Name of the Program: B.TECH (Logistics and Supply Chain Management- 4 Years) - (UG)

Objective of the program

The objective of the B. Tech program is to equip students with the necessary knowledge and skills for the design, management, and enhancement of supply chains in general to any sector. The curriculum covers various subjects such as operations management, logistics, transportation, warehousing, inventory management, supply chain planning and forecasting, purchasing and supplier management, information technology for logistics and supply chain management, quality management, and project management. Employers across various industries, such as manufacturing, retail, transportation, and logistics, have a strong demand for graduates with a B. Tech in Logistics and Supply Chain Management (L&SCM). Additionally, individuals may choose to pursue careers in academia, consulting, or government.

Distinct feature of the program

The B.Tech in logistics, and supply chain management (L&SCM) curriculum stands out due to its focus on a systemic approach to supply chain management. Students gain practical knowledge through internships and capstone projects, where they learn to apply technological solutions to supply chain problems. Students in the Bachelor of Technology in Logistics and Supply Chain Management (LSCM) program acquire knowledge and skills in utilizing technology to enhance the efficiency and effectiveness of supply chain operations. Students have the chance to apply their theoretical knowledge in practical settings.

First Semester

The courses in the first semester of the B.Tech program in Logistics and Supply Chain Management are highly relevant today. Mathematics-I equips students with essential problem-solving skills vital for optimizing supply chain operations. Physics provides a foundational understanding of physical principles applicable to goods, transportation, and handling. Indian Knowledge System fosters an appreciation for regional influences on supply chains. Engineering Graphics aids in designing efficient layouts. Computer Programming in C and Python addresses data analysis needs. English for Communication Skills enhances collaboration abilities. Extracurricular activities promote well-being and teamwork, all essential skills in the logistics and supply chain industry. Together, these courses provide a strong foundation for addressing the challenges of modern supply chain management.

S.No.	Course	Credits	L-T-P
1	Mathematics-I	3	3-0-0
2	Physics	3	2-0-2

3	Introduction to Biological Systems	3	2-0-2
4	Indian Knowledge System	3	3-0-0
5	Engineering Graphics	3	2-0-2
6	Computer Programming: C and Python	3	2-0-2
7	English for Communication Skills	2	1-0-2
8	Extra-curriculum (Yoga, Cultural, and Sports)	1	0-0-2
	Total	**21 credits**	15-0-12

Mathematics-I

The following are the primary focuses of this course: Matrices, Systems of linear equations, Determinants, Eigenvalues and eigenvectors Matrices, Complex numbers, Functions of one variable, Limits, continuity, and differentiability, Mean value theorems, Indeterminate forms, Taylor's theorem, Functions of two variables, Partial derivatives, Total derivatives, Tangent planes and normal lines, Maxima, minima, and saddle points, Double and triple integrals, Vectors, Stoke's theorem, Green's theorem and Gauss divergence theorem and their applications.

Course Objectives:

- To provide students with a foundational understanding of linear algebra and calculus.
- To develop logical reasoning and thinking through mathematical principles to improve problem-solving skills.
- To give students the ability to apply mathematical concepts to real-world problems and engineering challenges.

Course Outcomes:

- Students will demonstrate that they understand algebra and calculus.
- Capacity to use mathematical reasoning to solve complicated problems.
- Use mathematical concepts to analyze and effectively resolve engineering challenges

Textbooks

- Stroud, K. A., and Booth, D. J. (2020). Engineering mathematics. Bloomsbury Publishing. 8th edition
- Higher Engineering Mathematics (2014) by Rajnish Verma H.K. Dass

Physics

The following are the primary focuses of this course: Newton's Laws of Motion, Forces and Free-Body Diagrams, Circular Motion, and Gravitation, Work, and Energy, Conservation Laws, Laws of Thermodynamics, Heat Transfer: conduction, convection, and radiation, Ideal Gases and the Gas Laws, Simple Harmonic Motion, Wave Properties (including wave equations), Sound Waves, Superposition and Interference, Doppler Effect, Electric Charge, and Electric Fields, Gauss's Law, Electric Potential and Voltage, Capacitance and Dielectrics, Electric Current and Resistance, Ohm's Law, Magnetic Fields and Forces, Electromagnetic Induction, Electromagnetic Waves, Reflection and Refraction of Light, Thin Lenses and Lens Systems, Interference, and Diffraction, Polarization, Optical Instruments, Special Theory of Relativity, Quantum Mechanics, Atomic Physics and Nuclear Physics.

Course Objectives:

- To build analytical and experimental abilities to observe, quantify, and explain physical phenomena.
- To offer a thorough understanding of the fundamental laws and principles regulating the physical universe.
- To improve problem-solving abilities by applying physics principles.

Course Outcomes:

- Students will be able to perform experiments and data analysis to comprehend physical events.
- Students will also have a solid understanding of the fundamental physics principles and theories.
- Utilise physics to address problems and scenarios that arise in the real world.

Textbooks

- Malik, H. K., and Singh, A. K. (2018). Engineering Physics, 2nd edition
- Tipler, P. A., & Mosca, G. (2007). *Physics for scientists and engineers*. Macmillan, 6th edition

Introduction to Biological Systems

The following are the primary focuses of this course: Cell Theory and Cell Structure, metabolism, and cellular respiration, cell membrane structure, Laws of inheritance, DNA structure, and replication, Darwin's theory of evolution, Biodiversity conservation and preservation, the flow of energy in ecosystems, human body system, biotechnology, genetic engineering, scientific advancement in biological systems, biological research, and methods.

Course Objectives:

- Provide students with a fundamental knowledge of biological systems, such as organisms, cells, and ecosystems.
- Develop the scientific inquiry and analytical thinking abilities required to understand biological concepts.
- Understand the importance of biological systems in a variety of fields and daily life.

Course Outcomes:

- Understand the underlying concepts of biological systems and their interdependence.
- The ability to analyze biological occurrences and processes critically.
- Use biological concepts to comprehend real-world scenarios and issues.

Textbooks

- Essentials of Biology (2020) by Sylvia S. Mader and Michael Windelspecht, 6th edition
- Biology: Concepts and Investigations (2017) by Mariëlle Hoefnagels

Indian Knowledge System

The following are the primary focuses of this course: Indian Knowledge System – An Introduction, The Vedic Corpus, Number System and Units of Measurements, Mathematics, Astronomy, Engineering and Technology: Metals and Metalworking, Engineering and Technology: Other Applications, Town Planning and Architecture, Knowledge Framework and Classification, Linguistics.

Course Objectives:

- Investigate the various cultural, philosophical, and scientific dimensions of traditional Indian knowledge systems.
- Develop critical thinking abilities to assess the relevance and applicability of ancient Indian knowledge in modern circumstances.

Course Outcomes:

- Develop an understanding for India's rich cultural legacy through its ancient knowledge systems.
- Practise critically analyzing and interpreting ancient writings, ideologies, and scientific ideas.

Textbooks

- Mahadevan, B., Bhat Vinayak Rajat, Nagendra Pavana R.N. (2022), "Introduction to Indian Knowledge System: Concepts and Applications", PHI Learning Private Ltd. Delhi.
- Pride of India: A Glimpse into India's Scientific Heritage, Samskrita Bharati, New Delhi.
- Bag, A.K. (1979). Mathematics in Ancient and Medieval India, Chaukhamba Orientalia, New Delhi.
- Bag, A.K. (1997). History of Technology in India, Vol. I, Indian National Science Academy, New Delhi.
- Kapoor Kapil, Singh Avadhesh (2021). "Indian Knowledge Systems Vol – I & II", Indian Institute of Advanced Study, Shimla, H.P

Engineering Graphics

The following are the primary focuses of this course: Introduction to Engineering Graphics, Drawing instruments and materials, drawing conventions, Lettering, and dimensioning, Orthographic Projections, first and third-angle projections, projections of points, lines, and planes, Projections of solids, Various types of sectional views, full, half, and partial sections, revolved and removed sections, isometric projections, principles of isometric projection, construction of isometric views, isometric projections of solids, principles of perspective projection, construction of perspective views, Perspective projections of solids, geometric constructions, construction of basic geometric shapes, construction of conic sections, construction of special curves.

Course Objectives:
- Learn technical drawing techniques such as orthographic projections, isometric perspectives, and 3D modelling.
- Practise producing and modifying engineering drawings using computer-aided design (CAD) software.

Course Outcomes:
- Expertise in developing precise engineering drawings utilising manual and computer-based methods.
- Communicate engineering ideas and thoughts using standardized and exact graphics.

Textbooks

- N. D. Bhatt, (2012), Elementary Engineering Drawing (Plane and solid geometry).
- K.Venugopal and V. Prabhu Raja (2023), A textbook of Engineering Drawing

Computer Programming: C and Python

The following are the primary focuses of this course: Introduction to programming concepts, Overview of algorithms, data types, variables, and control structures, Basic Syntax, Writing

and running simple programs, Introduction to the syntax and structure of C and Python, Data Types and Variables, integers, floating-point numbers, characters, Variable declaration, assignment, and naming conventions, Looping structures, Programming Fundamentals, Functions and Modular Programming, Creating functions in C and Python, return values, Arrays and Lists, Working with arrays in C, Lists in Python and their operations, String manipulation and handling in both C and Python, Introduction to Data Structures, Basic data structures such as stacks, queues, and linked lists, Introduction to Algorithms, Basic sorting and searching algorithms, Introduction to Python Specifics, Python Specifics: Pythonic programming style and Python libraries and modules.

Course Objectives

- Learn the fundamentals of C and Python programming.
- Enhance problem-solving skills by using algorithms and logic in both languages.

Course Outcomes

- Demonstrate skill in C and Python programming, including scripting, debugging, and execution.
- Use programming concepts to address real-world problems using appropriate algorithms and data structures.
- Explain the pros and cons of using C and Python for different programming tasks.

Textbooks

- Computing Fundamentals And C Programming (2017) by E Balagurusamy
- Python: The Complete Reference (2018) by Martin C. Brown

English for Communication Skills

The following are the primary focuses of this course: Definition and importance of effective communication, Types of communication (verbal, non-verbal, written, and visual), speaking skills, learning skills, conversational skills, academic writing, business writing, presentation skills, digital communication (use of social media and email), resumes and cover letter writing.

Course Objectives

- Improve grammar, vocabulary, and comprehension for better communication.
- Improve both written and oral English for various communication settings.
- Understand cultural differences and etiquette for effective English-speaking conversation.

Course Outcomes

- Learn and improve English grammar, vocabulary, and comprehension.
- Gain confidence in expressing ideas, opinions, and facts in English.

Textbooks

- Technical Communication: English Skills for Engineers (2008) by Meenakshi Raman and Sangeeta Sharma
- Communication Skills for Engineers and Scientists (2023) by Sangeeta Sharma and Binod Mishra, 2nd edition

Extra-curriculum (Yoga, Cultural, and Sports)

Second Semester

In the second semester of the B.Tech programme in Logistics and Supply Chain Management, Mathematics-II, Introduction to Management Science, and Environmental Studies teach advanced problem-solving, data-driven decision-making, and sustainability. Engineering Mechanics and Electrical Engineering Fundamentals teach equipment and automation, while Basic Economics explains market dynamics. Maintenance and comprehension of equipment are taught in workshops. These courses equip students for modern logistics and supply chain management and its associated challenges.

S.No.	Course	Credit	L-T-P
1	Mathematics -II	3	3-0-0
2	Introduction to Management Science	3	3-0-0
3	Environmental Studies	3	3-0-0
4	Basic Economics	3	3-0-0
5	Engineering Mechanics	3	2-0-2
6	Electrical Engineering Fundamentals	3	2-0-2
7	Workshop Practice	2	0-1-2
	Total	**20 credits**	16-1-6

Mathematics-II:

The following are the primary focuses of this course: Infinite series, definition, and properties of Laplace transforms, solving linear differential equations using laplace transforms, Inverse Laplace transforms, numerical methods, Numerical solutions of nonlinear equations, numerical differentiation, and integration, Vector Calculus: Scalar and vector fields, level surfaces, directional derivative, Gradient, Curl, Divergence, Laplacian, line and surface integrals, theorems of Green, Gauss and Stokes, line integrals independent of path.

Course Objectives:

- Develop sophisticated mathematical skills beyond the basics, such as differential equations, linear algebra, and probability theory.
- Improve problem-solving ability by applying sophisticated mathematical principles.
- Allow students to apply sophisticated mathematical principles to engineering challenges and real-world circumstances.

Course Outcomes:

- Exhibit mastery in probability theory, linear algebra, and differential equations.
- aptitude for applying sophisticated mathematical ideas to tackle difficult situations.
- Effectively analyze and resolve engineering challenges by utilizing sophisticated mathematical concepts.

Textbooks:

- Higher Engineering Mathematics (2014) by Rajnish Verma H.K. Dass
- Higher Engineering Mathematics (2017) by Bandaru Ramana

Introduction to Management Science:

The following are the primary focuses of this course: Basic and Advanced linear programming, Simplex Method, sensitivity analysis and its application in operations, supply chain, finance, and operation management, integer programming, network models and their application, non-linear optimization models, project scheduling (i.e., PERT/CPM), Inventory models, simulation modeling, decisions analysis, multi-criteria decision making, forecasting and Markov processes, dynamic programming

Course Objectives:

- Introduce basic management principles and theories, such as planning, organizing, and decision-making.
- Develop the analytical thinking and problem-solving skills essential for managerial decision-making.
- Understand the practical applicability of management principles in real-life settings and company environments.

Course Outcomes:

- Understand, comprehend, and articulate basic theories and concepts in management.
- Gain the analytical abilities required for problem-solving and managerial decision-making.
- Effectively apply management concepts in a range of real-world contexts.

Textbooks

- An Introduction to Management Science: Quantitative Approaches to Decision Making (2022), 15th edition by David R. Anderson/Dennis J. Sweeney/Thomas A. Williams/Jeffrey D. Camm/James J Cochran
- An Introduction to Management Science Quantitative Approaches to Decision Making, (2019)14E by David R. Anderson/Dennis J. Sweeney/Thomas A. Williams/Jeffrey D. Camm/James J Cochran

Environmental Studies:

The following are the primary focuses of this course: Introduction to environmental science, living organisms and their environment, understanding ecosystems and their components, biodiversity, its importance, earth atmosphere, climate weather, water pollution, climate change, population growth, earth's geological process, air pollution, biodiversity, greenhouse gas emissions, water cycle, resource depletion, population and environment, soil formation, population and environment, renewable and non-renewable sources of energy, Land use patterns, Land degradation, forest conservation, water scarcity, issues related to water quality, watershed management, water conservation, Endangered species, protected areas, and wildlife management, environmental issues, sustainable development, environment impact and laws and policies for environment protection, awareness about the sustainability, capacity building for environment education.

Course Objectives:

- Teach students about sustainability, ecology, and environmental issues.
- Acquire critical thinking abilities to assess environmental issues and possible fixes.
- Promote awareness of the value of sustainable lifestyles and practices.

Course Outcomes:

- Understand and explain various environmental problems and their implications.
- Analyze environmental issues critically and propose potential solutions.
- Apply principles of sustainability to promote environmentally friendly behaviors.

Textbooks

- Introduction to Environmental Engineering and Science (2015), 3e by Masters
- Textbook of environmental studies for UG (2021) 3rd Edition by Erach Bharucha

Basic Economics:

The following are the primary focuses of this course: Definition of economics, microeconomics, macroeconomics, various economic systems, understanding supply and demand, utility, and presence, costs of production and production functions, competitive market, competition, and pricing strategies, gross domestic product, inflation and deflation,

monetary and fiscal policy, international trade, trade agreements, measurement of economic development and growth.

Course Objectives:

- Incorporate essential economic principles, such as supply and demand, market structures, macroeconomic indicators, and more.
- Conduct an analysis of economic phenomena and decision-making processes by applying economic theories.
- Comprehend the applicability of economic principles across a wide range of business and societal contexts.

Course Outcomes:

- Comprehend and articulate fundamental economic principles along with their practical implementations.
- Analyse practical economic situations by applying economic theories.
- Employ economic principles in order to comprehend and confront economic challenges that arise in various contexts.

Textbooks
- Economics (SIE) 20th Edition (2019) by Paul A. Samuelson, William D. Nordhaus, Sudip Chaudhuri, Anindya Sen
- Principles of Economics with MindTap (2022) 8th Edition, by N. Gregory Mankiw

Engineering Mechanics:

The following are the primary focuses of this course: Basics of mechanics, units of measurement, centre of gravity, moment of inertia, vectors, and scalars, forces, frames and moment, equilibrium of particles, equilibrium of rigid particles, trusses, beams, friction, kinematics, kinetics, work, and energy, virtual work, momentum and impulse, circular motion, projectiles, harmonic motion, collision, mechanical vibrations.

Course Objectives:

- Include statics and dynamics in the demonstration of basic mechanical principles.
- Develop problem-solving skills by applying mechanics concepts to the study and resolution of engineering difficulties.
- Recognise the application of mechanics in the analysis and design of engineering structures.

Course Outcomes:

- Understand and describe the fundamental principles of statics and dynamics.
- Effectively address engineering challenges using mechanics concepts.
- Apply mechanics concepts to the analysis and design of engineering structures.

Textbooks
- Engineering Mechanics: Statics and Dynamics (2021) 15th Edition by Russell C. Hibbeler
- Engineering Mechanics: Applied Mechanics (2021), 1st Edition by J.K. Gupta and S.K. Gupta

Electrical Engineering Fundamentals:

The following are the primary focuses of this course: Basics of electrical concepts, voltage, and its source, current and power, ohm's law, basic electrical circuit, Kirchhoff's law for current and voltage, electrical machines, power systems, introduction to semiconductor, AC and DC current, AC circuit analysis, transformer, basics of logic circuit, Proportional-Integral-Derivative (PID) controllers, electromagnetic fields and waves, Maxwell's equations, electronic devices, and amplifiers.

Course Objectives:

- Cover fundamental electrical principles and circuits, such as Ohm's Law, circuits, and basic components.
- Offer hands-on experience with electrical circuits and components.
- Understand how electrical concepts are applied in diverse devices and systems.

Course Outcomes:

- Comprehend the fundamental concepts and applications of electricity.
- Employ electrical principles to analyze and design fundamental circuits.
- Recognize the function of electrical principles in a variety of electronic systems and devices.

Textbooks

- Basic electrical engineering, (2019) 2nd Edition by D. C. Kulshreshtha
- Basic Electrical and Electronics Engineering, (2017) 2/e by S.K. Bhattacharya

Workshop Practice:

The following are the primary focuses of this course: Workshop safety, measurement tools, carpentry and woodworking, fitting, welding tools and joining techniques, sheet metal working, basic electrical work, metal cutting, turning, machining, milling, and drilling.

Course Objectives:

- Offer hands-on experience operating workshop equipment, systems, and adhering to safety procedures.
- Acquire the fundamental ability to operate workshop materials and apparatus.
- Participate in workshop activities while comprehending and applying safety, precision, and accuracy protocols.

Course Outcomes:

- Exhibit proficiency in operating workshop equipment and apparatus.
- Acquire fundamental abilities to operate and manipulate workshop equipment.

Textbooks
- Workshop Practice (2013) by Swarn Singh
- Workshop Practice by H.S. Bawa

Third Semester

Courses such as "Introduction to Probability and Statistics", "Operations Research-I", "Managerial Accounting", "Data Analytics for Managerial Decisions", "Introduction to Logistics and Supply Chain Management", and "Naya Bharat and Logistics" are especially pertinent during the third semester of the Bachelor of Technology programme in Logistics and Supply Chain Management. Skills in data analysis, optimisation, making sound financial decisions, and managing supply chains are taught to students, so equipping them for a successful career in the fast-paced logistics and supply chain industry.

S.No.	Course	Credit	L-T-P
1	Introduction to Probability and Statistics	3	3-0-0
2	Operations Research-I	3	3-0-0
3	Managerial Accounting	3	3-0-0
4	Data Analytics for managerial decisions	3	3-0-0
5	Introduction to logistics and supply chain management	3	3-0-0
6	Naya Bharat and Logistics	3	3-0-0
	Total	**18 credits**	18-0-0

Introduction to Probability and Statistics:

The following are the primary focuses of this course: Basic concepts of probability, Probability axioms and rules, Conditional probability, and independence. Discrete and continuous random variables, Probability mass functions (PMF) and probability density functions (PDF), Cumulative distribution functions (CDF), Expected value and variance of random variables. Binomial, Poisson, Normal distributions and Exponential distributions, Sampling Distributions and Central Limit Theorem, Point estimation, Confidence intervals, Hypothesis testing, Linear regression, Multiple regression and Model assessment and selection, and Analysis of variance (ANOVA).

Course Objectives:
- Introduce fundamental concepts of probability theory and its applications.
- Develop skills in statistical analysis, including data collection, analysis, and interpretation.
- Understand how probability and statistics are applied in real-world scenarios for decision-making.

Course Outcomes:
- Demonstrate a comprehensive understanding of probability theory.
- Apply statistical techniques to analyze and interpret data effectively.
- Apply probability and statistical methods to support decision-making processes.

Textbooks
- Introduction to Probability and Statistics for Engineers and Scientists (2021), 5e by Sheldon M. Ross
- Engineering Statistics (2000), 2e by Douglas C. Montgomery and George C. Runger

Operations Research-I:
The following are the primary focuses of this course: Overview of operations research, applications and their role in the decision-making process, Formulation of LP problems, Graphical solution method, Simplex method, Duality in LP, Introduction to integer programming, Branch, and bound method, Cutting plane methods, Formulation and solution methods for transportation problems, Assignment problems, Introduction to network models (e.g., shortest path, minimal spanning tree, maximum flow), Solution techniques for network models, Project scheduling: CPM, PERT, Project Crashing, Basics of dynamic programming, Applications in resource allocation and project scheduling, Introduction to queuing models, Characteristics of queuing systems, Basic queuing formulas, Inventory control models (e.g., EOQ - Economic Order Quantity), ABC analysis, Decision-making under uncertainty, Decision trees, Sensitivity analysis, Introduction to game theory, Two-person zero-sum games, Nash equilibrium, Basics of simulation modeling, Monte Carlo simulation, Introduction to optimization software tools (e.g., Excel Solver, LINGO/LINDO).

Course Objectives:

- Introduce mathematical methods for problem-solving and decision-making in operations.
- Teach optimization methods to improve efficiency and decision-making in operations.
- Understand the application of operations research techniques in real-life business scenarios.

Course Outcomes:

- Apply mathematical methods to solve complex operational problems.
- Utilize optimization techniques to improve operational efficiency.
- Apply operations research techniques in analyzing and solving business problems.

Textbooks

- Introduction to Operations Research (SIE), (2021) 11th Edition by Frederick S. Hillier, Gerald J. Lieberman, Bodhibroto Nag, Preetam Basu
- Operations Research: An Introduction, (2021) 10e by Hamdy A. Taha

Managerial Accounting:
The following are the primary focuses of this course: Introduction to managerial accounting, Types of costs (e.g., variable, fixed, mixed), Contribution margin analysis, Breakeven analysis, Profit planning and budgeting, Cost behavior, Cost concepts and classifications, Cost behavior and cost-volume-profit analysis, Process costing systems, Activity-based costing, traditional costing, Job order costing, Budgeting and performance measurement, Variance analysis (e.g., flexible budgets, standard costing) Capital investment decision methods, Cost control techniques, Financial statement analysis, Management control systems, Transfer Pricing, International Accounting.

Course Objectives:

- Introduce managerial accounting concepts, including cost analysis and budgeting.
- Provide tools and techniques for managerial decision-making using accounting information.
- Understand how managerial accounting aids in planning, control, and decision-making.

Course Outcomes:

- Understand and apply managerial accounting concepts in business contexts.
- Use accounting information to support managerial decision-making.
- Apply managerial accounting techniques for planning and control in business management.

Textbooks

- Jiambalvo, J. (2019). Managerial accounting. John Wiley and Sons
- Managerial Accounting (2023), 16th Edition by Kurt Heisinger and Joe Hoyle

Data Analytics for managerial decisions:

The following are the primary focuses of this course: Overview of data analytics, Data sources, and types, Data collection methods, Data cleaning and preprocessing, Data summarization techniques, Data visualization tools, and concepts, Exploratory data analysis (EDA), Predictive Analytics (Regression analysis for forecasting, Time series analysis and Machine learning for prediction), Optimization models and techniques, Decision trees and decision analysis, Simulation modeling, Principles of effective data visualization, Tools for creating data visualizations, Introduction to big data and data mining, and Techniques for analyzing large datasets. Analyzing text data for insights, Sentiment analysis of customer feedback and social media data, Building interactive dashboards for reporting and monitoring, and Business intelligence platforms and tools.

Course Objectives:

- Develop skills in analyzing and interpreting data for managerial decision-making.
- Introduce techniques for predictive analytics to forecast trends and patterns.
- Understand how data analytics aids in strategic decision-making processes.

Course Outcomes:

- Analyze and interpret data effectively for managerial decisions.
- Apply predictive analytics techniques to forecast trends and patterns.

Textbooks

- Business Analytics for Managers (Use R!) (2011), by Wolfgang Jank (Author)
- Business Intelligence, Analytics, and Data Science: A Managerial Perspective (2016) by Sharda Ramesh, Delen Dursun, et al.

Introduction to logistics and supply chain management:

The following are the primary focuses of this course: The importance of logistics and supply chain management in engineering, demand management in the supply chain, inventory control models, warehousing and inventory management, forecasting, information technology in logistics and supply chain management, supplier collaboration, supplier selection, network design and planning in the supply chain, sustainable supply chain, distribution strategies in the supply chain, supply chain contracts, supply chain risk management, strategic sourcing, reverse logistics, transportation modes, and management.

Course Objectives:

- Introduce the basics of logistics and supply chain management.

- Understand how logistics and supply chain processes optimize business operations.
- Learn to manage the flow of goods and information in supply chain networks efficiently.

Course Outcomes:

- Understand the fundamentals of logistics and supply chain management principles.
- Apply logistics and supply chain strategies to optimize business operations.
- Manage the flow of goods and information effectively within supply chain networks.

Textbooks
- Designing and Managing the Supply Chain: Concepts, Strategies, and Case Studies (2022), 4th Edition by David Simchi-Levi, Philip Kaminsky, Edith Simchi-Levi, Ravi Shankar.

- Supply Chain Management (2018), 7th Edition, by Sunil Chopra, Peter Meindl, Dharam Vir Kalra.

Naya Bharat and Logistics

The following are the primary focuses of this course: A review of India's economic transformation and the "New India" vision lean and just-in-time (JIT) and lean concepts in Indian manufacturing, Logistics and the management of food supply chains, Last-mile delivery and omnichannel logistics, Logistics for pharmaceuticals and medical devices The significance of logistics facilities and nodes, PM Gati Shakti-Master National Plan, Government policies and initiatives promoting logistics and supply chain productivity, environmental and social responsibility practices in logistics, Logistics innovations fuelled by digitalization and technology like blockchain, case studies pertaining to National Logistics policy and PM Gati Shakti-Master National Plan.

Course Objectives:

- Introduce the concepts and initiatives in the 'Naya Bharat' (New India) context.
- Explore the role of logistics in national development and economic growth.
- Understand sustainable logistics practices and innovative solutions for Naya Bharat.

Course Outcomes:

- Understand and explain the initiatives and concepts related to 'Naya Bharat'.
- Analyze the role of logistics in the development of the nation's economy.
- Propose sustainable logistics practices and innovative solutions for the development of 'Naya Bharat'.

Textbook
- Logistics Engineering Handbook (2007) by G. Don Taylor

Fourth Semester

The syllabus of the fourth semester of the Bachelor of Technology programme in Logistics and Supply Chain Management encompasses a selection of courses that are highly pertinent to the contemporary demands of the industry. The course "Operations Research-II" aims to develop and improve the optimisation abilities required for tackling complicated problems. The significance of effective and environmentally friendly transportation is explored in the course "Introduction to Multi-Modal Logistics". The primary objective of "Material Handling and Packaging" is to examine and analyse the implementation of efficient logistics strategies. The course titled "Financial Management for Supply Chain Leaders" aims to develop the participants' proficiency in finance and leadership abilities. The field of "Global Logistics and Supply Chain Management" encompasses the examination and management of difficulties that arise on a worldwide scale. The course titled "Introduction to Artificial Intelligence and Machine Learning" provides an overview of advanced technologies. These courses aim to equip students with the necessary skills and knowledge to thrive in the dynamic and constantly changing logistics and supply chain business.

S.No.	Course	Credit	L-T-P
1	Operations Research-II	3	3-0-0
2	Introduction to Multi-Modal Logistics	3	3-0-0
3	Material Handling and Packaging	3	3-0-0
4	Financial management for supply chain leaders	3	3-0-0
5	Global Logistics and Supply Chain Management	3	3-0-0
6	Introduction to AI & Machine Learning	3	3-0-0
	Total	**18 credits**	18-0-0

Operations Research-II:
The following are the primary focuses of this course: Unconstrained optimization, Constrained optimization and KKT conditions, Algorithms for solving nonlinear programming problems, Formulation of integer programming problems, Branch-and-bound and branch-and-cut algorithms, Applications in combinatorial optimization, Introduction to dynamic programming, and its Applications, Overview of heuristic and metaheuristic algorithms (e.g., genetic algorithms, simulated annealing), Solving complex optimization problems using heuristics, Pareto optimality and multi-objective decision-making, Algorithms for solving multi-objective optimization problems.

Course Objectives:

- Provide advanced mathematical models and approaches for dealing with complicated operational challenges.
- Develop optimization strategies for resource allocation and operational decision-making.
- Recognise how operations research approaches can be applied to real-world operational difficulties.

Course Outcomes:

- Solve complex operational challenges using powerful mathematical models.
- Use optimization strategies to allocate resources more efficiently.
- Use operations research methods to analyze and solve difficult operational problems.

Textbooks

- Operations Research: Applications and Algorithms (2003) by Wayne L. Winston
- (2018). An introduction to management science: a quantitative approach. Cengage learning (2019), 14th edition by Anderson, D. R., Sweeney, D. J., Williams, T. A., Camm, J. D., and Cochran, J. J.
- Introduction to Operations Research (SIE), (2021) 11th Edition by Frederick S. Hillier, Gerald J. Lieberman, Bodhibroto Nag, Preetam Basu

Introduction to Multimodal logistics:

The following are the primary focuses of this course: Modes of transportation, Road transportation (Trucks, carriers, and infrastructure), Rail transportation (Freight trains, intermodal, and rail yards), Air transportation (Cargo airlines, airports, airfreight logistics), Maritime transportation (shipping lines, ports, and containerization), Intermodal transportation, multi-modal transportation systems, the role of Multi-modal logistics for world economic corridors, government policies, and regulations for multi-modal logistics, Container Freight Station (CFS) Terminals, Roll-on/Roll-Off Service, Development of multi modal transport system in India - Metro Rails, Light Rail Transit (LRT), Sub-Urban Trains, Ring Rail and Monorails, Bus Rapid Transit Systems, Bullet Trains. City Transport. Inland Waterways, Economic corridors, Containerization, Non-containerization cargo, dry ports, pipelines, palletization, Channel tunnel.

Technologies for transportation systems, the role of transportation mode in first-mile, last-mile delivery, and hyper-local delivery, simulation, and modeling in logistics, Warehouse management systems (WMS), route optimization, documentation, and regulatory framework for domestic and international freight, strategies for sustainable and efficient multi-modal logistics.

Course Objectives:
- Introduce the logistics ideas and practices of utilizing numerous modes of transportation.
- Discover techniques for increasing efficiency and integration in multimodal logistics operations.
- Recognize risk factors and management techniques related to multimodal logistics.

Course Outcomes:
- Understand and define the principles governing the utilization of various forms of transportation in logistics.

- Implement approaches to increase efficiency and integration in multimodal logistics operations.

Textbooks
- Global Supply Chains and Multimodal Logistics: Emerging Research and Opportunities (Advances in Logistics, Operations, and Management Science (ALOMS)) by Deepankar Sinha
- Handbook of Logistics, Shipping, and Commercial Terminologies (2019) by Benny John

Material Handling and Packaging:
The following are the primary focuses of this course: Overview and importance of material handling equipment (Automated Electrified Monorail, conveyors, forklifts, cranes, AGVs, etc.) in logistics, automated storage systems, mechanisms of material handling, design principles of material handling, equipment, and workflow design, material storage, and retrieval design, digital technologies for material management for effective storage, performance material Safety measures, and regulations. Packaging overview, Types of packaging materials, benefits of effective packaging, Intelligent packaging, and IoT integration, sustainability practices in packaging, 3D printing in the design of packaging, Compostable and biodegradable packaging, strategies for environmentally friendly packaging, regulations for packaging, Case studies of innovative packaging.

Course Objectives:

- Introduce the fundamentals and techniques of logistics material handling efficiency.
- Learn about techniques for optimising packing procedures in order to streamline logistical operations.

Course Outcomes:

- Establish proficiency in logistics material handling techniques.
- Use packaging optimization solutions for more efficient logistics operations.
- Implement safety procedures to ensure efficient and safe material handling and packing.

Textbooks
- Immer J. R., Material Handling, Tata McGraw Hill Publication.
- James Apple, Material Handling System Design, John Wiley
- Theodore H., Allegre Sr., Material Handling Principles and Practice, CBS Publishers, and Distributors

Financial management for supply chain leaders:

The following are the primary focuses of this course: The function of finance in supply chain leadership, understanding financial statements, supply chain costing and budgeting, capital budgeting and investment decisions in supply chain, key financial metrics for supply chain performance, supply chain financing alternatives, and ethical implications in supply chain finance.

Course Objectives:

- Introduce financial basics and supply chain management analytical techniques.
- Develop strategies for effectively managing costs in supply chain operations.

Course Outcomes:

- Examine and manage supply chain finances by employing financial analysis methodologies.
- Use financial insights to make strategic decisions in supply chain operations.

Textbooks
- Financial Management: Theory & Practice by Eugene F. Brigham and Michael C. Ehrhardt
- Supply Chain Finance: A New Perspective on Cash Flow by Wendy Tate and Charles C. Thomas

Global Logistics and Supply Chain Management:
The following are the primary focuses of this course: Introduction to Logistics in global context, International trade and logistics, Logistics System Design, Logistics Channels, Concept of Inventory related to logistics, Transit inventory, Warehousing, Warehousing decision models, Transportation models, Volume flow, 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, Risk management in global logistics, Customs regulations and documentation, Incoterms, and international shipping terms. Introduction to global Supply Chain Management, global network supply chain design, Strategic Importance of IT and computer Simulation in Supply Chain Management; Supply Chain Performance; Supply Chain System Slacks; Demand Management; Supply Management; Inventory Management; and Production Management.

Course Objectives:
- Introduce global logistics concepts and supply chain management concerns.
- Investigate the regulatory systems that influence global logistics.

Course Outcomes:
- Understand global logistics concepts and supply chain management difficulties.
- Implement international logistics and operations strategies that are efficient.

Textbooks

- Supply Chain Management: Strategy, Planning, and Operation (Latest Edition), Sunil Chopra, Peter Menidle, Prentice Hall.
- Integral Logistics Management: Operations and Supply Chain Management within and Across Companies, Paul Schönsleben, CRC Press, Taylor & Francis Group.
- 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.

Introduction to AI and Machine Learning:

The following are the primary focuses of this course: Overview of AI and ML, Types of machine learning: supervised, unsupervised, reinforcement learning, Logistic regression, Linear regression, Decision trees and random forests, Linear Discriminant Analysis, Clustering algorithms (K-means, hierarchical clustering), Dimensionality reduction techniques (PCA) and Anomaly detection, Introduction to neural networks, Feedforward neural networks, Convolutional neural networks (CNNs), Recurrent neural networks (RNNs), Introduction to NLP, Sentiment analysis, text classification and ethics issues of artificial intelligence.

Course Objectives:
- Introduce fundamental AI and machine learning concepts and applications in logistics.
- Investigate the use of AI and machine learning technologies to optimize logistical operations.

Course Outcomes:
- Describe the underlying concepts and uses of artificial intelligence and machine learning in logistics.
- Use artificial intelligence and machine learning to optimize logistics operations.
- Use AI and machine learning in logistics and supply chain management to do predictive analytics.

Textbooks
- The Elements of Statistical Learning, by Trevor Hastie, Robert Tibshirani, Jerome H. Friedman
- Stuart Russell & Peter Norvig, Artificial Intelligence: A Modern Approach, Prentice-Hall, Third Edition (2009)

Fifth Semester

The fifth semester of the B.Tech in Logistics and Supply Chain Management offers contemporary, relevant courses. "Supply Chain Risk Modelling" teaches students how to identify and mitigate supply chain risks, a critical skill in our interconnected and uncertain world. "Logistics Network Design and Optimisation" covers the growing need for efficient and sustainable supply chain networks, aligning with environmental and cost-effective logistics solutions. Due to the present focus on international trade and logistics, "Port Terminal Management" and "Air Cargo Management" acknowledge the importance of multimodal transportation hubs in global goods flow. The continuously changing supply chain requires an entrepreneurial mindset, which "Innovation and Entrepreneurship" develops. Students learn cutting-edge technologies in the "Simulation and Digital Twin Lab" to optimise supply chains with digital tools and simulations. Students learn how to succeed in the dynamic and competitive profession of logistics and supply chain management by addressing industry challenges and opportunities in these courses.

S.No.	Course	Credit	L-T-P
1	Supply Chain Risk Modeling	3	3-0-0
2	Logistics Network Design and Optimization	3	3-0-0
3	Port terminal management	3	3-0-0
4	Air Cargo management	3	3-0-0
5	Innovation and Entrepreneurship	3	3-0-0
6	Simulation and digital twin lab	3	0-0-6
	Total	**18 credits**	15-0-3

Supply Chain Risk Modeling:
Nature of Supply Chain Risks, Risk drivers (external and internal), Risk prediction and metrics, Concept of risk pooling, Formulating risk mitigation strategies, Risk mitigation plan rollout and control.

Course Objectives:

- Develop and implement strategies for identifying and evaluating risks in the operations of supply chain chains.
- Develop models that can quantify and analyze the many different hazards that are present within supply chain networks.

Course Outcomes:

- Implement comprehensive risk assessment in supply chain activities.
- Quantify and analyze supply chain risks using models.
- Implement effective supply chain risk mitigation techniques.

Textbooks

- Manners-Bell, J. (2020). Supply Chain Risk Management: How to design and manage resilient supply Chains. Kogan Page Publishers.
- Olson, D. L. (2011). Supply chain risk management: tools for analysis. Business Expert Press.
- Lemke, F., & Petersen, H. L. (2018). Supply chain risk management: advanced tools, models, and developments.
- Khan, O., & Zsidisin, G. A. (2012). Handbook for supply chain risk management: Case studies, effective practices, and emerging trends. J. Ross publishing.

Logistics Network Design and Optimization:
The following are the primary focuses of this course: Requirements assessment - Location and capacity requirement analysis, Infrastructure analysis, Logistics network cost analysis, Owning vs outsourcing, Service level optimization, and Roadmap for logistics network design.

Course Objectives:
- Introduce principles for creating effective logistics networks.
- Create methods to improve logistics network efficiency and cost-effectiveness.
- Learn how technology integration improves logistics network design and optimization.

Course Outcomes:
- Develop optimal logistics networks utilizing acquired principles of efficiency.
- Develop and execute strategies to enhance the efficiency and effectiveness of logistics network operations.

Textbooks
- Yalaoui, A., Chehade, H., Yalaoui, F., & Amodeo, L. (2012). Optimization of logistics. John Wiley & Sons.
- Réveillac, J. M. (2015). Optimization tools for logistics. Elsevier.
- Juan, A. A., Rabe, M., Goldsman, D., & Faulín Fajardo, J. (2021). Simulation-optimization in logistics, transportation, and SCM. MDPI.

Port Terminal Management:
The following are the primary focuses of this course: Introduction to ports, port functions, ships, cargo and terminals, port planning and equipment, port pricing, port competition, and legal aspects in ports and terminals.

Course Objectives:
- Describe the concepts and procedures for effective port terminal management.
- Formulate plans to maximize throughput and efficiency in terminal operations.

Course Outcomes:
- Apply strategies for effective terminal operations into practise.
- Assure port terminal management of safety precautions and legal compliance.

Textbooks

- Ursavas, E. (2011). Port Operations and Container Terminal Management.
- Park, N. K. (2022). Smart Port Management and Strategy. Bentham Science Publishers.
- Pettit, S., & Beresford, A. (Eds.). (2017). Port management: cases in port geography, operations and policy. Kogan Page Publishers.
- de Langen, P. W. (2020). Towards a better port industry: port development, management and policy. Routledge.
- Saieva, G. Port Management and Operations (Lloyd's Practical Shipping Guides). Routledge

Air cargo management:

The following are the primary focuses of this course: Air cargo industry and its stakeholders, Pricing, forecasting, railway operations and Road transportation/ trucking, load optimization, Regulatory framework, competition, and air cargo Operations Management.

Course Objectives:
- Describe the fundamentals and procedures of air freight operations and logistics.
- Develop plans to streamline air freight operations for promptness and efficiency.
- Recognise and make sure that the rules governing air freight handling are followed.

Course Outcomes:
- Effectively manage air cargo logistics
- Assure adherence to rules regarding the handling of flying cargo.

Textbooks
- Sales, M., & Scholte, S. (2023). Air cargo management: Air freight and the global supply chain. Taylor & Francis.
- Maniriho, E. A. (2022). Aviation, AirCargo and Logistics Management: A Manual for Air Cargo Handlers and Shippers. Notion Press.
- Hoffmann, R. (2014). Dynamic capacity control in air cargo revenue management. KIT Scientific Publishing.

Innovation and Entrepreneurship:

The following are the primary focuses of this course: Definition of innovation, Types of Innovations, startup ecosystem, Intellectual Property Rights (IPR) and patents, Govt. Schemes and funding support ideas, innovations, startups, startup methodology, funding, crowdfunding and alternative financial methods, Entrepreneurial opportunities, attitudes, traits, and tendencies. Types of entrepreneurships, Current trends, government policies for building entrepreneurship ecosystem.

Course Objectives:

- Gain knowledge about the procedures and methods used in the logistics and supply chain sector for innovation.
- Develop the skills required for supply chain and logistics-related entrepreneurial endeavours.

- Gain an understanding of and experience creating sustainable supply chain and logistics business concepts.

Course Outcomes:

- Utilize innovative approaches and strategies in the domains of logistics and supply chain management.
- Acquire the requisite competencies for engaging in entrepreneurial endeavours within the industry.

Textbooks
- Managing Creativity and Innovation, Harvard Business School Press. Thinkertoys, by Michael Michalko, Ten Speed Press.
- The Art of Innovation, by Tom Kelley, Crown Business
- Richter, Nancy, Paul Jackson, and Thomas Schildhauer, eds. Entrepreneurial innovation and leadership: preparing for a digital future. Springer, 2018.
- McCauley, Pamela. Essentials of engineering leadership and innovation. CRC Press, 2017.
- Northouse, Peter G. Leadership: Theory and practice. Sage publications, 2021.

Simulation and digital twin lab:
The following are the primary focuses of this lab: Introduction to simulation and digital twin concepts, agent-based simulation, Monte Carlo simulation, digital twin modeling, and analysis using anyLogistix, system dynamics modeling using STELLA, and simulation modeling using Arena, Any Logic.

Course Objectives:

- Explain simulation principles and how they apply to logistics and supply chain management.
- Investigate and comprehend the idea and application of digital twin technology in logistics.
- Provide hands-on experience using simulation and digital twin technology.

Course Outcomes:

- Use simulation principles to model logistics and supply chain scenarios.
- Make efficient use of digital twin technology in logistics and supply chain management.
- Gain hands-on experience with simulation and digital twin technology applications.

Textbooks
- Simulation modeling and analysis (SIE) (2007) by Averill Law, Kelton, W. D., & Kelton, W. D.
- Ivanov, Dmitry. (2021). Supply chain simulation and optimization with anyLogistix.

Sixth Semester

The courses offered in the sixth semester like "Maritime Logistics" and "Blockchains and Smart Contracts for Digital Supply Chains" cover crucial aspects of contemporary logistics. The terms "Procurement and Supplier Relationship Management" and "Warehouse and Distribution Management" highlight crucial operational aspects. "Enterprise Lab" gives students hands-on experience. By addressing current industry demands, these courses prepare students for success in the dynamic and competitive field of logistics and supply chain management.

S.No.	Course	Credit	L-T-P
1	Maritime logistics	3	3-0-0
2	Blockchains, and smart contracts for Digital Supply Chains	3	3-0-0
3	Procurement and Supplier Relationship Management	3	3-0-0
4	Warehouse and Distribution Management	3	3-0-0
5	Enterprise Lab	3	0-0-6
6	Elective I	3	3-0-0
	Total	**18 credits**	12-0-6

Maritime logistics:

The following are the primary focuses of this course: Importance of maritime logistics in global trade, the structure of the maritime industry: vessel types, shipping lines, policies, and regulatory mechanism, types of port terminal operations, and the role of Industry 4.0 technologies in maritime logistics, demand, and inventory management in maritime logistics, modeling risk disruption, and resilience in maritime industry, sustainability issues in maritime logistics.

Course Objectives:
- Provide an overview of maritime logistics concepts and procedures, such as port operations and vessel management.
- Acquire knowledge of tactics to maximize supply chain flow via maritime transportation.

Course Outcomes:
- Effectively manage maritime logistics by applying acquired principles.
- Put plans in place for effective supply chain movement through maritime transportation.

Textbooks
- Maritime Logistics: A Guide to Contemporary Shipping and Port Management (2015) by Dong-Wook Song and Photis M. Panayides.
- Maritime Logistics: Contemporary Issues (2012) by Dong-Wook Song and Photis Panayides

Blockchains and smart contracts for Digital Supply Chains:

The following are the primary focuses of this course: Significance of blockchain in digital supply chain, the basics of blockchain, the definition of smart contract, cybersecurity issues in blockchain for supply chain, the application of blockchain in the supply chain, and sustainability aspects in blockchain. Introduction to Smart Contracts, Ethereum and Solidity, Components of Smart Contracts, Smart Contract Security, Smart Contract Deployment, Legal and Regulatory Considerations, Smart Contract Development Tools, Future Trends: Emerging technologies and trends in smart contracts (e.g., non-fungible tokens, DeFi, DAOs), Integration with IoT and AI.

Course Objectives:

- Give an overview of blockchain technology and how it can be used in digital supply chain management.
- Examine how supply chain transaction automation is facilitated by smart contracts.
- Gain an understanding of blockchain technology and smart contracts and use them to improve supply chain operations' efficiency and transparency.

Course Outcomes:

- Describe the fundamentals of blockchain technology and how digital supply chain management uses them.
- Use smart contracts to make supply chain transactions more automated and efficient.
- Utilise smart contracts and blockchain technology to increase supply chain operations' efficiency and transparency.

Textbook

- Mastering Blockchain: Unlocking the Power of Cryptocurrencies, Smart Contracts, and Decentralized Applications (2020) by Lorne Lantz, Daniel Cawry

Procurement and Supplier Relationship Management:

The following are the primary focuses of this course: Introduction to procurement, purchasing policy and procedure, quality management, supplier selection, and evaluation, Principles of Contract Negotiation, contract management, cost management, purchasing ethics and laws, supplier relationship management framework, and procurement risk, supplier/vendor selection using Digital service provider/ consultant selection, including technical qualification

Course Objectives:

- Introduce the fundamentals and operational procedures of procurement as they pertain to supply chain management.
- Formulate supplier relationship management strategies that are efficient.

Course Outcomes:

- Establish and maintain effective connections with suppliers to ensure seamless operations.
- Ensure cost-effective purchase without sacrificing quality.

Textbooks
- Purchasing and Supply Chain Management (2020), by Robert Handfield, Larry Giunipero, James Patterson, Robert Monczka

Warehouse and Distribution Management:
Warehouse layout and design principles, space utilization and storage systems, Automation and technology in warehouse design and warehouse operations, warehouse management systems, recent trends in warehouse and distribution management.

Textbook
- Warehouse Management: A Complete Guide to Improving Efficiency and Minimizing Costs in the Modern Warehouse (2017) by Gwynne Richards

Course Objective:

- Introduce warehouse management principles and practices to the supply chain.
- Understand the basics of warehouse design, layout, and inventory control to get the most out of your business.

Outcome:

- Demonstrate the skill to plan and oversee warehouse layouts that make storage, retrieval, and delivery as efficient as possible.
- Develop and execute plans to streamline distribution operations across the supply chain.

Enterprise Lab:
The following are the primary focuses of this lab: Real-world challenges in logistics, e-commerce, port management, inventory control, supply chain disruptions, and demand planning. It leverages mathematical and AI models, along with industry-standard software tools like CPLEX/GUROBI. Generative AI and deep learning techniques will be applied to problem-solving, with a focus on creating informative dashboards. Students will gain hands-on experience by tackling practical issues faced by startup owners, MSME (Micro, Small, and Medium-sized Enterprises) owners, and well-documented case studies, using operations research (OR), AI, simulation, and various modeling tools such as anyLogistix, Visualization tools such as Power BI, Tableau.

Course Objectives:

- Provide hands-on experience in implementing principles related to supply chain management in a commercial setting, whether it be a simulated or actual one.

Course Outcomes:

- Demonstrate competency in the application of supply chain management ideas within a commercial context.

Textbook

- Supply chain simulation and optimization with anyLogistix (2021) by Ivanov, Dmitry

Choose Elective-I subject from the list provided (Elective List: 1 to 17). The syllabus for each elective subject is provided at the end of the document.
Seventh Semester

The seventh semester of the B.Tech programme in Logistics and Supply Chain Management provides students with courses that prepare them for career success. "Digital Innovation and Technology in Supply Chain Management" examines how technology improves supply chain efficiency and competitiveness. "Intermodal Transportation and Containerization" covers modern transportation technology and practises, focusing on containerized shipping and multimodal transportation. "Global Trade Management" teaches international logistics concepts to prepare students for global logistics management. "SDGs and Logistics" promotes sustainable logistics practises in line with the SDGs. In addition, "Elective II" lets students specialise in personal or industry-relevant subjects. Finally, the "Internship" gives students excellent hands-on experience to confidently and competently face logistics and supply chain management difficulties.

S.No.	Course	Credit	L-T-P
1	Digital Innovation and Technology in Supply Chain Management	3	3-0-0
2	Intermodal transportation and containerization	3	3-0-0
3	Global trade management	3	3-0-0
4	SDGs and Logistics	3	
5	Elective II	3	3-0-0
6	Internship	3	0-0-6
	Total	**15 credits**	12-0-6

Digital Innovation and Technology in SCM:
The following are the primary focuses of this course: Importance of the digital revolution within supply chain partnerships, insight into the viewpoints, responsibilities, and choices of key stakeholders involved in reshaping supply chains in the digital age. Exploring the capabilities of digital supply chains, including enhancing visibility, flexibility, collaboration, and multichannel strategies. Examining the impact of technology, such as blockchain, the Internet of Things (IoT), artificial intelligence (AI), and digital twins, on supply chain processes and organizational structures. Analyzing digital platforms and assessing their performance. Investigating the challenges and opportunities presented by artificial intelligence-

driven supply chains. Delving into the concepts of Industry 4.0 and the broader scope of digital transformation. Supply Chain Digitization: Unifying Demand, Data Integration, Effective Forecasting, Adaptability, Segmentation, Smart S&OP, Roadmap, Case Studies.

Course Objectives:

- Introduce various digital technologies and innovations relevant to supply chain management.
- Explore strategies to integrate digital innovations for optimizing supply chain operations.
- Understand the impact of digital innovations on supply chain efficiency, transparency, and customer service.

Course Outcomes:

- Explain various digital innovations and their relevance to supply chain management.
- Implement strategies to integrate digital technologies for optimizing supply chain operations.
- Assess the impact of digital innovations on supply chain efficiency and customer satisfaction.

Textbooks
- Designing and Managing the Supply Chain: Concepts, Strategies, and Case Studies (2022) (4th Edition) by David Simchi Levi, Edith Simchi Levi, Ravi Shankar, Philip Kaminsky. McGraw Hill Education.
- The digital supply chain (2022) by MacCarthy, Bart L., and Dmitry Ivanov

Intermodal transportation and containerization:
The following are the primary focuses of this course: What is intermodal transportation, Multimodal and Intermodal transport: principle models and basic ideas, Global container system, Infrastructure of intermodal transportation, Transport modes' role in intermodal transportation, Rail and Road Transportation, Intermodal movements between seaports and the inland (hinterland) issues and processes, Container terminal handling quality, Container handling in main ports, The Agile Port System, Technical and Concept Innovations and their impact on intermodal design and network bundling, Designing intermodal trans. Systems. Intermodal trans. Modeling, Interconnectivity, and interoperability Inter-organizational coordination and information technology. Containerization, Standard container, Tank container, Open top container, Flat container, Refrigerated container, Advantages and Challenges of Containerization, Economies of scale, Infrastructure costs and stacking, Intermodal Transport Costs.

Course Objectives:

- Introduce principles and practices of utilizing multiple transportation modes in logistics.
- Explore strategies for efficient containerization and its role in logistics operations.
- Understand how intermodal transportation and containerization enhance supply chain efficiency.

Course Outcomes:
- Understand and explain principles governing the utilization of multiple transportation modes and containerization in logistics.
- Implement strategies for efficient intermodal transportation and containerization in logistics operations.
- Improve supply chain efficiency through the application of intermodal transportation and containerization.

Textbooks
- Monios, Jason, and Rickard Bergqvist, eds. Intermodal freight transport and logistics. CRC Press, 2017.
- Konings, J. W. The future of intermodal freight transport: operations, design, and policy. Edward Elgar Publishing, 2008.
- Lowe, David. Intermodal freight transport. Routledge, 2006.
- Fremont, A. (2013) Containerization and Intermodal Transportation, in J-P Rodrigue, T. Notteboom and J. Shaw (eds) The Sage Handbook of Transport Studies, London: Sage.

Global Trade Management:
The following are the primary focuses of this course: Comparative advantage: technology, factor proportions, Offshoring and outsourcing: offshoring, horizontal FDI, Vertical FDI, Customs controls: Export procedures and documents, Import procedures and documents, Methods of payments of Incoterms: Methods of payments, financing exporters and importers, instruments of payment, EXIM strategies and export marketing: EXIM business plan and strategy, export financing, import strategy, international marketing, Export incentive schemes: Duty exemption scheme, duty remission scheme, export promotion capital goods scheme, special economic zones.

Course Objectives:

- Introduce concepts and practices of managing global trade within supply chain operations.
- Understand international trade regulations and compliance requirements.
- Develop strategies to assess and mitigate risks in global trade operations.

Course Outcomes:

- Explain concepts and practices of managing global trade within supply chain operations.
- Ensure compliance with international trade regulations and requirements.
- Implement strategies to assess and mitigate risks in global trade operations.

Textbooks
- McBride, Stephen, and John Richard Wiseman, eds. Globalization and its Discontents. London: Macmillan, 2000.
- Gerber, James. International economics. Prentice Hall, 2010.
- Helpman, Elhanan. Understanding global trade. Harvard University Press, 2011.

SDGs and Logistics:

Introduction to SDGs and logistics, responsible supply chain management and ethical considerations within logistics, sustainable sourcing, eco-friendly packaging, social sustainability: employee rights, innovative working culture, fair treatment of workers, and community engagement, sustainable warehousing, procurement, Introduction to Logistics, Logistics System Design, Logistics Channels, Concept of Inventory related to logistics, Transit inventory, Warehousing, Warehousing decision models, Transportation models, Volume flow, 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, sustainable logistics, logistics 4.0, emerging trends in logistics.

Course Objectives:
- Explore strategies to integrate sustainability practices within logistics and supply chain operations.
- Understand and apply ethical and environmental considerations in logistics and supply chain management.

Course Outcomes:
- Implement strategies to integrate sustainability practices within logistics operations.
- Apply ethical and environmental considerations in logistics and supply chain management.

Textbooks:
- Sustainable Development Goals: Directive Principles For Sustainable India By 2030 (2019) By Ajay Ahlawat
- An Illustrated Guide To Sustainable Development & Goals (2022) by Renu Paswan
- Logistics & Supply Chain Management, (2022), Martin Christopher, Prentice Hall.
- Business Logistics: Supply Chain Management (2007) L Ronald H. Ballou, Prentice Hall.

Choose Elective-II subject from the list provided (Elective List: 1 to 17). The syllabus for each elective subject is provided at the end of the document.

Eight Semester

The students in the eighth semester of the B.Tech program in Logistics and Supply Chain Management participate in three critical components: "Industrial Training/Internship" for hands-on experience, "B.Tech Seminar" for research and industry insights, and "Project Work/Dissertation" for in-depth investigation. These factors are extremely important for future success in the industry, linking theory and practice.

S.No.	Course	Credit	L-T-P
1	Industrial Training/Internship	2	0-0-3
2	B.Tech Seminar	3	0-0-3
3	Project Work/Dissertation	4	0-0-4
	Total	**9 Credits**	0-0-10

List of Elective Courses

1. Supply Chain Analytics
2. Reverse Logistics
3. Lean Six Sigma in Logistics and Supply Chain
4. Retail Supply Chain Management
5. Humanitarian Logistics
6. Emerging Technologies in SCM
7. Agile project management
8. Competitive strategy for the supply chain
9. Green Transportation economics
10. Green supply chain management
11. Business law and ethics
12. Storage systems and equipment for warehouse 4.0
13. Industry 5.0
14. Robotics Process Automation
15. Stochastic operation research
16. Consumer choice models
17. Dynamic pricing and revenue management

Syllabus for elective subjects:

1. Supply Chain Analytics:
The following is the primary focus of the course: Discuss supply chain integration, Scope for supply chain analytics based on facilities location, inventory planning, transportation and distribution, information sharing, sourcing & procurement, pricing, etc. Based on uncertainty and dynamic environment. Optimization and trade-off analysis in centralization / decentralization, cross-docking, nearshore / offshore manufacturing, responsiveness / efficiency, etc.

Objectives:

- Utilise data analytics and its real-world applications to improve decision-making in the supply chain.
- Examine data from across various supply chain partners to increase efficacy and efficiency.
- Utilise analytics in the supply chain to forecast and make proactive decisions.

Outcomes:
- Use an analytical understanding to guide you in making sound decisions.
- Make better use of data analysis to achieve more efficiency throughout the supply chain.
- Develop models of forecasting for different situations that include supply chains.

Textbooks:

- Robertson, P. W. (2020). Supply chain analytics: using data to optimise supply chain processes. Routledge.
- Rahimi, I., Gandomi, A. H., Fong, S. J., & Ülkü, M. A. (Eds.). (2020). Big data analytics in supply chain management: Theory and applications. CRC Press.
- Vijayaraghavan, T. A. S. (2021). Supply chain analytics. Wiley.

2. Reverse Logistics:

The following is the primary focus of the course: Structural and Infrastructural differences between Forward Logistics and Reverse Logistics, Organization of reverse logistics – Strategic, Tactical, Operational level challenges, Mathematics of reverse logistics – network design, Customer relationships in reverse logistics, Employee relationships in reverse logistics, Sustainability and Reverse Logistics.

Objectives:
- Acquire strategies for handling returns and the procedures involved in reverse logistics.
- Provide strategies to cut back on reverse logistics expenses.

Outcomes:
- Simplify the procedures for handling returned merchandise.
- Reduce the amount of money spent on reverse logistics activities.

Textbooks:

- Ait-Kadi, D., Chouinard, M., Marcotte, S., & Riopel, D. (2012). Sustainable reverse logistics network: Engineering and management. Hoboken: Wiley.
- Dyckhoff, H., Lackes, R., & Reese, J. (Eds.). (2013). Supply chain management and reverse logistics. Springer Science & Business Media.

3. Lean Six Sigma in Logistics and Supply Chain:

The following is the primary focus of the course: Introduction to Lean Six Sigma, Various tools in Lean Six Sigma. The DMAIC process, Specific application of Lean six Sigma to Logistics and supply chain management.

Objectives:
- To understand Lean Six Sigma techniques to optimize supply chain operations.
- To understand the strategies to improve the quality level of goods and services in the supply chain.
- Reduce wastage and inefficiencies in all aspects of the supply chain.

Outcomes:
- Apply Lean Six Sigma techniques to enhance processes.
- Reduce waste and improve the effectiveness of operations.

Textbooks:

- Cudney, E. A., & Kestle, R. (2018). Implementing Lean Six Sigma throughout the supply chain: The comprehensive and transparent case study. Crc Press.
- Martin, J. (2014). Lean six sigma for supply chain management. McGraw Hill.
- Martin, J. W. (2007). Operational excellence: using lean six sigma to translate customer value through global supply chains. CRC Press.

4. Retail Supply Chain Management:

The following is the primary focus of the course: Challenges for Retail Logistics, Brick and mortar versus E-tail logistics, Global Aspects in Retail Supply Chains, Supply chains for fashion footwear & luxury items, Supply chains for food products, Merchandizing, Sustainability in the retail supply chain.

Objectives:
- Understand and manage inventory effectively within retail operations.
- To develop strategies for accurate demand forecasting in the retail sector.

Outcomes:
- Improve inventory levels for efficient retail operations.
- Forecast demand accurately to meet customer needs.
- Determine collaborative relationships with suppliers for retail success.

Textbooks:

- Topps, J., & Taylor, G. (2018). Managing the Retail Supply Chain: Merchandising Strategies that Increase Sales and Improve Profitability. Kogan Page Publishers.
- Myerson, P. (2020). Omni-Channel Retail and the Supply Chain: Working Together for a Competitive Advantage. CRC Press.
- Fernie, J., & Sparks, L. (Eds.). (2018). Logistics and retail management: emerging issues and new challenges in the retail supply chain. Kogan page publishers.

5. Humanitarian Logistics:

The following is the primary focus of the course: Introduction to humanitarian logistics, Humanitarian issues in general – natural disasters – earthquakes, hurricanes, famines, floods, etc., civil wars and migrants issues, asylum seekers, etc., Logistics requirement in various humanitarian crises, Role of local, provincial / State, and Federal / Central Government, Role of NGOs, Logistics Decision support systems, Resource requirement, resource planning, Optimization and Cost analysis.

Objectives:
- To understand strategies for effective logistics during humanitarian crises.
- To understand the significance of the resilience of supply chains in humanitarian contexts.
- To know the role of Efficiently allocating resources for humanitarian aid delivery.

Outcomes:
- Implement logistical strategies for disaster response.
- Develop supply chains capable of withstanding crises.
- Allocate resources efficiently for humanitarian aid.

Textbooks:

- Tatham, P., & Christopher, M. (Eds.). (2018). Humanitarian logistics: Meeting the challenge of preparing for and responding to disasters. Kogan Page Publishers.
- Kovács, G., Spens, K., & Moshtari, M. (Eds.). (2017). The Palgrave handbook of humanitarian logistics and supply chain management. Springer.
- Rand, G. (2010). Humanitarian Logistics, INSEAD Business Press.

6. Emerging Technologies in SCM

The following is the primary focus of the course: Digital transformation of supply chain relationships. In-depth understanding of the perspectives, roles, and decisions of relevant stakeholders in transforming supply chains in the digital era. Digital supply chain capabilities (Visibility, Agility, Collaboration, Omnichannel), the role of technology (Blockchain, IoT, AI, Digital Twins), processes and organizations, as well as digital platforms and performance. Artificial Intelligence Driven SCs: Challenges and
Opportunities. Industry 4.0 and Digital Transformation. Supply Chain Digitization: Unified View of Demand, Understand how to integrate internal and external data, Develop an Effective

demand forecasting process that brings together supply planning, financial planning, sales, and trade planning, Understand effective mechanisms to ensure adaptability, Supply Chain Segmentation, Smart S&OP, Smart Execution, and Control Tower, Develop a roadmap for a successful supply chain digitization: The Journey to Success; Organizational structure; Change Management. Relevant case studies of digitally transformed supply chains, long-term competitive advantage of successful case studies, through operations and digital enhanced value generation.

Objectives:
- To understand the implications of emerging tech like IoT, AI, and blockchain in supply chains.
- To develop an understanding of supply chain operations through technology adoption.

Outcomes:
- Apply and make use of cutting-edge technology in supply chain management.
- Boost agility and efficiency by implementing technology.
- Foster an innovative culture to support further tech adoption.

Textbooks

- Designing and Managing the Supply Chain: Concepts, Strategies and Case studies (4th Edition) by David Simchi Levi, Edith Simchi Levi, Ravi Shankar, Philip Kaminsky. McGraw Hill Education. Copyright © 2022
- MacCarthy, Bart L., and Dmitry Ivanov, eds. The digital supply chain. Elsevier, 2022.

7. Agile project management
The following is the primary focus of the course: Introduction to Agile project management; Agile Principles and Mindset; Agile Methodologies; Value Driven Delivery; Leadership and team performance; Adaptive Planning; Continuous Improvement; Stakeholder Engagement; Lean Thinking; Agile Leadership and Culture; Agile Project Management Tools.

Objectives:
- To understand methodologies for agile project management.
- To understand the various project management approaches within supply chains.

Outcomes:
- Implement agile methodologies for adaptable supply chain processes.
- Develop the capability to swiftly respond to changing market dynamics.

Textbooks:
- Cohn, Mike. Agile estimating and planning. Pearson Education, 2005.

- Hammarberg, Marcus, and Joakim Sunden. Kanban in action. Manning Publications Co., 2014.

8. Competitive Strategy for the Supply Chain:

The following is the primary focus of the course: Strategy driven supply chain, Roadmap and design for Supply Chain strategies, Integrating design with Execution, Processes, People, and Finance, Towards Excellence and Sustainability in Supply Chain Strategy.

Objectives:

- To understand the competitive strategies within the context of supply chain management.
- To gain an understanding of the strategies to differentiate the supply chain for competitive advantage.

Outcomes:

- To align supply chain strategies with overall business goals.
- To develop supply chain strategies that offer a competitive advantage.

Textbooks:

- Robertson, P. W. (2021). Supply chain processes: developing competitive advantage through supply chain process excellence. Routledge.

- DeSmet, B. (2021). The Strategy-Driven Supply Chain: Integrating Strategy, Finance and Supply Chain for a Competitive Edge. Kogan Page Publishers.
- Yücesan, E. (Eds.) (2016). Competitive Supply Chains: A Value-Based Management Perspective. Springer.

9. Green Transportation Economics:

The following is the primary focus of the course: Importance of green logistics and transportation, Impact of collection points and warehouses on economics and sustainability, Sustainability and green transport fleet selection, Economics, and environmental trade-off in all four modes of transport – air, water, rail, road.

Objectives:
- To understand the various sustainable and eco-friendly transportation options.
- To develop a basic understanding of economic viability while considering environmental impact.
- To understand and comply with regulations for green transportation.

Outcomes:
- Ensure compliance with environmental regulations in transportation.

Textbooks:

- Fahimnia, B., Bell, G. H. M., Hensher, D., A., Sarkis, J. (Eds.) (2015) Green Logistics and Transportation: A Sustainable Supply Chain Perspective, Springer.
- Psaraftis, H. N. (2018). Green Transportation Logistics: The Quest for Win-Win Solutions. Springer

10. Green supply chain management

The following is the primary focus of the course: What is green supply chain management? Supplier collaboration and development for Green SCM, Green procurement and purchasing practices, Regional and global level sustainability differences and practices, closing the loop – green reverse logistics.

Objectives:
- To understand the impact of the ecological footprint across the supply chain.
- To understand the role of stakeholders in commitment to green supply chain initiatives.

Outcomes:
- Reduce the environmental impact associated with supply chain operations.
- Implement sustainable practices in every stage of the supply chain.
- Facilitate stakeholder participation in endorsing green supply chain initiatives.

Textbooks:

- Sarkis, J., & Dou, Y. (2017). Green supply chain management: A concise introduction. Routledge.
- Achillas, C., Bochtis, D. D., Aidonis, D., & Folinas, D. (2018). Green supply chain management. Routledge.

11. Business law and ethics

The following is the primary focus of the course: Introduction to business laws and ethics, theories of business ethics, ethical dilemmas, ethical decision, globalisation, and business Ethics, corporate ethics, corporate social responsibility, ethics of consumer protection, environmental ethics, role of various agencies in ensuring ethics in organization, ethics and Indian business, marketing ethics.

Objectives:
- To understand legal frameworks governing business and supply chain operations.
- To understand the strategies to mitigate legal and ethical risks within supply chains.

Outcomes:
- Comply with legal and ethical considerations in business and supply chain decisions.
- Strategies to mitigate legal and ethical risks effectively within supply chains.

Textbooks
- Business Ethics: An Indian Perspective, 3e (2019) by A C Fernando, K P Muralidheeran, E K Satheesh
- Business Law, Ethics & Communication (2015) by Kapoor G.K. Gupta C.B.

12. Storage systems and equipment for warehouse 4.0

The following is the primary focus of the course: Warehouse structure and design, Receiving and put away, Smart pallete storage and handling systems, Use of Robots as AGVs in warehouses, Case picking, Handling of atypical conditions – spillage, breakage, etc., Digital systems in warehouses and material handling.

Objectives:
- To understand the modern storage systems and equipment for advanced warehouses.
- To understand various approaches to enhance warehouse operations and productivity.
- To understand the implications of Industry 4.0 technologies for warehouse operations.

Outcomes:
- Implement modern storage systems for efficient warehouse operations.
- Align warehouse technology with Industry 4.0 standards.

Textbooks:
- Frazelle, E. H. (2016). World-class warehousing and material handling. McGraw-Hill Education.
- Ten Hompel, M., & Schmidt, T. (2008). Warehouse management. Springer Berlin Heidelberg.

13. Industry 5.0

The following is the primary focus of the course: Evolution of Industrial revolutions, Industry 4.0 and Industry 5.0, Transformation of Industry 5.0 in various sectors – Automotive, Heavy engineering, Light engineering, Hi-Tech electronics manufacturing, Effect on allied sectors – healthcare, transportation, logistics, etc.

Objectives:
- To understand the evolution and future of manufacturing in the Industry 5.0 ecosystem.
- To understand the strategies to enhance human workers and advanced technologies collaboration.

Outcomes:
- To develop strategies to ready for the next wave of industrial revolution in manufacturing.
- To introduce innovative and sustainable practices within Industry 5.0.

Textbooks:

- Elangovan, U. (2021). Industry 5.0: The future of the industrial economy. CRC Press.
- Show, P. L., Chew, K. W., & Ling, T. C. (Eds.). (2021). The prospect of industry 5.0 in biomanufacturing. CRC Press.

14. Robotics Process Automation

The following is the primary focus of the course: Automation of Routine Tasks with Robots, Sequence, Flowchart, Control Flow, Memorise, and Data Manipulation, manage incoming User Requests and Helper Robots, Handling Errors, Debugging, and Logging, Controlling, and updating the software, The bot's deployment, and upkeep.

Objectives:

- To understand the implications of adopting robotic solutions for automating supply chain and logistics processes.

Outcomes:

- Apply robotics to automate various supply chain and logistics tasks.
- Improve efficiency and accuracy through robotics process automation.
- Reduce errors and risks associated with manual processes.

Textbooks

- Introduction To Robotics Process Automation (2023) by Abhishek Arora and Dr. Ruchi Kawatra
- Learning Robotic Process Automation: Create Software robots and automate business processes with the leading RPA tool – UiPath (2018) by Alok Mani Tripathi

15. Stochastic operation research

The following is the primary focus of the course: Introduction to Advanced Operations Research; Problem Formulation and Model Building Techniques; Introduction to Nonlinear Programming and Convex Optimization; Duality and Sensitivity Analysis; Integer Linear Programming and Mixed-Integer Linear Programming (MILP); Network Optimization: Shortest Path, Max Flow, and Assignment Problems; Unconstrained Optimization: Gradient Descent, Newton's Method; Constrained Optimization: Lagrange Multipliers, KKT Conditions; Convex Optimization: Properties, Algorithms, and Applications; Introduction to Stochastic Processes; Stochastic Programming: Two-Stage and Multi-Stage Problems; Markov Decision Processes and Reinforcement Learning; Multi-Objective Optimization; Pareto Optimality and Efficiency; Goal Programming; Evolutionary Algorithms for Multi-Objective Optimization; Introduction to Game Theory; Cooperative and Non-Cooperative Games;

Applications of Game Theory in Supply Chain; Monte Carlo Simulation; Discrete-Event Simulation for Complex Systems.

Objectives:

- To understand the different probability and statistical methods for supply chain decision-making.
- To understand the strategies for managing uncertainties within supply chain operations.

Outcomes:

- Apply probability models to address uncertainties in supply chains.
- Analyze and mitigate risks associated with uncertain supply chain variables.
- Develop strategies for optimizing operations under uncertainty.

Textbooks
- Hillier F.S. and Liebermann G.J. (2002). Introduction to Operations Research, McGraw Hill.
- Taha, Hamdy A. Operations research: an introduction. Pearson Education India, 9th edition.

16. Consumer choice models:

The following is the primary focus of the course: Fundamental principles of consumer behavior, utility theory, preferences, and decision-making processes, cognitive and psychological factors, segmentation, biases, branding, pricing, and digital influences, ethical and sustainability considerations, emerging trends like neuromarketing.

Objectives:
- To understand the various factors influencing consumer choices in supply chains.
- To develop an understanding of the models to predict and understand consumer preferences.

Outcomes:
- Understand factors influencing consumer choices within supply chains.
- Predict consumer preferences to align supply chain strategies.
- Develop strategies based on insights derived from consumer choice models.

Textbooks
- Interpreting Consumer Choice: The Behavioural Perspective Model (Routledge Interpretive Marketing Research) (2013) by Gordon Foxall
- Consumers' Choice Model: An Alternative Meta-Goals Model Focused on Cognitive Effort (2012) by Jisook April Park

17. Dynamic pricing and revenue management:

The following is the primary focus of the course: Introduction to Revenue Management, Predicting Demand, Foundations of Pricing, Dynamic Pricing Approaches, economics for dynamic pricing and revenue management, demand forecasting, optimization for Revenue Management and network revenue management.

Objectives:
- To understand the importance of dynamic pricing models for maximizing revenue in supply chains.
- To understand the strategies to optimize revenue through pricing mechanisms.

Outcomes:
- Apply pricing strategies responsive to market dynamics.
- Adjust pricing strategies in response to market fluctuations.

Textbooks
- Talluri, K.T. and G.J. van Ryzin. (2004) The Theory and Practice of Revenue Management.
- Kluwer Academic Publishers.
- Pricing and Revenue Optimization (2005) by Robert L. Phillips. Stanford Business Book.