

## **Integrated Dual Degree Program**

### **1.0 Genesis**

To keep the pace with changing business environment National Institute of Industrial Engineering (NITIE) plans to collaborate with premium, high-repute technology institutions. This collaboration is aimed at fulfilling three-fold needs as follows. Firstly, to develop the techno-managerial capability among students. Students will develop their skills in technical subjects at technical institutions and the managerial skills at NITIE, Mumbai. Secondly, the business world and market are seeing increasing demand for AI/ML applications and the collaboration will facilitate the development of analytical abilities among students. Thirdly, as NITIE is the nodal point for the **PM Gati Shakti** scheme, the partnering institutions can collaborate and provide a thrust in the logistics and supply chain area. Therefore, to cater to the need of developing techno-managers in the logistics and supply chain area the integrated dual degree program needs to be conceptualised at NITIE in collaborative mode.

The Integrated Dual Degree program will be of five years duration. This will be a full-time residential program on the campus of IIT Patna and NITIE.

### **2.0 Title of the program**

The proposed title of the dual degree will be the BTech (Respective branch) + MBA (dual specialisation). The BTech degree will be awarded by the partnering institute (IIT) while the MBA degree will be awarded jointly by the partnering IIT and NITIE.

### **3.0 Entry at NITIE**

There are two suggested options for entry of students to NITIE from IIT under the dual degree program. Students can join after completing 7 semesters (hereinafter referred as **Option I**) or after completing 8 semesters (hereinafter referred as **Option II**).

### **4.0 Eligibility and selection**

Option I: The student shall have a minimum CPI of 7.5 upto semester IV.

Option II: The student shall have a minimum CPI of 7.5 upto semester VI

CPI should be more than this at end of following semesters

IIT Patna will invite applications from the students and carry out the selection process.

### **5.0 Credit system at NITIE**

At NITIE, each core /elective course is having 3 hours per week and there are 10 weeks in a module. Thus, each course is having 30 hours of engagement and is assigned 3 credits as per existing NITIE curriculum structure. Further, there are core microcredit courses of 15 hours

engagement and assigned 1.5 credits. Thus, the credit to hours of engagement ratio is defined as 1:10.

## 6.0 Prerequisite courses at IIT

Before joining NITIE, the students are required to complete either 51 (Option I) or 76.5 (Option II) credits (as per NITIE credit system) of the relevant courses in their parent IIT. This is equivalent to 765 hours of engagement as mentioned above in year I. Considering 45 hours per course in a semester-based system of IIT, 765 hours of engagement are equivalent to 17 semester-length courses.

For option I: till seventh semester, students will complete 7 pre-requisite courses while they are at IIT (For option II: till eighth semester students will complete 17 pre-requisite courses. These prerequisite courses will prepare the dual degree students for the fundamentals of techno-managerial courses. This has twofold purpose: (i) to contribute successfully and effectively to the summer internship to maximize the applied learning, and (ii) to enhance learning effectiveness when the students will begin the second year at NITIE to learn specialized courses.

The list of relevant prerequisite courses is given in **Annexure-I** (Any 12 courses from the list to be completed before joining NITIE).

Further, the course content of these prerequisite courses (which is as per the latest curriculum of NITIE) is given in **Annexure-II**. This course content will be shared with the partnering IIT.

The equivalence of the course content shall be defined by the partnering IIT based on the course content provided by the NITIE depending on Option I or II. The mapping/list of equivalent courses will be placed at **Annexure-III**.

## 7.0 Program calendar

### Entry to NITIE

In case of **option I**, the students will complete seven semesters at IIT by December and join NITIE in the month of January every year. The credit requirement of the 8<sup>th</sup> semester of IIT will be completed at NITIE in the module III and module IV which is the Summer Internship Program (SIP).

Option I, i.e., sending the students to NITIE after seventh semester. In this case, the semester 8 requirements of IIT Patna are as follows: 126 classroom hrs and 168 project hrs. Considering the current structure of NITIE, it is proposed that students joining from IIT Patna shall complete the requisite classroom hours by choosing four out of eight core courses in module III and one core microcredit – Entrepreneurship Lab (total five core courses). Further, the requirements of the project hours will be completed through 8 weeks Summer Internship Program.

In case of **option II**, Students will complete their eight semesters latest by 30<sup>th</sup> April at IIT Patna and will join NITIE by 1<sup>st</sup> May Immediately after joining NITIE, the students will proceed for their eight weeks Summer Internship Program.

### **Fifth year at NITIE**

After completion of summer internship, the students will join NITIE to complete the fifth year of the dual degree program (which is equivalent to second year of NITIE PG program). In order to complete the fifth year credit requirements of the dual degree from NITIE, the students are required to complete credit requirements as per the prevailing second year curriculum of NITIE. Currently this requirement is 57 credits, which translate to 375 hours of engagement plus capstone project.

The structure of courses in the fifth year along with list of electives offered is placed at **Annexure-IV**.

Also, the course structure of first four years at IIT is placed at **Annexure-V**.

### **8.0 Placement process**

NITIE will provide opportunities to the dual degree students to participate in the summer placement and final placement process as per the NITIE rules and timelines.

The students will have to participate in summer placement selection process during their fourth year as per the NITIE placement schedule. The students may be required to remain present in the campus during placement process if it is carried out in physical/offline mode. The students will have to undergo 8-week summer internship at the end of fourth year (April and May).

The students will participate in final placement during their fifth year at NITIE as per the institute placement calendar.

### **9.0 Course fees**

For option-I: For the students joining NITIE after seventh semester, the fees payable at NITIE would be Rs 18.0 lakhs (Rs Eighteen Lakh only).

For option-II: For the students joining NITIE after eighth semester, the fees payable at NITIE would be Rs 12.0 lakhs (Rs Twelve Lakh only).

For Option I

The abovementioned course fees will be shared in proportion of 70:30 between NITIE (70%) and partnering IIT (30%).

For Option II

The abovementioned course fees will be shared in proportion of 50:50 between NITIE and partnering IIT

The details of fee structure are placed at **Annexure-VI**.

## **10.0 Seat Allocation**

Out of 30 seats, 15 are proposed to be allocated to IIT (Patna) at present.

## **11.0 PGP Rules**

During the tenure of the dual degree students at NITIE, all the PGP rules will be applicable to them, and the decision of institute authorities will be final and binding.

Also currently there are no fees concessions/scholarships for the sponsored seats candidates and the same will be applicable to the dual degree candidates.

**Annexure-I: List of prerequisite courses (any 12 from the list)**

<b>Sr. No.</b>	<b>Course Title</b>	<b>Course type</b>
1.	Data Science for Managerial Decisions	Core
2.	Operations Management	Core
3.	Supply Chain Management	Core
4.	Marketing Management	Core
5.	Financial Reporting & Analysis	Core
6.	Manufacturing Systems Analysis and Management	Core
7.	Optimization and Decision Techniques	Core
8.	Microeconomics for Managers	Core
9.	Business Intelligence Decision Modelling	Core
10.	Procurement & Order Fulfilment	Core
11.	Transportation and Logistics Systems	Core
12.	Corporate Finance	Core
13.	B2B Marketing	Core
14.	Managing the Workplace Behaviour	Core
15.	Business Applications of AI & ML Techniques	Core
16.	Innovation and Entrepreneurship	Core
17.	Digital and Cyber Physical Systems	Core
18.	Project Management	Core
19.	Sustainability Management	Core
20.	Business Research Methods	Core
21.	People Management	Core

## Annexure-II: Course contents – Prerequisite courses

### ***DATA SCIENCE FOR MANAGERIAL DECISIONS***

#### **Course Objective (s)**

This course aims to provide basic foundations needed for data scientists. It includes the fundamental concepts of programming in python; and covers the mathematical and statistical essentials required for understanding and implementing predictive and prescriptive models for solving business problems. It will provide hands-on training to participants.

#### **Course Content**

##### Programming fundamentals

##### ➤ Python for data science

- Introduction to programming and why Python? Overview of Jupyter Instance, Data types in python, functional programming, Useful libraries for data science like NumPy, Pandas, SK-Learn, matplotlib, seaborn and others

##### Mathematical essentials for Data Science

➤ Linear Algebra, Introduction to Linear Algebra and applications of Linear Algebra in data science, Properties and operations of matrices, Eigen values, eigen vectors, physical interpretation and applications

➤ Optimization algorithms, What is optimization and need for optimization in data science, • How to develop mathematical formulations for business problems, Linear, Non-Linear Programming problem, Maxima and Minima of a function, First order derivative test for maxima and minima, Second order derivative test for maxima and minima, Convexity and Concavity, Point of Inflexion, Applications to business and economics

##### Statistical essentials for Data Science

Types of Data, Scales of measurements, Descriptive Statistics, Measures of Central Tendency, Measures of Variability, Random Variable, Probability and laws of Probability, Conditional and Joint Probability, Bayes Theorem, Discrete and Continuous Probability Distributions, Sampling Techniques, Central limit theorem, Point and Interval Estimation, Testing of hypothesis, Type I and Type II errors, Inferences, Regression Analysis

#### **Reference Books/ Cases/ Resources**

Hastie, T., Tibshirani, R., Friedman, J. H., & Friedman, J. H. (2009). *The elements of statistical learning: data mining, inference, and prediction* (Vol. 2, pp. 1-758). New York: springer.

Provost, F., & Fawcett, T. (2013). *Data Science for Business: What you need to know about data mining and data-analytic thinking*. O'Reilly Media, Inc.

Anderson, D. R., Sweeney, D. J., Williams, T. A., Camm, J. D., & Cochran, J. J. (2018). *Statistics for Business & Economics*. Cengage learning.

## ***OPERATIONS MANAGEMENT***

### **Course Objective(s):**

The objective of the course is to develop familiarity with the concepts of production systems their constraints, and their linkages with the overall business strategy; planning and control of operations; optimal utilization of resources and interfaces of operations management with other managerial areas.

### **Course Content:**

Introduction to Operations and Supply Management; Project Management; Manufacturing Processes and Facility Layout; Service Processes and Waiting Lines; Quality Management; Lean Manufacturing; Demand Management and Forecasting; Aggregate Sales and Operational Planning; Inventory Control; Material Requirements Planning; Scheduling

### **Reference Books/ Cases/ Resources:**

Operations & Supply Management, (Latest Edition), Chase, R. B. Aquilano, N. J. Jacobs, F. R. Boston, McGraw-Hill.

Operations Management: Processes and Supply Chains, (latest Edition), Krajewski, L.J., Ritzman, L. P. and Malhorta, M.J., Pearson.

Operations Management, (Latest Edition), Heizer, Jay; Render, Barry, Upper Saddle River, N.J.: Prentice-Hall.

Operations Management, (Latest Edition), William J. Stevenson, Tata McGraw Hill education Private Limited.

## ***SUPPLY CHAIN MANAGEMENT***

### **Course Objective (s)**

To provide an understanding and cross functional perspective of Supply Chain and strategic implications and the best practices in Supply Chain Management as a whole.

### **Course Content**

Introduction to Supply Chain Management & Case Analysis; Strategic Importance of IT & Computer Simulation in Supply Chain Management; Supply Chain Performance; Supply Chain System Slacks; Demand Management; Supply Management; Inventory Management; Production Management; Transportation Management; Location Management; Source Management; Supply Chain Strategy; Special Types of Supply Chains; Decisions phases in Supply Chain

### **Reference Books/ Cases/ Resources:**

Supply Chain Management: Strategy, Planning, and Operation (Latest Edition), Sunil Chopra, Peter Menidle, Prentice Hall.

Essentials of Supply Chain Management, Michael H. Hugos, John Wiley & Sons.

Designing and Managing the Supply Chain (Latest Edition), David Simchi-Levi, Philip Kaminsky, Simchi-Levi, McGraw Hill.

Integral Logistics Management: Operations and Supply Chain Management within and Across Companies, Paul Schönsleben, CRC Press, Taylor & Francis Group.

Supply Chain Design and Management: Strategic and Tactical Perspectives, Academic Press, San Diego, Manish Govil and Jean-Marie Prop.

Principles of Supply Chain Management: A Balanced Approach. 4th ed. Wisner, J. D., Tan, K.-C., & Leong, G. L. Nelson, Cengage.



## **MARKETING MANAGEMENT**

### **Course Objective (s):**

This course provides an understanding of the fundamental concepts and basic skill sets in Marketing domain. The learning outcomes include:

- Understanding fundamental concepts in Marketing
- Identifying Market Segments and Targets; and designing brand positioning
- Analysing business and consumer markets
- Emerging Areas in Marketing domain
- Marketing applications in post pandemic era

**Course Content:** Introduction to Marketing: Defining Marketing for the New Realities; Developing Marketing Strategies and Plans; Capturing Marketing Insights: Collecting Information and Forecasting Demand; Conducting Marketing Research; Connecting with Customers: Analyzing Consumer Markets; Analyzing Business Markets; Building Strong Brands: Identifying Market Segments and Targets; Crafting the Brand Positioning; Shaping the Market Offerings: Designing and Managing Services; Developing Pricing Strategies and Programs; Delivering Value: Designing and Managing Integrated Marketing Channels; Managing Retailing, Wholesaling, and Logistics; Communicating Value: Designing and Managing Integrated Marketing Communications; Managing Digital Communications: Online, Social Media and Mobile Marketing; Emerging areas in Marketing

**Reference Books:** Kotler, Philip and Keller, K. L. . Marketing Management, 15<sup>th</sup> Edition.

## ***FINANCIAL REPORTING & ANALYSIS***

**Course Objective (s):** Financial Reporting & Analysis is a 3 credit course designed to make the participants understand the dimensions of accounting with specific reference to accounting as an information system for managers. The course intends to impart the following to its participants:  
Understand the importance of standards in understanding financial statements. Analyze the components of a financial statement. Evaluate the performance of a business using financial statements. Compare financial performance both inter and intra business.

**Course Content:**

**MODULE 1- PREPARATION OF FINANCIAL STATEMENTS**

Introduction to Balance Sheet, Introduction to Income Statement, Income Statement- Preparation, Balance Sheet- Preparation

**MODULE 2: ACCOUNTING POLICIES AND MANAGERIAL CHOICES**

Revenue Recognition, Issues in Revenue Recognition, Accounting for Inventory, Accounting for Depreciation, Accounting for Equity, Sources of Capital- Debt

Accounting for Debt

**MODULE 3 FINANCIAL STATEMENT ANALYSIS**

Understanding of Annual Report, Understanding of Cash Flow Statement, Financial Statement Analysis

**Reference Books/ Cases/ Resources**

**Authors:** Anthony, Hawkins and Merchant

**Title:** Accounting- Text and Cases

**Publisher:** McGraw-Hill.

## **MANUFACTURING SYSTEMS ANALYSIS AND MANAGEMENT**

### **Course Objective (s):**

To develop a fundamental understanding of an operating system

To analyze the industrial processes for developing insights into better decision making.

To design and manage the process to accomplish specific goals to serve customers better.

### **Course Content:**

**Introduction:** Process view of an organization, process performance, product, and process attributes, Process types (process-focused Vs. Product focus Vs. Continuous-flow), process characteristics comparison, the concept of a product-process matrix,. Agile Vs. Lean Production, Push Vs. Pull system, JIT Vs. TOC, Lean six sigma, OEE, DMAIC, MTTF, MTTR, Monte Carlo methods

**Process Analysis:** Process flow map/diagram, the concept of setup time and run time, bottleneck, cycle time, capacity, process efficiency (man and machine utilization), throughput, flexibility, improving process flexibility (batch size reduction), etc.

**Key process measures:** such as WIP, flow time, flow rate, talk time, inventory, inventory turns, etc. Little's Law, application of little's law Ex, material flow, customer flow, job flow, cash flow, service flow), process capacity utilization, effective process capacity, bottleneck analysis, Effect of variability on process performance.

**Managing queues** – the concept of the waiting line, symbols, definitions, and performance analysis.

### **Reference Books:**

Edward S. POUND, Jeffrey H. Bell, and Mark L. Spearman, Factory Physics for Managers: How Leaders Improve Performance in a Post-Lean Six Sigma World, McGraw Hill Indian Pvt Ltd, New Delhi, 2016

Ravi Anupindi, Sunil Chopra, Sudhakar D. Deshmukh, Jan A. Van Mieghem, Eitan Zemel, Managing Business Process Flows, 3rd Edition, 2012 Pearson

John Nicholas, Lean Production for Competitive Advantage : A Comprehensive Guide to Lean Methodologies and Management Practices, 2nd Edition , 2021.

## ***OPTIMIZATION AND DECISION TECHNIQUES***

### **Course Objective (s)**

This course aims to provide an exposure to operations research tools and techniques for modelling and solving real-life decision-making problems in the area of operations, supply chain management, marketing, finance, and human-resource management.

### **Course Content**

Introduction to Operations Research (OR), Formulation of real-life decision-making problems as linear programming problems, Graphical Method, Simplex Method, Sensitivity Analysis & Duality; Transportation, Assignment and Transshipment Problems and its applications, Queuing Theory, Simulation, Decision Making under Risk & Uncertainty, Game Theory.

### **Reference Books/ Cases/ Resources**

Anderson, D. R., Sweeney, D. J., Williams, T. A., Camm, J. D., & Cochran, J. J. (2018). *An introduction to management science: quantitative approach*. Cengage learning.

Winston, W. L. (2003). *Operations research: applications and algorithms*. Belmont: Thomson Brooks/Cole.

Hillier F.S. and Liebermann G.J. (2002). *Introduction to Operations Research*, McGraw Hill

## ***MICROECONOMICS FOR MANAGERS***

### **Course Objectives:**

To demonstrate the link between the economic concepts & principles and effective decision making in business and management. To apply economic tools in business environment for arriving at suitable firm level decisions for desired business outcomes

### **Course content:**

The course will cover different aspects of managerial economics including theory of the firm, analysis of consumer behaviour, market forces of demand and supply, theory of production and costs, price and output determination under different types of markets and market failure and role of government in the economy

### **Text Book:**

Dominick Salvatore and Siddhartha K. Rastogi, Managerial Economics, Principles & Worldwide Applications, 9th edition, Oxford University Press 2020

### **Reference Book:**

Robert S Pindyck, Daniel L Rubinfeld and Prem L Mehta, Microeconomics 8th Edition, Pearson 2017.

Paul G. Keat, Philip K Y Young, Stephen E Erfle and Sreejata Banarjee, Managerial Economics: Economic Tools for Today's Decision Makers, 7th Edition, Pearson, 2018.

Thomas and Maurice, 2010, Managerial Economics, McGraw Hill

Gupta G. S., Managerial Economics, McGraw Hill

## ***BUSINESS INTELLIGENCE DECISION MODELLING***

### **Course Objective (s)**

In today's world, managing business requires conceptualization and understanding of complex decision-making problems, and demands skills in usage of various quantitative tools and techniques to solve and analyze these problems. Therefore, this course will equip students with the decision-making tools and techniques applicable for analyzing managerial decision problems and for arriving at appropriate solutions.

### **Course Content**

Integer Programming, Fixed-Charge Problems, Knapsack and Combinatorial Optimization Problems, Branch and Bound Algorithm, Cutting Plane Algorithm, Network Optimization Models, Shortest-Path Model - Dijkstra's algorithm, Minimum Spanning Tree Problems, Maximum Flow Problems, Minimum Cost Flow Problems, Goal Programming, Data Envelopment Analysis, Markov Chain, Deterministic Dynamic Programming, Probabilistic Dynamic Programming.

### **Reference Books/ Cases/ Resources**

Anderson, D. R., Sweeney, D. J., Williams, T. A., Camm, J. D., & Cochran, J. J. (2018). *An introduction to management science: quantitative approach*. Cengage learning.

Winston, W. L. (2003). *Operations research: applications and algorithms*. Belmont: Thomson Brooks/Cole.

Hillier F.S. and Liebermann G.J. (2002). *Introduction to Operations Research*, McGraw Hill

## ***PROCUREMENT AND ORDER FULFILMENT***

### **Course Objective (s)**

To understand warehouse management system and develop competence to improve performance of it.

### **Course Content**

Concept of warehouse, role of warehouse in supply chain, types of warehouse, functions of warehouse, warehouse location, warehouse layouts, warehouse operations, Receiving and Putaway, Pallet storage and handling systems, Case picking systems, equipment used in warehouse, storage & retrieval systems, warehouse automation, Handling, Storage and Retrieval Process including Kitting and packaging, Latest Technologies in Warehouse Management - Robotics, AGV, Sorters, Pick to Light and Put to Light systems, warehouse management system, safety and insurance issues in warehouse, warehouse cost management, warehouse performance management and improvement, warehouse design, seven principles of world-class warehousing, use of ICT in warehouse management, warehouse workforce design and development, warehouse maintenance, world-class practices in warehouse management.

### **Reference Books/ Cases/ Resources**

Edward H. Frazelle, World-Class Warehousing and Material Handling, McGraw-Hill Publishers. ISBN: 978-0-07-178559-4.

Gwynne Richards, Warehouse Management: A complete guide to improving efficiency and minimizing costs in the modern warehouses, Kogan Page Ltd, New Delhi. ISBN:978-0-7494-6934-4.

## ***TRANSPORTATION AND LOGISTICS SYSTEMS***

### **Course Objective (s):**

To provide basic understanding of the logistics function and its role in Supply Chain Management in the overall supply chain. Coverage will include various tools and techniques. Designing of logistics networks, Warehouses and transportations for optimisation of logistics is covered.

### **Course Content:**

Introduction to Logistics, Logistics System Design, Logistics Channels, Concept of Inventory related to logistics, Transit inventory, Warehousing, Warehousing decision models, Transportation models, Volume flow, Multimodal logistics, India's logistics transportation Sector and its challenges, Total logistics costs, Logistics metrics, Order Management, logistics information systems, Integration of all activities for effective supply chain performance, Reverse logistics, Designing logistics network, 3pl and 4pl logistics, Global logistics

### **Reference Books/ Cases/ Resources**

Logistics & Supply Chain Management, (Latest edition), Martin Christopher, Prentice Hall.

Business Logistics: Supply Chain Management (Latest Edition) L Ronald H. Ballou, Prentice Hall.

Introduction to Logistics Systems Management (2nd Edition): Gianpaolo Ghiani, Gilbert Laporte, Roberto Musmanno, Wiley.

Supply Chain and Logistics Management Made Easy: Methods and Applications for Planning, Operation, Integration, Control and Improvement, and Network Design (Latest Edition): Paul A. Myerson, Pearson FT Press.

Warehouse Management: A Complete Guide to Improving Efficiency and Minimizing Costs in the Modern Warehouse, 2nd Edition, Gwynne Richards, Kogan Page.

Coyle J.J, Bardi E.W., Langley C.J., The Management of Business logistics, A Supply Chain Perspective, Thomson Asia



## ***CORPORATE FINANCE***

### **Course Objective (s):**

Financial Management involves the study of different models of corporate financing and governance followed by several domestic and global firms. This course aims to give the basics of financial management and its environment to the participants. The course also aims to familiarize participants with the significant areas of corporate finance- investment, financing, and distribution of income.

### **Course Content:**

Introduction: Basic concepts, scope of financial management, relevance to the course, expected deliverables

Time Value of Money: Discounted Cash Flow valuation, Net Present Value: Meaning, Computation, Application in Business, Other Investment Rules: Discounted Pay Back, IRR, MIRR, Meaning, Computation, Applications

Making Capital Investment Decisions: Estimation of Cash Flows, Sunk Cost, Opportunity Cost, Depreciation, Effect of Inflation, Alternative Definitions of Operating Cash flow

Risk Analysis and Capital Budgeting: Sensitivity Analysis, Scenario Analysis, Break even analysis. ,

Interest Rates and Bond Valuation: Bonds and Bond valuation, Government and Corporate Bonds,

Stock Valuation: Present value of common stocks, Dividend discount model, valuing the entire firm

Capital Asset Pricing Model: Individual securities, expected returns, variance and covariance, diversification, CAPM, Risk , Cost of Capital and Valuation: Cost of Capital – Estimating the Cost of Equity – Risk Free Rate – Estimating Betas – Cost of Capital for Divisions and Projects – Cost of Debt – WACC. , Capital Structure: Financial Leverage and Firm value, Modigliani and Miller Theory

### **Reference Books/ Cases/ Resources**

**Authors:** Ross, Westerfield, Jaffe and Kakani,

**Title:** Corporate Finance,

**Publisher:** TATA McGraw Hill.

## ***B2B MARKETING***

**Course objective:** To understand and apply business marketing principles in complex world of business

**Contents:** Define B2B Marketing; Outlining various Perspectives of Organizational Buyer; Analysing Organizational Buying Behaviour; Designing Business Market Segments; Analysis of Organizational Demand; Formulating B2B Marketing Plans and Strategic Perspectives; Developing and Managing Products for Business Markets; Importance of Managing Innovation and NPD; Developing Services for Business Markets; Formulating Pricing Strategy for Business Markets; Designing Business Marketing Channels.

**Textbook:**

Hutt, Michael D. and Speh, Thomas W., Business Marketing Management: B2B, Cengage Learning.

## ***MANAGING THE WORKPLACE BEHAVIOUR***

### **Course Objective**

Understand and apply several OB frameworks, tools, and concepts that can enhance their individual, group, and organizational effectiveness. Reflect on and apply Organizational Behaviour knowledge in ways that will enhance their abilities as a manager and leader.

### **Course Content**

Introduction to OB, Attitudes & Job Satisfaction, Personality & Values, Perception, Leadership, Decision Making, Motivation, Group Behavior; Work Teams, Communication, Power, politics & Influence, Conflict & Negotiation, Organization Structure, Organizational Culture; Organizational Change, Diversity in Organizations

### **Reference Books/ Cases/ Resources:**

Nelson, D., Quick, J. C., & Khandelwal, P. (2016). Organizational Behavior. ORGB, Cengage Learning India Pvt Ltd. 2(E) Stephen P. Robbins and Timothy A. Judge, Organisation Behavior, 13th edition, PHI, 2009S. L. McShane, M. A. Glinow and R. Sharma, Organization Behaviour, 3rd /4th Ed. Tata McGraw Hill, 2008

## ***BUSINESS APPLICATIONS OF AI & ML TECHNIQUES***

### **Course Objective (s)**

This course aims to introduce the concepts of Artificial Intelligence (AI) and Machine Learning (ML) to enable students understand how AI and ML is contributing to the dynamic business environment; and how to apply AI/ML techniques to support business change and enable companies to achieve their strategic, tactical, and operational goals.

### **Course Content**

➤ Artificial Intelligence and Problem Solving

➤ Supervised Learning: Regression Algorithms

Linear Regression, Decision Trees Regression, Random Forests Regression, Gradient Boosting Machines (Light GBM and XG Boost), Comparison of regression algorithms – Right choice of algorithms, Model evaluation metrics and Bias-Variance trade- off, Regularization techniques, Additional techniques on improving the accuracies in challenging scenarios with smart feature engineering and modelling methodologies

➤ Supervised Learning: Classification Algorithms

Logistic Regression, Decision Trees classification, Random Forest classification, Gradient Boosting Machines, Support Vector Machines, Artificial neural networks, back propagation, introduction to Deep Learning, Comparison of classification of algorithms – Right choice of algorithms

➤ Unsupervised Learning: Clustering Algorithms

Strategic preparation of data for clustering, K-Means, hierarchical clustering, agglomerative clustering algorithms, Evaluation metrics and right choice based on the business need, Predicting the similarity and differences between the clusters

### **Reference Books/ Cases/ Resources**

Stuart Russell and Peter Norvig. (2010). *Artificial Intelligence: A Modern Approach*, 3rd edition, Pearson Education.

George Luger (2017). *Artificial Intelligence: Structures and Strategies for Complex Problem solving*, 6th edition, Pearson Education.

Hastie, T., Tibshirani, R., Friedman, J. H., & Friedman, J. H. (2009). *The elements of statistical learning: data mining, inference, and prediction* (Vol. 2, pp. 1-758). New York: springer.

Shai Shalev-Shwartz and Shai Ben-David (2014). *Understanding Machine Learning: From Theory to Algorithms*, Cambridge University Press.

Giuseppe Bonaccorso (2017). *Machine Learning Algorithms*, Packt Publishing.

## ***INNOVATION AND ENTREPRENEURSHIP***

### **Course Objective (s)**

Enable the learners to experience launching and managing a start-up of their own. Enable the students to understand the curricular learning by implementing it in the start-up and importing the start-up experiences into the curricular learning

### **Course Content**

Understanding Entrepreneurial Learning - Effectuation – Design Thinking – Value Stream Analysis Learning by a start-up experiment Understanding Start-up – Small Business – Entrepreneurship – Student start-up, Student academic labour and start-up - MOE / AICTE Student start-up policy– Objectives, design and strategy of a student start-up. The Lean start-up – VISION – Start, define, lean, experiment STEER –Leap, test, measure, Pivot ACCELERATE – Batch, Grow, Adapt, Innovate Registering a start-up – Business Model development – Customer development

### **Reference Books/ Cases/ Resources**

Eric Ries (2011). The Lean Startup London, Portfolio / Penguin Lackeus, M (2015). Entrepreneurship in Education, OECD Report

## ***DIGITAL AND CYBER PHYSICAL SYSTEM***

### **Course Objective (s)**

This course aims to demonstrate an understanding of digital and cyber physical system and its use in the context of production and manufacturing systems. It focuses on understanding the concepts of Internet of Things, Control Towers, Digital Twins in the context of production, manufacturing, operations and supply chain management.

### **Course Content**

Introduction to Cyber Physical Systems and Cyber Physical Technologies, Internet of Things (IoT), Industrial Internet of Things, Smart Cities, Smart Grid, "Smart" Anything (e.g., Cars, Buildings, Homes, Manufacturing, Hospitals, Appliances), Synchronous Models, Asynchronous Models, Dynamic Systems, Hybrid Systems, Supply Chain Control Towers, Digital Twins, Characteristics of Digital Twins, Working of Digital Twins, Digital Twins Development and Deployment using anyLogistix.

### **Reference Books/ Cases/ Resources**

Alur, R. (2015). *Principles of cyber-physical systems*. MIT press.

Danda B. Rawat, Joel J.P.C. Rodrigues, Ivan Stojmenovic (2015). *Cyber-Physical Systems: From Theory to Practice*, CRC Press.

## ***PROJECT MANAGEMENT***

### **Course Objective (s)**

To present the concepts, techniques and tools for managing projects effectively in terms of time, quality and cost, and also to develop skills in techniques for planning, estimating, monitoring and controlling cost, schedules, risk and performance parameters.

### **Course Content**

Systems approach to project management, project feasibility studies, project appraisal, project selection, market and demand analysis, technical analysis, financial analysis, project cash flows, time value of money and cost of capital. Project organization, cost estimation and budgeting, resource planning, procurement and mobilizations, roles and responsibilities, and contract administration. Project scheduling, CPM and PERT techniques, project risk analysis and management, project crashing and scheduling with limited resources. Project monitoring and control and earned value analysis.

### **Reference Books/ Cases/ Resources**

Kerzner, H., Project Management – Systems Approach to Planning, Scheduling and Controlling, 2001.

Meredith and Mantel, Project Management, 2001.

Wiest, J.D. and Levy, F.K., A Management Guide to PERT / CPM, 2001.

PMI, A Guide to Project Management Body of Knowledge, 2000.

## ***SUSTAINABILITY MANAGEMENT***

### **Objectives:**

To understand a business perspective of environment and sustainability and apply its concepts and principles in industry.

### **Content**

Understanding Principles of Sustainable Development (SD), Evolution of SD and its Business Context, Understanding Business-Environment-Society interdependence, Compare Different Perspectives on SD, Understand SD challenges for Global Economy and implications on Industry, Greening vs. Sustainability perspective for Industry, SD Framework for different Economies, Applications of SD Tools and Techniques in Industry for Sustainable World.

The Route Towards Sustainable Innovation and Entrepreneurship: Innovating for Sustainability; LCA and Carbon Footprinting for Innovative and sustainable product and process development; Harnessing Business to Achieve the Sustainable Development Goals Through Technology and Innovation; Sustainable Innovation Strategies and Disruptive innovation in enterprises and society

### **Text Books**

Strategic Sustainability: A natural Environmental Lens on Organizations and Management, Daniel S Fogel, Routledge Publications, 2016

David T. Allen and David R. Shonnard, Sustainability Engineering: Concepts, Design and Case Studies, 1e, Poul Boger Publisher, 2012.

Vanessa Ratten, Marcela Ramirez-Pasillas, Hans Lundberg; Managing Sustainable Innovation, Routledge Publisher, 2020



## ***BUSINESS RESEARCH METHODS***

### **Course Objective (s)**

To impart knowledge to evaluate and conduct research on management problems/issues  
To provide skills necessary for the conduct of student research projects as a part of the programme requirement  
To highlight the importance of research in management

### **Course Content**

Research process, types of research, significance & scope of research for managers and industry, Formulation of research problem-Sources, management dilemma, how to formulate a research problem? Objectives, variables -Types of variables, Measurement, Scale, The Sampling process-types, errors, determination of the sample size, confidence interval  
Research design: survey research experimental design, quasi-experimental design, survey research, important concepts related to research design: exploratory and explanatory research, research design: experimental design  
Data, primary and secondary data, qualitative and quantitative data, library research, references, bibliography, abstracts, questionnaire, observation method, interview method, survey method, case study method Tools & techniques of data collection and editing of data  
Reliability and Validity of data  
Hypothesis testing, null and alternative hypothesis type one and type two errors, one tailed and two-tailed test, the procedure for hypothesis testing. Application of data analysis, Use of parametric and nonparametric tests- an intro. Testing of hypothesis-t, z,  
Descriptive statistics, Cross tabulation, Chi square  
Correlation and regression, Applications  
Analysis of variance- applications,  
Preparation of research proposal and report writing

### **Reference Books/ Cases/ Resources**

William G. Zikmund, Barry J. Babin, Jon C Carr, Adhikari, Mitch Griffin, Business Research Methods: A South-Asian Perspective  
Cooper, Donald, R.Schindler, Pamela. S, Business Research Methods, Tata McGraw Hill, Sixth edition,2006.  
  
Sekaran, Uma, Research Methods for business-A Skill building approach., John Wiley and sons, Fourth edition,2003.

## ***PEOPLE MANAGEMENT***

### **Course Objective**

To introduce the basic concepts, functions and processes of human resource Management. To create an awareness of the role, functions and functioning of human resource department of the organizations

### **Course Content**

Human Resource Management: Concept and Challenges, HR Profession, and HR Department, HR Philosophy, Policies, Procedures and Practices, Functional Areas of HRM- Man power planning, job analysis, recruitment and selection, Human Resource Development: Values and Tools, performance management system, basics of compensation management, HR as a Factor of Competitive Advantage, Accountability in HR

### **Reference Books/ Cases/ Resources:**

Dessler Gary, Human Resource Management, Pearson Education Asia, 2000, Bohlander, Snell & Sherman, Managing Human Resources, 11th edition, South Western College Publishing. P. Jyothi, D. N. Venkatesh, Human Resource Management, Oxford University Press

## Annexure-III: Mapping of prerequisite courses at IIT

(To be filled by partnering IIT)

Pre-requisite Courses at IIT Patna for Dual Degree Program with NITIE

Prerequisites for for OPTION I- 1.5 years in NITIE

Requirement of courses/equivalent courses from the list of 21 is **6 courses : 270 hours**

In IIT Patna students will do relevant MINIMUM contact hours of 250 Hours from existing courses

Semester	Course Code/Name	Credit	Contact Hours
2 <sup>nd</sup>	CS102 - Programming and Data structures	6	42
2 <sup>nd</sup>	HS201 -Micro Economics	6	42
3 <sup>rd</sup>	HS202 - Macro Economics	6	42
5 <sup>th</sup>	MA309/MB309 - Optimization Technique	6	42
6 <sup>th</sup>	HS302 - Financial Analytics	6	42
Or 8 <sup>th</sup>	MA502/MB502 - Numerical Optimization	6	42
	<b>Total</b>		<b>250</b>

For the remaining courses-

1. Financial Reporting & Analysis
2. Business Intelligence Decision Modelling
3. Corporate Finance
4. Transportation and Logistics Systems

From the above listed subjects ANY THREE can be covered in following four ways.

- I. Students can do self-study through available online sources (like You Tube, Coursera, NPTEL etc) on a minimum of 3 subjects. Mentoring sessions by NITIE and IIT faculty may be organised. At the end of the module students will undergo an examination, which every student should pass.

- II. Students can take three months project on the above courses. Three mini projects on the above subjects with the help of mentoring from faculty of NITIE (online) and IIT Patna (offline). Every week scheduled meeting will facilitate the timely completion of project. Students will then undertake final examination, which every student shall pass.
- III. Three Online courses of Coursera/ Swayam/NPTEL if available (free for NITIE students) Pass certificate is required
- IV. If the particular department offers relevant courses to cover contact hours. It is possible that the name of the subject is different but the content is identical.

Relevance of course will be decided by NITIE

#### Option II

12 courses from Annexure I or their equivalent as decided by IIT Patna and NITIE have to be done during the 8 semesters in IIT Patna.

**Annexure-IV: Structure of Fifth year at NITIE  
(Including Module-4 of SIP at the end of 4<sup>th</sup> year)**

**MODULE 4**

<b>Sr. No.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Course type</b>	<b>No of hours</b>	<b>No of credits</b>
1		Summer Internship	Core	--	6
		<b>Total</b>		--	<b>6</b>

All Post-Graduate Programme students are required to undertake summer internship project (SIP) on live problems / industry-oriented research in industrial or business organizations, during their Module 4. The SIP carries 6 credits, and the **duration of the SIP is 8 weeks**. Ideally, summer project work should demonstrate the capability of a student to solve real-life live problems in an organization. Alternatively, it can investigate application of available/extended/newly developed critical concepts/models to any work-situations leading to reinterpretation of established facts/new facts. The Organization will be assigning a project to the student. The student will also have a mentor/guide from the Organization. Additionally, the student will be assigned to a 3-member **Faculty Guide Team from NITIE and partnering IIT**. The student is expected to be in regular contact with his/her Industry mentor/guide as well as the Faculty Guide Team assigned to him/her. There will be regular reviews carried out by the Faculty Guide Team during the SIP.

The student must submit periodic reports of the progress of his/her project work to the faculty guide team concerned. A draft copy of the final project report should also be submitted to the faculty guide team, as per the timelines specified by the Academic Office. The final report must also contain a Certificate of Completion from the HR of the Organization. The Organization may conduct a presentation of the SIP at their end, if required. However, there will be a mandatory Final presentation to the **Faculty Guide Team of NITIE+IIT** at the end of the SIP. The schedule of presentation of the project work will be announced by the Academic Office in accordance with the Academic Calendar. Permission of the company to present any company data during the project presentation should be taken prior to the presentation. However, confidentiality of the project does not mean withholding of such facts and details from the examination panel (Faculty Guide Team) which will impinge directly on the evaluation of the quality and the quantity of the project work. The final grade for the SIP will be based on the report, presentation, and the quality of the work done during the SIP.

### MODULE 5

Sr. No.	Course Code	Course Title	Course type	No of hours	No of credits
1.		Business Strategy	Core	30	3
2.		Macroeconomics	Core	30	3
3.		CSE Elective I	Elective	30	3
4.		CSE Elective II	Elective	30	3
5.		Open Elective I	Elective	30	3
6.		Online Course I* - student needs to undertake two such courses to earn 3 credits	FBC*	--	3 (1.5 credit per course)
7.		Business Ethics	Core Microcredit	15	1.5
		<b>Total</b>		<b>165</b>	<b>19.5</b>

### Module 6

Sr. No.	Course Code	Course Title	Course type	No of hours	No of credits
1.		Marketing Analytics	Core	30	3
2.		CSE Elective III	Elective	30	3
3.		CSE Elective IV	Elective	30	3
4.		Open Elective II	Elective	30	3
5.		Online Course II* - student needs to undertake two such courses to earn 3 credits	FBC*	--	3 (1.5 credit per course)
6.		Capstone Project – I Focus areas: (i) Innovation, (ii) Infrastructure, (iii) Consumption and Production, (iv) Energy, (v) Social – Diversity, Equity, and Inclusion	Core	--	1.5
		<b>Total</b>		<b>120</b>	<b>16.5</b>

\*The guidelines for undergoing online courses including list of permissible courses, platforms from which the courses can be done, length of course in number of hours, course evaluation/grading criteria will be communicated separately to the students.

## MODULE 7

Sr. No.	Course Code	Course Title	Course type	No of hours	No of credits
1.		CSE Elective V	Elective	30	3
2.		CSE Elective VI	Elective	30	3
3.		Open Elective III	Elective	30	3
4.		Institute-run global online courses – student needs to undertake three courses to earn 6 credits	FBC*	--	6 (2 credit per course)
5.		Online Course III* - student needs to undertake two such courses to earn 3 credits	FBC*		3 (1.5 credit per course)
6.		Capstone Project-II Focus area: Application of acquired skills to address a business problem in Professional/ Corporate setting	Core	--	3
		<b>Sub Total</b>		<b>90</b>	<b>21</b>
		<b>Total for year 2</b>		<b>375</b>	<b>57</b>
		<b>Grand Total (Year 1 + Year 2)</b>		<b>1145</b>	<b>140</b>

\*The guidelines for undergoing online courses including list of permissible courses, platforms (such as MOOCS/NPTEL/Coursera) from which the courses can be done, length of course in number of hours, course evaluation/grading criteria will be communicated separately to the students.

\*FBC-Flexible breadth course- Students can undertake the FBC courses during first year and second year however the evaluation will be reflected in the transcript in the seventh module. All the FBC courses successfully completed by the students will appear on their transcript.

## **CAREER SPECIALIZATION ELECTIVES (CSE) AND CSE STREAMS**

**(All electives 30 hours – 3 credit courses)**

### **LIST OF CSE STREAMS**

Considering the recent business and technological advances and the need of the students to develop a broader skillset the following ten **streams of Career Specialization Electives (CSE streams)** are proposed.

- i. Operations & Supply Chain Management (*OSCM*)
- ii. Business Analytics (*BA*)
- iii. Marketing (*Mkt*)
- iv. Finance (*Fin*)
- v. Sustainability (*Sust*)
- vi. Organizational Behaviour and Human Resources Management (*OBHR*)
- vii. Business Strategy (*BS*)
- viii. Manufacturing Analytics (*MA*)
- ix. Project Analytics (*PA*)
- x. Innovation and Entrepreneurship (*I&E*)

Electives offered in each CSE stream are listed in the subsequent pages.



## LIST OF CSE ELECTIVES

### ELECTIVE LIST OF OPERATIONS & SUPPLY CHAIN MANAGEMENT (OSCM)

Course Title	Pre-Requisites If any
Procurement and Materials Management	
Services Operation Management	
Quality Engineering and Management	
Manufacturing Planning and Control Systems	
Inventory Management	
International Operations Management	
Operations Strategy	
Strategic Procurement	
Policy Analysis and System Dynamics Modelling	
Simulation Modelling and Analytics	
Modelling and managing technology decisions in Supply chain	
Cyber risk analytics in Supply chain	
Innovative Packaging	
Facility Layout, Planning, and Design	
Industrial Design and Human Factors	

### ELECTIVE LIST OF BUSINESS ANALYTICS (BA)

Course Title	Pre-Requisites If any
Large Scale Optimization	
Multi-Objective Optimization	
Blockchain and its Applications	
Reinforcement Learnings: Theory and Applications	

Deep Learning and Industrial Applications	
Data Analytics and Knowledge Management	
Digital Strategy	
E-Commerce System for Business	
Digital Customer Relationship Management	
IT Consultancy Management	
IT Risk Management	
Agile Business through Digital Transformation	
Big Data Analytics	
Business Analytics using Data Mining	
Business Value of Digitization	
Cloud Computing for Business	
Emerging Technologies in Operations and Supply Chain Management	
Enterprise Resource Planning	
IoT for Industrial Applications	
Transforming Business with Artificial Intelligence	
Business Intelligence, Decision Support System & AI Applications	
Business Process Management for Risk and Performance Management	
Data Structure and Algorithm with Python Programming	
Information Systems for Manufacturing Asset Management	
Managing Digital Transformation in the Enterprise	

Forecasting Methods and Applications	
Computer Intelligence and Nature Inspired Algorithms	
Forecasting Methods and Applications	
Data Privacy and Technology	
Stochastic Optimization	
Game Theory and its Applications	
Healthcare Analytics	
Supply Chain Analytics	

#### ELECTIVE LIST OF MARKETING (MKT)

Titles of Marketing e courses	Pre-Requisites If any
Advertising	
Brand Management	
Consumer Behavior	
Digital Marketing	
Green Marketing	
Healthcare Analytics	
International Marketing	
Marketing Research	
Marketing for Hi Tech Products	
Pricing of Products and Services	
Retail Management	
Rural Marketing	
Sales and Distribution Management	
Services Marketing	
Marketing and Society	
Neural Marketing	
Growth Marketing	

### ELECTIVE LIST OF FINANCE AND ACCOUNTING (F&A)

Course Title	Pre-Requisites If any
Advanced Financial Reporting and Analysis	
Financial Analytics and Modelling	
Asset Pricing	
Derivatives and Financial Modelling	
Financial Risk Management	
Financial Time Series Modelling	
Fixed Income Portfolio Management	
International Financial Management	
Investment Strategies and Portfolio Management	
Mergers, Acquisitions and Valuation	
Strategic Cost Management	
Infrastructure and Project Finance	
FinTech and Analytics	
Financial Risk Analytics	
Supply Chain Finance	
Sustainable Finance and Climate Change	
Entrepreneurial Finance	
Machine Learning in Finance	
Quantitative Finance	
Applied Econometrics	

### ELECTIVE LIST OF SUSTAINABLE MANAGEMENT (SUST)

Course Title	Pre-Requisites If any
Process Safety Management	
Occupational Health & Safety	
Environmental Impact Assessment	
Business Continuity Planning	
Strategic CSR	

ESG Analytics	
ESG Performance Mgmt.	
ISO family of standards	
Energy Efficiency & Climate Change	
Design Thinking and Sustainability	
Product Development and Sustainability	
Sustainable Strategy and Organizational Capability	
Circular Economy and Circular Business Models	
Sustainable Operations Mgmt.	
Sustainable Communication & Reporting	
Sustainability Leadership Development	
ESG strategies for Fast Moving Consumer Goods	
ESG Strategies for Business	
Environmentally Sustainable Strategy & Operations	
Business Strategies for Climate Change	
Sustainable Finance and ESG Investing	
Life Cycle Sustainability Assessment	
Sustainable Supply Chain Management	
Safety Legislation	
Environmental Law and Policy	
Fire and Safety Management	
Loss Prevention and Industrial Insurance	
Safety Management in Oil and Gas Industries	
Carbon Accounting for Corporate Reporting	
Sustainability Frameworks (ESG) & Standards	

**ELECTIVE LIST OF ORGANISATIONAL BEHAVIOUR AND HUMAN RESOURCE MANAGEMENT (OBHR)**

<b>Course Title</b>	<b>Pre-Requisites If any</b>
Competency Assessment and Development	
Cross Cultural Management	
Performance Management	

Entrepreneurship Development (start-up practicum)	
People Analytics	
Leadership Development/Leading in the virtual world	
Managing Negotiation	
Strategies for Managing Career	
Organizational Change and Development	
Positive Psychology in Organization	
Compensation and Benefits Management	
Soft Skills Development	
Strategic and International HRM	
Social Network Analysis	
Diversity, Equity and Inclusion Management	
Theories and Assessment of Personality	
Managing self-Transactional Analysis	
Human Values and Principles of Consciousness	
Managing Industrial Relations	
Strategic HRM	
Diversity, Equity and Inclusion	

#### **ELECTIVE LIST OF BUSINESS STRATEGY (BS)**

<b>Course Title</b>	<b>Pre-Requisites If any</b>
Macroeconomics	
Industrial Organization	
Public Systems and Policy	
Economics of Strategy	
Public Policy Analytics	
Game Theory for Public Policy and Strategy	
International Business Strategies	
Impact Evaluation of Public Policy	
Digital Economics and Strategy	
Rural Business Management and Policy	
Social Network Analysis for Strategic Decision Making	

Global Trade and Institutions	
Institutional Economics	
Economics of Regulation and Competition Policy	
Public Finance and Governance Strategies	
Global Competitiveness	
Strategic Management in the Public Sector	
Cost Benefit Analysis	
Growth and Development Economics	
Sustainability Economics and Policy	
Behavioural Economics	
Social Choice Theory and Welfare Economics	
Indian Economy	
Economics of Retailing and Distribution	
Information Economics	
Business Analysis and Econometric Applications	
Environmental Economics	
Market Design	
Energy Markets and Pricing Strategies	

#### **ELECTIVE LIST OF MANUFACTURING ANALYTICS (MA)**

<b>Course Title</b>	<b>Pre-Requisites If any</b>
Managing Operations in Additive Manufacturing	
Methods of Manufacturing Improvement	
Manufacturing System Design	
Flexible Manufacturing System	
Manufacturing Modelling - Quantitative Approach	
Lean Manufacturing and Services	
Manufacturing Strategy	
Decision Modeling for Technology Transfer and Acquisition	
Management of Intellectual Property	

### ELECTIVE LIST OF PROJECT ANALYTICS (PA)

<b>Course Title</b>	<b>Pre-Requisites If any</b>
Project Risk Analytics	Project Management
Modeling and Managing Special and Complex Projects	NIL
Machine learning for project performance	AI & ML Techniques
Quantitative Modelling for Project Management	<b>NIL</b>
Project Finance and Cost Budgeting	Project Management
Project Procurement & Contracts Management	Project Management

### ELECTIVE LIST OF INNOVATION AND ENTREPRENEURSHIP (I&E)

<b>Course Title</b>	<b>Pre-Requisites If any</b>
Managing Creativity	
Innovative Packaging	
Entrepreneurial Finance	
Entrepreneurship Development	
Management of Intellectual Property	
Design thinking and Innovation analytics	
Customer Acquisition for Startups	
Startup Valuation	
Venture Capital and Private Equity	
New Product Development and Launch	
Family Business Management	
Technology Entrepreneurship	
Entrepreneurial Thinking	
Lean Startup	
Entrepreneurship and Innovation Strategy	
Entrepreneurial Success: Managing Negotiations and Networks	
The Art of Idea Pitching and Fund Raising	



**Annexure-V: Structure of 1<sup>st</sup> to 4<sup>th</sup> year at IIT**  
**(To be provided by partnering IIT)**

### Annexure-VI: Fee Structure for the program

Sr. No.	Fee Nomenclature	Option 1 (joining NITIE from Module-3)	Option 2 (joining NITIE from module-4)
	Program Fees for Fifth year	<b>18,00,000</b>	<b>12,00,000</b>
	Less IIT Component (30%)	<b>5,40,000</b>	<b>3,60,000</b>
	NITIE Fees	<b>12,60,000</b>	<b>8,40,000</b>
I	Admission Fee	--	--
II	Tuition Fee* (@ 55-60%)	7,52,000	4,78,000
III	Facilities charges (@ 20%)	2,52,000	1,68,000
IV	Student welfare and Alumni activities charges (@10%)	1,26,000	84,000
V	Hostel charges	80,000	60,000
VI	DEPOSITS	50,000	50,000
	<b>TOTAL</b>	<b>12,60,000</b>	<b>8,40,000</b>