

JAYPEE INSTITUTE OF INFORMATION AND TECHNOLOGY

M.Tech Biotechnology

Semester III

DISSERTATION

Course Code	17M17BT213	Semester ODD	Semester III Session 2022-2023 Month from June to December
Course Name	Dissertation		
Credits	16	Contact Hours	32

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

COURSE OUTCOMES		COGNITIVE LEVELS
C213.1	Identify the research problem and select suitable scientific methods to solve the given research problem	Apply (Level 3)
C213.2	Formulate the plan and test for hypothesis	Create (level 6)
C213.3	Assess the key findings and interpret the data	Evaluate (Level 5)
C213.4	Compose the written scientific report and effectively present the data	Create (Level 6)

Project Based Learning: In this course, students work on various research projects under the guidance of the faculty mentors of our department. Therefore, the learning from this course is completely Project-based.

Employability: Students expose themselves to various novel techniques and disciplines during execution of their project work and the outcome of these research projects facilitates them in cultivating innovation, R&D aspect and also motivates them towards right Employability.

PROJECT BASED LEARNING-II

Project Based Learning -II (17M17BT212)				
PROJECT BASED LEARNING-II (17M17BT112)				
Viva- I/ Mid Term Viva: 30 Marks				
Viva-II / End Term Viva: 35 Marks				
Day to Day Marks from Supervisor: 35				
	COURSE OUTCOMES	Cognitive level	Assessment tool Direct (80%)	Assessment tool Indirect (20%)
CO1	Compare and contrast the existing literature and interpret the research problem	Understanding Level 2	Viva-I (Defining and Interpreting the research problem- 5 ; summarize and evaluate the current knowledge of the topic based on Literature reviewed - 5 , Viva - 5), Day to Day Marks from Supervisors ((Defining and Interpreting the research problem- 2 ; summaries' and evaluate the current knowledge of the topic based on Literature reviewed - 3)	Exit Survey
CO2	Make use of biotechnological and allied fields to explore different strategies	Applying Level 3	Viva-I (Rational of the study & Objectives- 5), Day to Day Marks by Supervisor (Rational of the study & Objectives- 5), Viva-II (Strategic approach proposed for exploring answers to the research problem and attained - 10); Day to Day Marks by Supervisor (Strategic approach proposed for exploring answers to the problem statement and attained - 5)	Exit Survey
C03	Designing the research strategy	Create Level 6	Viva-I (Designing the research strategy / work plan - 10) Day to Day Marks by Supervisor (Understanding of the	Exit Survey

			proposed research strategy/ work plan -5) Viva-II (Research strategy followed and outcomes of the study - 10), Day to Day Marks by Supervisor (Research strategy followed the outcomes of the study -5)	
C04	Conclude the research finding through presentation and technical report	Analyzing Level 4	Viva-II (Conclusion / Learning Outcome, Viva and Report) – 15 , Day to Day marks from Supervisor (Conclusion / Learning Outcome, Report – 10)	Exit Survey
<p>Project based learning: The students learn the importance of secondary data collection using databased, journals, periodicals and databases. They perform wet lab and in-silico, experimental studies, systematic review or survey-based analysis to define the problem statement and learn biotechnological and allied approaches to answer the problem statements. Such knowledge help student to develop independent thinking and inculcate the practice of following good laboratory, scientific and ethical practices in their career.</p>				

PRODUCT DEVELOPMENT IN BIOTECHNOLOGY

Course Code	17M12BT118	Semester Odd	Semester. III. Session 2022-2023 Month from July – Dec
Course Name	Product Development in Biotechnology		
Credits	3	Contact Hours	3

Faculty (Names)	Coordinator(s)	Prof. Neeraj Wadhwa
	Teacher(s) (Alphabetically)	Prof. Neeraj Wadhwa, Dr. Manisha Singh

COURSE OUTCOMES		COGNITIVE LEVELS
CO1	Outline various processes relevant for Bio business	Understand Level (C2)
CO2	Compare marketing techniques and related ethics	Apply Level (C2)
CO3	Select appropriate technology for the production of biological products	Understand Level (C3)
CO4	Explain financial, regulatory, health policy aspects for biobased industries	Understand Level (C2)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Biotechnology Industries overview	Biotech industries in India and abroad, Biotechnology as a function of science and business, Company structures versus other non-biotech companies, Functional units Company structure and functions Emerging technology and technical convergences issues	5
2.	Business in the context of biotechnology Entrepreneurship-	Science/development, the idea and its development , Plant tissue culture lab-equipment- glassware's chemical requirement-- construction, techniques in culturing and export abroad, Vermitechnology, Mushroom cultivation, single cell protein, Biofertilizer technology-production, Textile processing, leather treatment, leather industry set up Detergent industry, bakery, diary, Technology product development Other biotech product development, such as biofuels, bioengineered foods, etc.- commercialization of Bakery and dairy products relevant case studies	14
3.	Product development	Production of commercially important primary metabolites like organic acids, amino acids and alcohol & Production processes for various classes of secondary metabolites: Antibiotics, Vitamins and Steroids. Production of Industrial Enzymes, Biopesticides, Biofertilizers, Bio preservatives, Biopolymers, Pulp and Paper, SINGLE CELL PROTEIN & Mushroom culture, Bioremediation. Bioprocess strategies in Plant Cell organ culture and Animal Cell culture.	12

4.	Bio business plans	Concerns and opportunities, Environmental clearances requirement from government, Quality checks and validation certificates, Branding, Marketing and Packaging concerns Bank loan and finance strategy, Budget planning, Policy and regulatory concerns,	6
5.	Bioremediation Bioethics and legal issues	Business Development public perception in product development, Sustainability, Environmental concerns of product and their waste as well of genetically modified products and organism-	5
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 (PBL): Students will be skilled, prepared and oriented towards understanding the insight of various bio-based business development ideas. They will be made aware of various planning and policy systems existing in the global market to start and run a business. Students will also be trained to develop entrepreneurial skills.			

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.	Satyanarayana, U. "Biotechnology" Books & Allied (P) Ltd., 2005.
2.	Kumar, H.D. "A Textbook on Biotechnology" 2nd Edition. Affiliated East West Press Pvt. Ltd., 1998.
3.	Balasubramanian, D. et al., "Concepts in Biotechnology" Universities Press Pvt. Ltd., 2004.
4.	Ratledge, Colin and Bjorn Kristiansen "Basic Biotechnology" 2nd Edition Cambridge University Press, 2001
5.	Faber K, Biotransformation's in Organic Chemistry, IV edition, Springer
6.	Dubey, R.C. "A Textbook of Biotechnology" S. Chand & Co. Ltd., 2006. Trevor Palmer, Enzymes II ed Horwood Publishing Ltd
7.	Cruger, Wulf and Anneliese Crueger, "Biotechnology: A Textbook of Industrial Microbiology", 2 nd Edition, Panima Publishing, 2000
8.	Moo-Young, Murrey, "Comprehensive Biotechnology", 4 Vols. Pergamon Press, (An Imprint of Elsevier) 2004.
9.	Richard Oliver "The coming Biotech Age; the business of Biomaterials "Mc Graw Hill Publication, New York USA2000
10.	Karthikeyan. S and Arthur Ruf." Bio business" MJP Publication Chennai India 2009
11.	Cynthia Robins," The business of Biotechnology". UK Harper Collins 2001

COST ACCOUNTING FOR ENGINEERING PROJECTS

Course Code	19M12HS211	Semester Odd	Semester III Session 2022-2023 Month July to December
Course Name	Cost Accounting for Engineering Projects		
Credits	3	Contact Hours	3-0-0

Faculty (Names)	Coordinator(s)	Dr. Praveen Kumar Sharma
	Teacher(s) (Alphabetically)	Dr. Praveen Kumar Sharma

COURSE OUTCOMES		COGNITIVE LEVELS
C201-1.1	Understand basic concepts of Cost Accounting	Understand (C2)
C201-1.2	Apply concepts of cost in project management	Apply (C3)
C201-1.3	Analyze cost behavior for decision making	Analyze (C4)
C201-1.4	Construct different budgets for controlling the cost	Create (C6)

Module No.	Title of the Module	Topics in the Module	No.of Lectures for the module
1.	Introduction	Introduction & Overview of Cost Management Process	2
2.	Cost Concepts	Relevant Cost, Differential Cost, Incremental Cost, Opportunity Cost, Objectives of a costing system, Inventory Valuation, Provision of data for decision making	4
3.	Project execution	Meaning, Different types, why to manage, cost overruns centers, various stages of project execution: conception to commissioning. Project execution as conglomeration of technical and nontechnical activities. Detailed Engineering activities.	5
4.	Project Execution	Pre project execution main clearances and documents Project team: Role of each member. Importance Project site Data required with significance, Project contracts, Types and contents, Project execution, Project cost control, bar charts & network diagrams, Project commissioning	7
5.	Cost Behavior	Distinction between Marginal Costing and Absorption Costing; Break-even Analysis, Cost-Volume-Profit Analysis. Various decision-making problems.	6

6.	Profit Planning Marginal Costing	Standard Costing and Variance Analysis. Pricing strategies: Pareto Analysis. Target costing, Life Cycle Costing. Costing of service sector. Just-in-time approach	6
7.	Material Planning	Material Requirement Planning, Enterprise Resource Planning, Total Quality Management and Theory of constraints. Activity-Based Cost Management, Bench Marking; Balanced Score Card & value chain analysis.	6
8.	Budgetary Control	Flexible budgets, Performance budgets, zero based budgets, Measurements of divisional profitability pricing decisions including transfer pricing.	6
Total number of Lectures			42
Project based learning: student will form the group of four to five students. To make subject application based, student will apply various concepts such as Cost management and various types of Costing, project execution & quantitative technique for cost management, Cost behaviour and profit planning. Student will apply these concept on organization, or in any ongoing project or interdisciplinary base research project or any innovative idea in any particular industry along with feasibility.			
Evaluation Criteria Components			
Maximum Marks			
T1 20			
T2 20			
End Semester Examination 35			
TA 25 (Quiz+ 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. M. Datar and M. Rajan, <i>Horngren's Cost Accounting: A Managerial Emphasis. 16th ed.</i> Pearson Education, 2018.
2.	B. M. L. Nigam and I. C. Jain, <i>Cost Accounting: Principles and Practice, PHI Learning Pvt. Ltd.</i> PHI Learning Pvt. Ltd., 2010.
3.	R. S. Kaplan and A. A. Atkinson, <i>Advanced management accounting.</i> PHI Learning, 2015.
4.	A. K. Bhattacharyya, <i>Principles and practice of cost accounting.</i> PHI Learning Pvt. Ltd., 2004.
5.	N. D. Vohra, <i>Quantitative Techniques in Management, 3e.</i> Tata McGraw-Hill Education, 2006
6.	C. Drury, <i>Management and Cost Accounting ,10th edition, Cengage Learning.</i> 2017.
7.	<i>Planning Analysis, Selection, Implementation & Review 9e, Tata McGraw Hill, New Delhi.</i> 2019.

Constitution of India

Course Code	19M13HS211	Semester Odd	Semester: M.Tech III 2022 -2023 Month: August 2022-January 2023
Course Name	Constitution of India		
Credits	2-0-0	Contact Hours	(2-0-0)

Faculty (Names)	Coordinator(s)	Dr. Chandrima Chaudhuri
	Teacher(s) (Alphabetically)	Dr. Chandrima Chaudhuri

COURSE OUTCOMES	
C202.1	Demonstrate an understanding of the conflict between the Fundamental Rights and Directive Principles as given in the Indian Constitution
C202.2	Assess the nature of the Indian constitution and its applicability in the study of politics in India.
C202.3	Assess the devolution of powers and authority of governance of the Union government and the local government
C202.4	Demonstrate an understanding of the powers and functions of the Indian executive, legislature and judiciary

Module No.	Title of the Module	Topics in the Module	No.of Lectures for the module
1.	History of Making of the Indian Constitution	History Drafting Committee-Composition & Working	2
2.	Philosophy of the India Constitution	Preamble -Salient Features	2
3.	Fundamental Rights and Directive Principles	Right to Equality Right to Freedom Right against Exploitation Right to Freedom of Religion Cultural and Educational Rights Right to Constitutional Remedies Directive Principles of State Policy	5
4.	Organs of Governance	Parliament-Composition, Qualifications & and Disqualification, Powers and Functions Executive- President, Governor, Council of Ministers Judiciary-Appointment and Transfer of Judges, Qualifications, Power and Functions	8
5.	Local Administration	District's Administration head: Role and Importance Municipalities: Introduction, Mayor and role of	8

		Elected Representative, CEO of Municipal Corporation Panchayati raj: Introduction, PRI: Zila Panchayat. Elected officials and their roles, CEO Zila Panchayat: Position and role. Blocklevel:OrganizationalHierarchy(Different departments),Village level, Importance of Grass root democracy	
6.	Election Commission	Election Commission: Role and Functioning	3
Total number of Lectures			28

Project: Projects based on the different aspects of the Indian Constitution have to be submitted by the students as a part of the project-based learning. This would help the students learn about the nitty gritty of the Constitution, their rights and duties which would later on help them not only in their work place but in their general life

Evaluation Criteria

Components	Maximum Marks
Mid Term Examination:	30
End Semester Examination	40
TA	30 (Assignment and 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.	Austin, G. (1996). <i>The Indian Constitution: Corner Stone of a Nation</i> . Oxford: Oxford University Press
2.	Bakshi, P.M.(2015). <i>The Constitution of India</i> . Delhi: Universal Law Pub. Co. Pvt. Ltd
3.	Bhuyan, D. (2016). <i>Constitutional Government and Democracy in India</i> . Cuttack:Kitab Mahal.
4.	Busi, S.N. (2016). <i>Dr. B. R. Ambedkar framing of Indian Constitution</i> . Hyderabad:Ava Publishers
5.	Basu, D.D. (2018). <i>Introduction to the Constitution of India</i> . Nagpur: Lexis Nexis
6.	Jayal, N.G. & Mehta, P.B. (eds.)(2010). <i>The Oxford Companion to Politics inIndia</i> . New Delhi: Oxford University Press.
7.	Constitution series by Rajya Sabha Television and discussion on Indian Constitution by Rajya Sabha Television

Advanced Operations Research (18M12MA111)
Course Description

Course Code	18M12MA111	Semester Odd	Semester III Session 2022-23 Month from Aug - Dec 2022
Course Name	Advanced Operations Research		
Credits	3	Contact Hours	3-0-0
Faculty (Names)	Coordinator(s)	Dr. Shruti	
	Teacher(s) (Alphabetically)	Dr. Shruti	
COURSE OUTCOMES			COGNITIVE LEVELS
After pursuing the above mentioned course, the students will be able to:			
C203.1	construct and solve linear programming problems and analyze their optimal solution using parametric and sensitivity analysis		Analyzing Level (C4)
C203.2	identify and solve the inventory models with and without shortages.		Applying Level (C3)
C203.3	construct the network diagram and analyze the critical activities using PERT/CPM for project planning.		Analyzing Level (C4)
C203.4	identify pure and mixed strategy games and solve and analyze them using graphical and linear programming techniques.		Analyzing Level (C4)
C203.5	solve multi-objective programming problems by graphical and simplex method.		Analyzing Level (C4)
C203.6	demonstrate Kuhn-Tucker conditions and apply them to solve non-linear programming problems, quadratic and separable programming problems.		Analyzing Level (C4)
Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Review of Linear Programming Problems and Duality	Convex sets, graphical and simplex method, artificial variable techniques, revised simplex method, duality theory, dual simplex method, revised dual simplex method.	5
2.	Parametric and Sensitivity Analysis	Sensitivity analysis, parametric linear programming, parametric sensitivity analysis.	5
3.	Inventory	Introduction, inventory models, economic order quantity (EOQ), deterministic and probabilistic inventory models, inventory control.	7
4.	Network Analysis	Network diagram, project planning using critical path method (CPM) and program evaluation review technique (PERT), crashing of network, simulation techniques.	7
5.	Games and Strategies	Pure and mixed strategies, minimax (maximin) criterion of optimality, solution of various models in game theory by graphical and linear programming technique, rules of dominance.	6

6.	Multi-objective Programming Problems	Solution of multi-objective programming problems by graphical and simplex method.	4
7.	Nonlinear Programming Problems	Convex functions and their properties, Kuhn Tucker theory, convex quadratic programming, Wolfe's and Beale's algorithm, Separable convex programming.	8
		Total number of Lectures	42
Evaluation Criteria			
Components		Maximum Marks	
T1		20	
T2		20	
End Semester Examination		35	
TA		25 (Quiz, Assignments)	
Total		100	
Project based learning: Students will be divided in a group of 4-5 to conduct literature survey, case study on inventory models, project planning, multi-objective linear programming and nonlinear programming problems in real life. The students will solve the problems with the help of MATLAB and submit a detailed report and present their important outcomes also.			
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.	Taha,H. A. , Operations Research - An Introduction, Tenth Edition, Pearson Education, 2017.		
2.	Rao,S. S. , Engineering Optimization, Theory and Practice, Fourth Edition, John Wiley, 2009.		
3.	Deb, K. , Optimization for Engineering Design, Algorithms and Principles, PHI, 2010.		