil CETIN Stem Cells in Cell Therapy and Regenerative Medicine, OMICS International, ebook, 2018
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.	Stewart Sell, Stem Cells Handbook 2003 Humana Press, USA
8.	**Recent research articles will be discussed in the class and same will be provided.**
9.	Websites: http, www.isscr.org/, https://stemcells.nih.gov/

S.No.		Course Outcome	Cognitive level
1	**Major Project Part-1 (10B19BT794)- Dr. Chakresh Kumar Jain**		
	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
Major Project: Students research on topic of their interest and define problem statement, figure out probable solution by reviewing the current literature, Identify the experimental methods, perform all the experiment in lab and communicate their findings orally and by writing. This develops independent working and thinking ability, Experimental skills and other set of skills such as research, problem identification, problem solution, written and oral communication, etc.			

Course Code	15B19BT793	**Semester ODD**	**Semester** VII **Session 2022-2023** Month: from **July -December**
Course Name	Summer Training Viva		
Credits	2	**Contact Hours**	**NA**
Faculty (Names)	**Coordinator(s)**	Prof. Sujata Mohanty	
	Teacher(s) (Alphabetically)	Prof. Sujata Mohanty	

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

Project Based Learning: Summer Training viva is an absolutely Project Based Learning. Students expose themselves to various working environment of Industry/Academic Institutes/ Health practising centres during the execution of their project work and this interface facilitate themincultivating the entrepreneurial culture, R&D aspect, innovation and also motivate them towards right Employability.

Course Code	**1812HS411**	**Semester** Odd	**Semester** VII **Session 2022-2023** **Month from** July 2022-December 2022	
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 to human 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 techniques	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 professional and academic training, HR's Contribution to Business Value, the Changing Nature of HR.	8
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, Using Tableau.	10
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	12

		Management, Retention Analytics. Data Visualization and Storytelling using Tableau.	
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			**44**

Evaluation Criteria

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

Project Based Learning:

Students, in groups of 5-6, are required to select a contemporary topic of HR. Further students are required to select a sector from where they will collect the data. Data should be collected from at least 50 respondents from the chosen sector. The information can be collected with the help of an interview or some kind of questionnaire pertaining to the HR topic chosen. Analysis of the collected data should be done using SPSS software. Findings should be discussed and recommendations should be suggested.

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.	**Edwards and Edwards, Predictive HR Analytics. Mastering the HR Metric, Kogan Page, Limited, 2019**
2.	Banerjee, Pandey and Gupta, Practical Applications of HR Analytics, Sage, 2019
3.	Bhattacharyya, HR Analytics: Understanding Theories and Applications, Sage, 2017
4.	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
5.	Guenole, Ferrar and Feinzig, The Power of People: How Successful Organizations Use Workforce Analytics To Improve Business Performance, First Edition, Pearson, 2017
6.	Sesil, Applying Advanced Analytics to HR Management Decisions: Methods for Selection, Developing, Incentive and Improving Collaboration, Pearson, 2014

Course Code	**16B1NHS831**	**Semester: Odd (specify Odd/Even)**		**Semester: VII Session** 2022-2023 **Month:** July to December	
Course Name	Gender Studies				
Credits	3		**Contact Hours**	(3-0-0)	
Faculty (Names)	**Coordinator(s)**	Dr Parineeta Singh			
	Teacher(s) (Alphabetically)	Dr Parineeta Singh			

COURSE OUTCOMES		**COGNITIVE LEVELS**
C401-19.1	Demonstrate knowledge of the construct of gender and the way itintersects with other social and cultural identities of race, class, ethnicity and sexuality	Understand(C2)
C401 - 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)
C401-19.3	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)
C401-19.4	Assess the need for Gender Sensitization and Gender Inclusivity and its practice in contemporary settings	Evaluate (C5)
C401-19.5	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, Viva)
Total	**100**

Project- Divide your life in different age brackets such as 0-5 years, 5-8 years, 8-12 years, 12-15 years, 15-18 years and 18-21 years and write about your experiences with gender. When was the first time you experienced your gender? What was/is the process of gender construction for you? How does different institutions such as family, schools, media, religion etc. has shaped your gender? What kind of differentiations, discriminations (if any) you have faced on the basis of your gender. Also mention the differences you experienced in the second phase when you experienced the bodily changes? How has your gender identity is created during the course of your life? Please explain all these (not limited to these questions only) with the help of any gender theory that we have discussed in the course.

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)

Course Code	17B1NHS731	**Semester: Odd**	**Semester** VII **Session** 2022-2023 **Month from** July to December	
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	6

		based costing for CRM	
4.	CRM in B2C, B2B Markets, Customer Experienc e Manageme nt	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 iew) and CRM Roadmap	Evaluating Technological solutions for CRM, Comparison of Siebel, Oracle, MySAP.com and People Soft Enterprise solutions, Comparison of Talisma, Sales logix, Microsoft 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.	7
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**
		Class Presentations	**6**

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

Project Based Learning: The project is to be done in group size of 4-5 members each. Student groups can choose an organization from one of the industry vertical like banking, IT, hospitality, telecom, airlines, logistics and consulting. Students need to study the CRM processes (internal CRM processes for improving employee productivity and external processes improving the organization-consumer interface) in the vertical/organization chosen. They need to develop a conceptual modelto depict the processes. A questionnaire needs to be developed it can either be an employee-based survey or consumer-based survey. Based on data collection and analysis, CRM strategies have to be formulated, for better consumer segmentation/process improvement/productivity enhancement/ identification of customers with greater Customer Life Time Value/ Customer Retention Program. Strategies can be developed for Key Account Management and Campaign Management. This adds to the employability skills of customer management in an organization.

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, Ed. Peelan Rob Beltman, 2nd Edition, Pearson, 2014.
2.	Ou, Y. C., Verhoef, P. C., & Wiesel, T. The effects of customer equity drivers on loyalty across services industries and firms. Journal of the Academy of Marketing Science, *45*(3), 336-356, 2017.
3.	Lin, Y. C., Lee, Y. C., & Lin, S. Y. The influence of the personality traits of webcasters on online games. International Journal of Electronic Customer Relationship Management, *11*(1), 94-103, 2017
4.	Menzel, C. M., & Reiners, T.Customer relationship management system a case study on small-medium-sized companies in north Germany. In *Information Systems for Small and Medium-sized Enterprises* pp. 169-197. Springer, Berlin, Heidelberg, 2014.
5.	Customer Relationship Management-A strategic perspective, G. Shainesh, Jagdish Sheth, Reprinted Macmillan Publishers India Limited, 2009.
6.	Mukerjee, K., Customer Relationship Management-A Strategic approach to Marketing, 3rd Edition Prentice Hall of India, 2007.
7.	Customer Relationship Management Concepts and Technologies-Francis Buttle, 3rd Edition Taylor and Francis, 2015.
8.	Berry, Michael, J. A, Linoff, Gordon S., Datamining Techniques for Sales, Marketing and CRM, 2nd Edition, Wiley Publications, 2007.

Course Code	17B1NPH732	**Semester :** Odd	**Semester:** VII, **Session: 2022-2023** **Month from:** July to December
Course Name	Nanoscience and Technology		
Credits	3	**Contact Hours**	3
Faculty (Names)	**Coordinator(s)**	Dr. Navendu Goswami and Dr. Sandeep Chhoker	
	Teacher(s) (Alphabetically)	Dr. Navendu Goswami 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 transistor	5
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) ofmicroscopes 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 Tc 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**

Project based learning: Students would work on a project of their choice in the field of Nanoelectronics, Nanobiotechnology, Catalysis by nanoparticles, Quantum dot devices, Quantum well devices, High Tc nano-Superconductors, Nanomaterials for memory application, CNT based devices, MEMS and NEMS. In such projects students can apply the basic concepts of Nanoscience for solving theoretical and numerical problems. They can also work on analysis of a nanomaterial to determine its properties through suitable characterization tools such as SEM, TEM, AFM etc. The learning gained through this project would consolidate the understanding and provide skills of analysis and application in Nanoscience and Technology and thereby providing the employability prospects in the organizations and industries involved in the research and development of nanomaterials synthesis and characterizations, nanoelectronics, nanobiotechnology/nanomedicine etc.

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.

Subject Code	**18B12HS211**	**Semester: ODD**	**Semester VII Session:2022-2023** **Months: from Aug 2022 - Dec 2022**
Subject Name	**PSYCHOLOGY OF PERSONALITY**		
Credits	**3**	**Contact Hours**	**(3-0-0)**

Faculty (Names)	**Coordinator(s)**	Dr. Badri Bajaj
	Teacher(s) (Alphabetically)	Dr. Badri Bajaj

COURSE OUTCOMES		**COGNITIVE LEVELS**
C401-9.1	Demonstrate a basic understanding of concepts of personality	Understanding (Level 2)
C401-9.2	Apply the concepts of personality in day to day life	Applying (Level 3)
C401-9.3	Examine the different theoretical perspectives and approachesof personality	Analyzing (Level 4)
C401-9.4	Develop solutions for handling problems and achieving goals using personality concepts, theories and approaches	Creating(Level 6)

Module No.	**Subtitle of the Module**	**Topics in the module**	**No. of Lectures forthe module**
1.	**Introduction to the Psychology of Personality**	Definition and perspectives, Approaches, Research methods	**6**
2.	**Determinants of Psychology of Personality**	Motivation and Emotion, Interior selves and interior worlds, Mentalabilities	**6**
3.	**Theories**	Psychoanalytical Theory of Personality: Freud, Neo Freudians:Jung, Horney, Erikson	**10**
4.	**Approaches**	Trait Approach: Allport, Cattell, Biological Approach, Social learning , Humanistic approach	**10**
5.	**Assessment of Personality**	Interviews, Projective tests,Behavioral assessment, Personality inventories	**10**

Total:	**42**

Evaluation Criteria Components	Maximum Marks
T 1	20
T 2	35
End Semester Examination TA	25 (Assignment, Quiz, Oral Questions)
Total	**100**

Project based learning: Students of Psychology of personality will choose any two theories from the syllabus and study these theories. Make group of 2-3 students. Write everyday applications of some aspects of these theories. Submit the report of the project through Google Classroom link. Make presentations in the respective tutorial classes.

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.	Schultz, D. P., and Schultz, S. E., *Theories of personality*. Cengage Learning11th Ed., 2016.
2.	Burger, Jerry M. *Personality: an introduction*. Cengage Learning, 10th Ed.,Cengage Learning, 2019.
3.	Mayer, John D. *Personality: A systems approach*. Rowman & Littlefield, 2017.

Course Code:	**21B12HS411**	**Semester: ODD**	**Semester: 7th** **Session: 2022-2023** **Months: August to December**
Course Name	Urban Sociology		
Credits	03	Contact Hours	3-0-0

Faculty (Names)	**Coordinator(s)**	Prof. Alka Sharma
	Teacher(s) (Alphabetically)	Prof. Alka Sharma Dr. Priyanka Chhaparia

COURSE OUTCOMES		**COGNITIVE LEVELS**
C401-25.1	Understand the concepts and theories of Urban Sociology	C2
C401-25.2	Apply an analytical framework to understand the structural characteristics of cities students are residing in	C3
C401-25.3	Analyze the role of agencies and actor in shaping the process of urbanisation	C4
C401-25.4	Evaluate the importance of good governance and urban planning	C5

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Introduction to Urban Sociology	Basic Concepts and terminologies of Urban Sociology, Origin of urban societies, Rural-Urban Continuum	4
2.	Theories in Urban Sociology	The Classical Foundations of Simmel, Max Weber, Tonnies, Louis Wirth, Durkhiem and Friedrich Engels	5
3.	The Ecological View	The Chicago School,Concentric zone theory (Burgess), Sector theory (Hoyt), Multiple Nuclei theory (Harris and Ullman)	3
4.	Contemporary Urban Sociology	Political Economy of Cities, Henry Lefebvre, Class Conflict Theories, Accumulation Theory, Neoliberalism, Neo-Weberian, Neo-Marxism, Colonialism	4
5.	Mapping and Organisation	Social Area Analysis, Urban Social Divisions, Concentration and Centralization, Segregation, Cooperatives, Role of	4

		Cooperatives in Urban planning and development	
6.	Urbanisation in India	Development of Urban Sociology in India, Evolution of and from different structures, Spatial Structures and classification of cities	4
7.	Urban Planning	Historical timeline of urban planning, Principles of Urban Planning, Need for planning, Governance, Agencies Involved, Urban local bodies	5
8.	Urban Issues in India	Level, trends, and pattern, Issues (poverty, slum, and environment) and Implications, Lessons from a pandemic	4
9.	Technology and Urbanisation	Digitisation and expansion of cities, Impact of technology on Urbanisation, role of technology in governance	4
10.	Globalisation and Urban Development	Concept of globalisation and its impact on urbanisation, new perspectives on urbanisation, emergence of Mega cities	4
11.	Sustainable Urban Development	Challenges in current model of urbanisation, Need for sustainable urban development, Tenets of sustainable development, Introduction to SDGs and their relevance to urbanisation, sustainable structures	4
		Total number of Lectures	**45**

Evaluation Criteria

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

Project Based Learning: The students would be divided into a group of 4-5. They would be asked to map and discuss the different parts of their cities. The lectures and readings on the process of urbanization and models of urbanization will form the basis for this exercise. Students would be required to critically analyse the urban spaces using sociological perspectives and theories. The students would be needed to make a presentation and also submit a report.

Recommended Reading material:

1.	Gottdiener, M., Budd, L., &Lehtovuori, P. *Key concepts in urban studies*. Sage. (2015)
2.	Lin Jan and Mele Christopher, ed. *The Urban Sociology Reader*. London: Routledge. (2005)
3.	Rao, M. S. A., ed. *Urban Sociology in India: Reader and Source Book*. New Delhi: Orient Longman. (1974)
4.	Savage, M., and Warde, A. *Urban sociology, capitalism and modernity*. Macmillan International Higher Education. (1993)

5.	Sivaramakrishnan, K.C., Kundu, Amitabh & Singh, B.N. *Handbook of Urbanization in India*. Oxford University Press (2007)
6.	Wirth, Louis. *Urbanism as a Way of Life*. American Journal of Sociology. (1938)
7.	Sharma, A.K. and Misra, B.D. *Urbanization in India: Issues &Challenges.*New Delhi: Ane Books Pvt. Ltd.(2018)

Detailed Syllabus

Subject Code	**16B1NHS435**	**Semester : ODD**	**Semester: V Session: 2022-2023** **Month: August 2022 to Dec 2022**
Subject Name	**SOCIOLOGY OF MEDIA**		
Credits	**3**	**Contact Hours**	**(3-0-0)**

Faculty (Names)	**Coordinator(s)**	**Dr. Priyanka Chhapariya**
	Teacher(s) (Alphabetically)	**Dr. Priyanka Chhapariya** **Shikha Kumari**

CO Code	**COURSE OUTCOMES**	**COGNITIVE LEVELS**
C303-2.1	Demonstrate a basic understanding of different concepts used in the systematic study of Sociology of Media	Understanding(C 2)
C303-2.2	Examine various sociological theoretical orientations towards media and society.	Analyzing(C 4)
C303-2.3	Analyze the key issues related to the processes of Production of Media, Popular Culture and consumer culture.	Analyzing(C 4)
C303-2.4	Critically evaluate the Cultural Consumption, Social Class & the process of construction of subjectivities and audience reception in new Media	Evaluating(C 5)
C303-2.5	Create positive and critical attitude towards the use of new media and understanding of threats of Digital Age	Creating(C 6)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Introduction	Introduction to the Course	1
2.	Theoretical Orientation	● Functionalist Approach to the Sociology of Media and Popular Culture ● Critical Approach to the Sociology of Media and Popular Culture	8

		● Symbolic Interactionist Approach to the Sociology of Media and Popular Culture ● Different theories of Media	
3.	Concept of Popular Culture and its critical analysis	● What is popular culture? ● Difference between 'pop' culture and 'high' culture ● What distinguishes popular culture from other kinds of culture (art, folk culture)? Is there a distinction at all anymore? ● Visualizing Society through 'pop' culture/ media ● Risks and rituals that come with Popular Culture	8
4.	New media	● Difference between tradition media and new media ● New media as technology ● New Information Technology (brief history in case of India)	5
5.	Media & State	● Mediatization of Society ● Free-speech Media	5
6.	Consumption of Media and Media reception	● Social Actors as Audience/ Audience as market– Theory ● Media effects: Media and representations (gender, ethnic)- the under-representation and misrepresentation of subordinate groups. ● Media and the construction of reality: media logic and cultivation analysis theory ● Information Society vs Informed Society ● Cultural Consumption and Social Class	9
7.	Media in Global Age	● Rise of Network Society- Manuel Castells ● Global Media: impact of market & state ● Global Perspectives: The world on our doorstep ● Marketing and aesthetics in everyday life	7
		Total number of Lectures	**42**

Evaluation Criteria

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

Project Based Learning- Each student will review research papers applying assumptions of different media theories studies in the course and submit a project.

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.	JosephTurow, *Media Today: An Introduction to Mass Communication*,3rd Ed., Taylor & Francis. UK. (2008).
2.	JA Fisher 'High Art v/s Low Art, in Berys Nigel Gaut& Dominic Lopes (eds.), *The Routledge Companion to Aesthetics*. Routledge2001
3.	G.Ritzer, 'McDonaldization of Society,. *The Journal of American Culture*. Volume 6, Issue 1. (2001 [1983])Pp. 100-107.
4.	Manuel. Castells,'Introduction', in *Rise of Network Society: The Information Age: Economy, Society and Culture*, 2nd Ed (1996).

Course Code	17B1NMA732	**Semester** - Odd	**Semester** VII **Session** 2022-2023 **Month from** Aug 2022- Dec2022
Course Name	Applied Numerical Methods		
Credits	3	**Contact Hours**	3-0-0
Faculty (Names)	**Coordinator(s)**	Dr Yogesh Gupta and Dr Neha Ahlawat	
Teacher(s) (Alphabetically)		Dr Yogesh Gupta, Dr Neha Ahlawat, Dr. Pankaj Srivastava	

COURSE OUTCOMES		**COGNITIVE LEVELS**
After pursuing the above-mentioned course, the students will be able to:		
C401-8.1	solve a single and a system of non-linear equations and analyze the convergence of the methods.	Applying Level(C2)
C401-8.2	explain finite and divided difference formulae for numerical interpolation.	Understanding Level (C3)
C401-8.3	apply numerical differentiation and integration in engineering applications.	Applying Level(C3)
C401-8.4	solve a system of linear equations using direct and iterative methods with their applications in various engineering problems	Applying Level(C3)
C401-8.5	solve eigen-value and corresponding eigen- vector problem fora square matrix	Analyzing Level(C4)
C401-8.6	evaluate the solutions of initial and boundary value problems using various numerical methods.	Evaluating Level(C5)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Roots of Non-linear Equations	Concept of round-off and truncation errors. Iterative methods to find roots for one or more nonlinear equations with their convergence	6
2.	Interpolation and Approximation	Interpolating polynomial, Lagrange formula with error, Formulae for equi-spaced points, Divided differences, Spline interpolation, Least square approximation	7
3.	Numerical Differentiation and Integration	Approximation of derivatives, Newton-Cote's formulae, Gauss-Legendre quadrature formulae, Double integration	7
4.	Numerical Linear Algebra	Gauss-elimination and LU-Decomposition Methods. Iterative methods: Jacobi and Gauss Seidel Methods and their convergence. Power's method for the largest eigen-value, Jacobi and Householder's methods for eigen-values of real symmetric matrices	10
5.	Numerical Solutionsof ODE and PDE	Runge-Kutta and predictor corrector methods for IVPs, Finite difference methodsfor BVPs, Shooting methods, Numerical solutions of parabolic and elliptic partial differential equations by Finite Difference Methods	12
Total number of Lectures			**42**

Project based learning: Each student in a group of 3-4 will apply the concepts of numerical methods for eigen values. ODE and PDE to solve practical problems.

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Quiz, Assignments, PBL)
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.	**Gerald, C.F. and Wheatley P.O.**, Applied Numerical Analysis, 7th Ed., Pearson Education, 2004.
2.	**Conte, S.D. and deBoor, C.**, Elementary Numerical Analysis, 3rd Ed., McGraw-Hill, 1980.
3.	**Gupta, R.S.**, Elements of Numerical Analysis, 2nd Ed., Cambridge University Press, 2015.
4.	**Jain, M.K., Iyengar, S.R.K. and Jain, R.K.**, Numerical Methods for Scientific and Engineering Computation, 6th Ed., New Age International, New Delhi, 2014.
5.	**Smith, G.D.**, Numerical Solution of Partial Differential Equations, 2nd Ed., Oxford, 1978.

Detailed Syllabus
Lecture-wise
Breakup

Subject Code	**17B1NHS733**	**Semester: ODD**	**Semester: VII Session 2022-23** **Month: July- December**
Subject Name	**Human Rights and Social Justice**		
Credits	**3 (3-0-0)**	**Contact Hours**	**(3-0-0)**

Faculty (Names)	**Coordinator(s)**	**Dr. Namreeta Kumari**
	Teacher	**Dr. Namreeta Kumari**

CO Code	COURSE OUTCOMES	COGNITIVE LEVELS
C401-18.1	Demonstrate an understanding of the concept and idea of human rights and social justice	Understand (C2)
C401-18.2	Evaluate and interpret information about human rights issues from various sources like print and electronic media, film, documentary and other information technologies	Evaluate(C5)
C401-18.3	Demonstrate an understanding of the International norms and standards of human rights	Understand (C2)
C401-18.4	Analyze the emerging dimensions of human rights and the challenges posed by them	Analyze (C4)

Module No.	Subtitle of the Module	Topics in the module	No. of Hours for the module
1.	Conceptual Background 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	6
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	9
3.	International Human Rights Standards	● Universal Declaration of Human Rights, 1948. ● International Covenant on Civil and Political Rights, 1966 ● International Covenant on Economic, Social and Cultural Rights, 1966	8
4.	Human Rights of the specially disadvantaged sections of the society	● Scheduled Castes/Scheduled Tribes and Other Backward Classes: Caste Prejudice and Discrimination ● Minorities: Human Rights Issues of Ethnic minorities ● Women and Children: Gender Discrimination, Domestic Violence and Offences against Women; Gender Sensitive Laws, Children: Child Abuse, Child Labour, Street Children ● Aged and Disabled Persons: Vulnerability and social taboos	8
5.	Human Rights of the Working Class	● Migrant Workers ● Bonded Labourers	5

		• Agricultural Labourers • Casual Workers	
6.	Emerging Dimensions Of Human Rights	• National Sovereignty versus 'international enforcement' of human rights • International politics of human rights and selective application of international sanctions • Unilateral use of coercion and implementation of human rights • Human rights, and science and technology	6
Total number of Hours			**42**

Evaluation Criteria

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

Project Based Learning: The students will be required to form groups of 4-5 and review documentaries/movies which are based on the violation/issues of human rights and social justice

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.	Banton, M. (1996). *International Action against Racial Discrimination*. Oxford: Clarendon Press
2.	Cassese, J. (1990). *Human Rights in Changing World.* Philadelphia: Temple University Press
3.	Cruft, R., Liao, S.M.& Renzo. M. (2015). *Philosophical Foundations of Human Rights*. Oxford: Oxford University Press
4.	Dhiman, O.P. (2011). *Understanding Human Rights An Overview*. New Delhi: Kalpaz Publication
5.	Donnelly, J. (2013).*Universal Human Rights and Practices*. Ithaca: Cornell University Press
6.	Easterly, W. (2014). *The tyranny of experts: Economists, dictators, and the forgotten rights of the poor*. New York: Basic Books
7.	Joshi. K.C. (2019). *International Law and Human Rights*. Lucknow: Eastern Book Company
8.	Saksena, K.P. (ed.) (1984). *Human Rights in Asia: Problems and Perspectives*. New Delhi: HURITER
9.	Sen, A. (1999). *Development as Freedom*. Oxford: Oxford University Press

10.	Sinha, M.K, (2000). *Basic Documents on International Human Rights and Refugee Laws*. New Delhi: Manak Publications
11.	Verma, R.S., (2000). *Human Rights: Burning Issues of the World*. Volumes I, II and III. Delhi: Radiant Publishers
12.	U.N. Department of Public Information. (2018). *Universal Declaration of Human Rights*. U.SA.: United Nations

Detailed Syllabus

Lecture-wise Breakup

Course Code	**15B1NHS731**	**Semester** ODD **(specify Odd/Even)**	**Semester Session** 2022-23 Month from Aug 2022 to December2022
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	Analyze 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**	Theoretical orientation: Concepts and definitions of Disaster, Hazard, Vulnerability, Resilience, Risks	4
2.	**Disasters: Types Of Disaster**	Understanding Natural and manmade disasters: its Impacts & Hazards.	4
3.	**Impact of Disaster on Caste, Class and Gender**	Caste and disaster, Disaster discrimination, in terms of caste, class, gender, age location, Role of Women's in Disaster..	5

4.	**Disaster Management Cycle and 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, plans, Programmes and Legislation.	2
9	**Global trends in disasters, Urban Disaster, Pandemics, Climatic Change and Complex Emergencies**	Agenda 21: For Local actions, Global trends in disasters, urban disasters, pandemics(COVID2019), 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(Assignments/Case Study, Project, Attendance)
Total	**100**

Project Based Learning: Students in group of 5-6 will be given project to understand the menace of disaster through waste deposition in our environment. To make this subject application based students develop cost effective and environmentally sound techniques and strategies for solid waste management. By installing high tech driven composters students can analyse the implications of waste in our environment, through this live project. Converting solid waste in organic manure ,produced in college mess -canteen, later on that organic manure and liquid manure can be used for open areas, gardens and parks in college premises.

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.	Government of India, 2009. National Disaster Management Policy.
2.	Gupta Anil K, Sreeja S. Nair. 2011 Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi
3.	Indian Journal of Social Work 2002. Special Issue on Psychosocial Aspects of Disasters, Volume 63, Issue 2, April
4.	Alexander David, Introduction in "Confronting Catastrophe", Oxford University Press, 2000
5	Coppola P Damon, 2007. Introduction to International Disaster Management
6	Yojana :A DEVELOPMENT MONTHLY Magazine, Volume 61,January 2017
7	S.K. Misra& V. K. Puri, Indian Economy, Himalaya Publishing House, 2011.
8	Parasuraman, S. & P.V. Unnikrishnan, 2005, “Disaster Response in India: An Overview,” India Disasters Report, Punjablok.
9	Satapathy S. (2009) Psychosocial care in Disaster management, A training of trainers manual (ToT), NIDM publication.
10	Blaikie, P, Cannon T, Davis I, Wisner B 1997. At Risk Natural Hazards, Peoples' Vulnerability and Disasters, Routledge.
11	Dave, R.K. (2018) , Disaster Management in India : Challenges and Strategies
12	Disaster Management and Rehabilitation, Rajdeep Dasgupta, 2007
13	Jensen, John R., 2007, Remote Sensing of the Environment: An Earth Resource Perspective, 2nd Ed., Up Saddle River, NJ: Prentice Hall

14	NDMA, 2010, National Disaster Management Guidelines , Role of NGOs in Disaster Management

Detailed Syllabus

Lecture-wise Breakup

Course Code	18B12CS424	**Semester Odd**	**Semester** VII **Session** 2022-23 Month from July to December
Course Name	Algorithm Analysis and Artificial Intelligence		
Credits	**3**	**Contact Hours**	**3-0-0**

Faculty (Names)	**Coordinator(s)**	Alka Singhal
	Teacher(s) (Alphabetically)	Alka Singhal

COURSE OUTCOMES		**COGNITIVE LEVELS**
C401-12.1	Analyze algorithm's time complexities (Master's method, Recursion tree and substitution method- Sorting and Searching algorithms)	Analyse Level (Level 4)
C401-12.2	Propose solutions for real life computing problems using greedy, divide & conquer, and dynamic programming techniques.	Create Level (Level 6)
C401-12.3	Apply informed and uninformed searching algorithms(A*, Hill Climbing and Simulated Annealing) in AI related problems.	Apply Level (Level 3)
C401-12.4	Solve constraint satisfaction problems and adversarial search algorithms	Create Level (Level 6)
C401-12.5	Apply inference mechanisms(propositional logic , first order predicate logic, and probabilistic reasoning)	Apply Level (Level 3)
C401-12.6	Design and simulate Genetic Algorithms for Optimization.	Create Level (Level 6)

Sr.	**Module**	**Chapters**	**Lectures**
1.	Introduction	Time Complexity analysis: Master's Method. Divide and Conquer methods: Insertion Sort, Merge Sort, Quick Sort	06
2.	Divide and Conquer and Greedy Algorithms	Strassen's Matrix multiplication , Knapsack Problem; Coin change Problem; Huffman Coding; Activity Selection; Minimum Spanning tree, shortest path.	09
3.	Dynamic Programming Algorithms	Knapsack Problem; Coin change Problem; Matrix chain Multiplication, Longest common subsequence etc.	05
4.	Artificial Intelligence : Problem Spaces and	State Spaces, Uninformed search strategies (BFS, DFS, DLS, IDS, Bidirectional search),Informed Search &	07

	Problem Solving by search	exploration (A*,Heuristic, Local search algorithms, online search agents)	
5.	Constraint satisfaction problems	Constraint satisfaction problems (backtracking, variable and value ordering, local search), Adversarial Search (games, alpha beta pruning, elements of chance, state of art games)	06
6.	Propositional Logic	Knowledge based agents, PL, FOPL, Syntax and semantics, use, knowledge engineering) , Inference in FOPL(Propositional vs First order inference	06
7.	Uncertainty	Probabilistic reasoning, Bayesian rule, Bayesian network, Inference, Reasoning over time	03
8.	Genetic Algorithms	Travelling Salesman Problem,Knapsack Problem	01
		Total number of Lectures	**43**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25(Attendance-10Quiz/Assignments/Presentations/Mini-Project- 15)
Total	**100**

Project based learning: Each student understood on the application of Artificial Intelligence for algorithmic optimization. They presented the application by a power-point presentation. It can help improve the efficiency of the real life projects in the real world IT organizations.

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc.

TEXT BOOKS

1.	Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein , Introduction to Algorithms, MIT Press, 3rd Edition, 2009
2.	Artificial Intelligence – A modern approach by Stuart Russel and Peter Norvig, PHI, 2008.
REFERENCE BOOKS Journals, Reports, Websites etc. in the IEEE format	
3.	Artificial Intelligence Review: An International Science and Engineering Journal, Springer

4.	Nunes de Castro, Leandro, " Nature-Inspired Computing Design, Development, and Applications" IGI Global, 31-May-2012 - 435 pages
5.	Steven Skiena ,The Algorithm Design Manual, Springer; 2nd edition , 2008
6.	Knuth, The art of Computer Programming Volume 1, Fundamental Algorithms, Addison-Wesley Professional; 3 edition,1997
7.	Horowitz and Sahni, Fundamentals of Computer Algorithms, Computer Science Press, 1978

Course Code	**10B1NBT735**	**Semester Odd**	**Semester 7th Session** Month from July- Dec
Course Name	**Enzymes in food processing**		
Credits	3-0-1	**Contact Hours**	3+1
Faculty (Names)	**Coordinator(s)**	Prof. Neeraj Wadhwa	
	Teacher(s) (Alphabetically)	Neeraj Wadhwa	

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, 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.	Legal and economic consideration	Regulatory requirements for enzyme preparation Economic consideration for the use of technical enzymes.	4
		Total number of Lectures	42

Evaluation Criteria

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

Project Based Learning; Students 3 to 4 will form a group and pick up any food processing Industry. They will submit a technical and economic feasibility report which will focus on choice of technology, methodology of converting raw material to finished product, its storage, application .of technical food processing enzyme as well as report the projected sales revenue underlying cost and estimated profit.

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 Processing 3rd 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

Course Code	**17B1NBT739**	**Semester** ODD **(specify Odd)**	**Semester VII Session** 2022 -2023 **Month from: July-Dec.**
Course Name	**Biocomputing and Applications**		
Credits	4	**Contact Hours**	4

Faculty (Names)	**Coordinator(s)**	Dr. Shazia Haider
	Teacher(s) (Alphabetically)	Dr. Shazia haider

COURSE OUTCOMES		**COGNITIVE LEVELS**
CO1	Understand about the biocomputing methods, principles and practices.	Understand Level (C2)
CO2	Outline the advanced genomics, transcriptomics and proteomics, methods	Understand Level (C2)
CO3	Apply web-based methods and tools for simulation of biological problems	
CO4	Analyze vaccine designing and protein-ligand interactions for drug discovery	Analyze Level(C4)

Module No.	**Subtitle of the Module**	**Topics in the module**	**No. of Lectures for the module**
1.	Bio-computing basics	Basics of Biological system, DNA/RNA/Protein, structures, Bioinformatics problems, Mapping, computational methods, limitations Information scope	5
2.	Genomics methods and tools	homology search programs, Psi, Phi-BLAST, Wu Blast, MEGABLAST, T-Coffee, EMBOSS, Gene mapping, Genscript, Bioedit, MEGA, PAML, etc, methods; PSSM/PWM, Entropy, information content etc.	6
3.	Web based tools for complex analysis	Genome annotation and editing methods and tools. Protein, Nucleic Acid sequences and complex, analysis and modelling tools, pipelines. Etc.	5

4.	Trancriptomics methods and tools	Transcriptome profiling, RNA-seq, NGS Data generation and analysis, KEGG, Blast2GO, Validation.	5
5	Proteomics tools	Quantitative proteomics (PANDA), Sub-cellular, localization, nuclease site prediction. Maldi-tof MS data analysis, Open source [Opl analyzer etc.], protein microarray	5
6	Immunoinformatics methods and tools	Immunoinformatics (Case study), antigen/epitopes identification, Prediction of MHC I and MHC binding site, Databases IMGT/LIGM-DB, MHC-Peptide Interaction Database, vaccine design, Peptide designing tool	7
7.	Protein ligand interactions and simulations	Molegro/Autodock software, structure of protein structure (pdb), Genetic algorithm, basics of drug-enzyme and simulations, structure-based designing, target-based designing, high throughput computation of drug molecule, virtual screening, Modules; QSAR, Molegro/ docker/ online free tools etc	9
		Total number of Lectures	42

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignments 1, class test. PBL)
Total	**100**

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

1.	Smith, D.W, "Biocomputing: Informatics and Genome Projects", Academic press
2.	Baxevanis A., D & Ouellette "Bioinformatics A practical guide to analysis of genes and protein", Wiley-Interscience, 1998.
3.	David Mount "Bioinformatics: Sequence and Genome analysis", Cold Spring Harbor

4	Recent Research papers and online resources