UNIVERSITY OF MADRAS

MASTER OF BUSINESS ADMINISTRATION (MBA) DEGREE PROGRAMME

SYLLABUS WITH EFFECT FROM 2023-2024

934E913: Specialization Courses in Operations Management

Subject Code	Subject Name	Category	L	T	P	O	Credits	Inst. Hours	Marks		
									CIA	External	Total
934E913A	Project Management	Elective	3	-	-	-	3	3	25	75	100
934E913B	Total Quality Management	Elective	3	-	-	-	3	3	25	75	100
934E913C	Six sigma	Elective	3	-	-	-	3	3	25	75	100
934E913D	Materials Management	Elective	3	-	-	-	3	3	25	75	100
934E913E	Service Operations Management	Elective	3	-	-	-	3	3	25	75	100
934E913F	Process Management	Elective	3	-	-	-	3	3	25	75	100
934E913G	Product design	Elective	3	-	-	-	3	3	25	75	100
934E913H	Supply Chain Analytics	Elective	3	-	-	-	3	3	25	75	100
934E913I	Operations Strategy	Elective	3	-	-	-	3	3	25	75	100

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Subject Code	Subject Name	Category	L	T	P	O	Credits	Inst. Hours	Marks		
									CIA	External	Total
934E913A	**Project Management**	Elective	3	-	-	-	3	45	25	75	100

Course Objectives	
C1	To enable the students to understand and communicate on the basic concepts of project management
C2	To enable the students to determine the scope, time and cost of project management
C3	To learn about the quality, and to classify and analyze the resources, get appraised on the stakeholders and to get appraised on the procurement management
C4	To appraise the students on the importance of risk and communication management
C5	To enable the students to adapt, understand, and devise methods used to manage, measure and evaluate the performance of project

SYLLABUS

UNIT	Details	No. of Hours	Course Objectives
I	**Project management overview:** Definition and examples of projects, Key features of projects, Life cycle of projects, Typical project problems, Human issues in Projects, Role of Computers in Projects - Project identification and screening: (Brainstorming, Strength, and weaknesses in the system, environmental opportunities and threats, Identification and screening) – Project Appraisal and Selection	9	C1
II	**Scope, Time and Cost Management:** Project Organization Structure, Culture – Scope Management – Defining the Project – SOW - WBS and PBS – Time Management – Network Diagram – Forward Pass and Backward Pass Critical path – PERT and CPM - AOA and AON methods – tools for Project Network – Estimation Techniques - Cost Management – Earned Value Method.	9	C2
III	**Quality, Resource, Stakeholder and Procurement Management:** Quality assurance and quality control, project audit and quality audit - Methods of enhancing quality: the different types of testing, inspections,	9	C3

	reviews, standards. Management and control of testing - Human Resource Management - Scheduling Resources – Resource Allocation methods - Reducing Project duration: Project Crashing and resource-leveling methods - Leadership styles and skills – Problem-solving skills - Project Manager roles and responsibilities –Stakeholder Management: Identify Stakeholders - Plan Stakeholder Management – Manage Stakeholder Engagement - Control Stakeholder Engagement – Procurement Management.		
IV	**Risk Management and Communication Management:** Risk identification: types of risk, risk checklists-Risk prioritization -Risk management tactics, Including risk avoidance, risk transfer, risk reduction, risk mitigation and contingency planning- Risk registers – Communication Management	9	C4
V	**Performance Management:** Project Integration - Progress and Performance measurement and evaluation – Project monitoring information system, developing a status report and other control issues - Project audit and closure – audit process, project closure, team, team member and project manager evaluations - International Projects – environmental factors, cross-cultural considerations, selection and training for international projects - Future likely trends in Project management – certain unresolved issues and project management career issues.	9	C5
	Total	**45**	

Course Outcomes

Course Outcomes	On completion of this course, students will;	**Program Outcomes**
CO1	Be able to understand and communicate on the basic concepts of project management	P04, P06
CO2	Be able to determine the scope, time and cost of project management	P02, P04, P06
CO3	Be to learn about the quality, and to classify and analyze the resources, get appraised on the stakeholders and to get appraised on the procurement management	P02, P04, PO6, P07
CO4	Be able to appraise the students on the importance of risk and communication management	P01, PO2, P04, P06, PO7
CO5	Be able to enable the students to adapt, understand, and devise methods used to manage, measure and evaluate the performance of project	P01, P02, PO4, P06, P07

Reading List	
1.	Josepth Heagney, Fundamentals of Project Management, 5th Edition, Amacom, 2011
2.	Judy Payne, Steve Simister, Ellen J. Roden, Managing Knowledge in Project Environments, Routledge, 2019
3.	International Journal of Project Management, Elsevier
4.	Project Management Journal, Wiley Online Library
References Books	
1.	Narendra Singh (2019), Project management & control, first edition, Himalaya publishers.
2.	Project management – A Managerial Approach (2020) by Jack R. Meredith, Scott M. Shafer, Samuel J. Mantel Jr., First edition, Wiley.
3.	James P Lewis, (2012), Fundamentals of Project Management, 4th edition, AMACOM.
4.	Thomas Mochal, Jeff Mochal, (2011), Lessons in Project Management, 2nd edition, Apress.
5.	Project Management Institute, (2013), A Guide to Project Management Body of Knowledge, 5th edition, Project Management Institute, Project Management: A Managerial Approach, 11th Edition.

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**
CO 1				3		3		
CO 2		2		3		3		
CO 3		2		2		3	3	
CO 4	2	2		2		3	2	
CO 5	3	3		3		3	3	

3-Strong 2-Medium 1-Low

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Subject Code	Subject Name	Category	L	T	P	O	Credits	Inst. Hours	Marks		
									CIA	External	Total
934E913B	**Total Quality Management**	Elective	3	-	-	-	3	3	25	75	100

Course Objectives	
C1	To provide insights to the students TQM framework and customer focus on quality.
C2	To throw light and build knowledge on the principles and philosophies of quality management
C3	To analyze the statistical process control, process capability and reliability concepts in quality management
C4	To create awareness and importance of QFD process, old and new quality management tools.
C5	To elucidate on ISO-QMS, formulate quality audits and build TQM culture.

SYLLABUS

UNIT	Details	No. of Hours	Course Objectives
I	**Introduction to Quality Management:** Definitions – TQM framework, benefits, awareness and obstacles. Quality – vision, mission and policy statements. Customer Focus – customer perception of quality, Translating needs into requirements, customer retention. Dimensions of product and service quality. Cost of quality.	9	C1
II	**Principles and Philosophies of Quality Management:** Overview of the contributions of Deming, Juran Crosby, Masaaki Imai, Feigenbaum, Ishikawa, Taguchi techniques – introduction, loss function, parameter and tolerance design, signal to noise ratio. Concepts of Quality circle, Japanese 5S principles and 8D methodology.	9	C2
III	**Statistical Process Control and Process Capability:** Meaning and significance of statistical process control (SPC) – construction of control charts for variables and attributed. Process capability – meaning, significance and measurement – Six sigma concepts of process capability. Reliability concepts – definitions, reliability in series and parallel, product life characteristics curve. Total productive maintenance (TMP) – relevance to TQM,	9	C3

	Terotechnology. Business process re-engineering (BPR) – principles, applications, reengineering process, benefits and limitations.		
IV	**Tools and Techniques for Quality Management:** Quality functions development (QFD) – Benefits, Voice of customer, information organization, House of quality (HOQ), building a HOQ, QFD process. Failure mode effect analysis (FMEA) – requirements of reliability, failure rate, FMEA stages, design, process and documentation. Seven old (statistical) tools. Seven new management tools. Bench marking and POKA YOKE.	9	C4
V	Quality Systems Organizing and Implementation: Introduction to ISO 9001, 9004– quality management systems – guidelines for performance improvements. Quality Audits. TQM culture, Leadership – quality council, employee involvement, motivation, empowerment, recognition and reward- Introduction to software quality.	9	C5
	Total	**45**	

Course Outcomes		
Course Outcomes	On completion of this course, students will;	**Program Outcomes**
CO1	Have insights to the students TQM framework and customer focus on quality.	P01, P02, P04, P06
CO2	Be able to build knowledge on the principles and philosophies of quality management	P03, P05, P06
CO3	Analyze the statistical process control, process capability and reliability concepts in quality management	P02, P06, P07
CO4	Be able to create awareness and importance of QFD process, old and new quality management tools.	P01, P04, P06
CO5	Elucidate on ISO-QMS, formulate quality audits and build TQM culture.	P03, P05, P07, P08

Reading List	
1.	The TQM Journal, Emerald Insight
2.	International Journal of Quality, & Reliability Management, Emerald Publishing
3.	Sanjay L. Ahire,Robert Landeros,Damodar Y. Golhar, Components of successful total quality management, The TQM Magazine, Emerald Insight
4.	Juan José Tarí , Total Quality Management: A Literature Review and an agenda for future research, Wiley Online Library
References Books	
1.	Panneerselvam.R, Sivasankaran. P, Quality Management, PHI Learning, 2014.

2.	Shridhara Bhat K, Total Quality Management – Text and Cases, Himalaya Publishing House, First Edition, 2002.
3.	PoornimaM.Charantimath, Total Quality Management, Pearson Education, 2nd Edition, 2011.
4.	Douglas C. Montgomory, Introduction to Statistical Quality Control, Wiley Student Edition, 4th Edition, Wiley India Pvt Limited, 2008.
5.	Dale H.Besterfield et al, Total Quality Management, 3rd edition, Pearson Education, First Indian Reprints, 2004

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**
CO 1	3	3		2		2		
CO 2			3		2	3		
CO 3		2				3	3	
CO 4	2			3		2		
CO 5			3		3		2	3

3-Strong 2-Medium 1-Low

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Subject Code	Subject Name	Category	L	T	P	O	Credits	Inst. Hours	Marks		
									CIA	External	Total
934E913C	**Six Sigma**	Elective	3	-	-	-	3	3	25	75	100

Course Objectives	
C1	To acquaint the students with the fundamentals of Six Sigma philosophies, techniques and apply the DMAIC approach to improving business processes
C2	To gain insights and practice process mapping and measurement practices.
C3	To connect data analysis and statistics to identify root cause of problems along with ways to brainstorm improvement ideas and prioritize them
C4	To appraise on the scientific tools for quality improvement and demonstrate off-line quality control for quality improvement.
C5	To develop knowledge of control charts for attributes and process capability analysis.

SYLLABUS

UNIT	Details	No. of Hours	Course Objectives
I	OVERVIEW OF SIX SIGMA Underlying concept of variation, the relationships to related Quality Management approaches, basic Six Sigma tools, international ISO standards for Six Sigma, and the nature of Six Sigma improvement projects, DMAIC Methodology Overview, Financial Benefits of Six Sigma, The Impact of Six Sigma to The Organization. Project Definition: Project Charter, developing a Business Case, chartering a Team, Defining Roles and Responsibilities, Gathering Voice of the Customer, Support for Project, Translating Customer Needs into Specific Requirements (CTQs), SIPOC Diagram.	9	C1
II	MEASURE Process Mapping (As-Is Process), Data Attributes (Continuous Versus Discrete), Measurement System Analysis, Data Collection Techniques, Data Collection Plan, Understanding Variation, Measuring Process Capability, Calculating Process Sigma Level, Visually Displaying Baseline Performance. Statistics, Probability and Probability Distribution, Measurement System Analysis, Process Performance Analysis.	9	C2
III	ANALYZE Visually Displaying Data (Histogram, Run Chart,	9	C3

	Pareto Chart, Scatter Diagram), Detailed (Lower Level) Process Mapping of Critical Areas, Value-Added Analysis, Cause and Effect Analysis (a.k.a. Fishbone, Ishikawa), Affinity Diagram, Data Segmentation and Stratification, Verification of Root Causes, Determining Opportunity (Defects and Financial) for Improvement. Data Analysis, Test of Hypothesis, Design of Experiment, FMEA and QFD.		
IV	IMPROVE Design of Experiment, FEMA and QFD, Brainstorming, Multi-Voting, Quality Function Deployment (House of Quality), Selecting a Solution, Failure Modes and Effects Analysis (FMEA), Poka Yoke (Mistake Proofing Your New Process), Piloting Your Solution, Implementation Planning. Control: Assessing the Results of Process Improvement, Statistical Process Control (SPC) Overview, developing a Process Control Plan, Documenting the Process.	9	C4
V	CONTROL Statistical Process Control, Operating Characteristic (OC) Curve for Variable Control, charts Attribute Control charts, Minitab Application, Acceptance Sampling, Design for Six Sigma (DFSS), DMADV, DMADOV and DFX	9	C5
	Total	**45**	

Course Outcomes		
Course Outcomes	On completion of this course, students will;	**Program Outcomes**
CO1	Get themselves acquaint with the fundamentals of Six Sigma philosophies, techniques and apply the DMAIC approach to improving business processes	PO1, PO2, PO5
CO2	Gain insights and practice process mapping and measurement practices.	PO2, P06
CO3	Be able to connect data analysis and statistics to identify root cause of problems along with ways to brainstorm improvement ideas and prioritize them	PO2, P05, PO6
CO4	Be able to appraise on the scientific tools for quality improvement and demonstrate off-line quality control for quality improvement.	PO5, PO6
CO5	Develop knowledge of control charts for attributes and process capability analysis.	PO2, PO6, PO8

Reading List	
1.	https://www.mtcbh.net/mt-content/uploads/2017/01/6-sigma-handnbook.pdf

2.	https://www.apo-tokyo.org/00e-books/IS-09_SixSigma/IS-09_SixSigma.pdf
3.	M.K. Tiwari, Effective Decision Support for Lean and Six Sigma Methodologies, International Journal of Production Research, 2008
4.	Arnheiter, E.D. and Maleyeff, J., 2005. The integration of lean management and Six Sigma. The TQM Magazine, [e-journal] 17.
References Books	
1.	Mitra, Amitava. Fundamentals of Quality Control and Improvement, Wiley India Pvt Ltd, third Edition, 2013.
2.	Montgomery, D C. Design and Analysis of Experiments, Wiley, 10th Edition, 2019.
3.	T. M. Kubiak and Donald W. Benbow, The Certified Six Sigma Black Belt Handbook, Pearson Publication, 3rd Edition, 2018.
4.	Montgomery, D C. Statistical Quality Control: A modern introduction, Wiley, 7th Edition, 2013.
5.	Pyzdok, Thomas (2003) "The Six-Sigma Guide for GB, BB and Managers at all levels", McGraw Hill, New York.
6.	Howard S. Gitlow and David M. Levine, Six Sigma for Green Belts and Champions, Pearson Education, Inc. First Edition, July 2004

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**
CO 1	3	2			3			
CO 2		3				2		
CO 3		2			3	3		
CO 4					3	2		
CO 5		2				3		2

3-Strong 2-Medium 1-Low

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Subject Code	Subject Name	Category	L	T	P	O	Credits	Inst. Hours	Marks		
									CIA	External	Total
934E913D	**Materials Management**	Elective	3	-	-	-	3	3	25	75	100

Course Objectives	
C1	Visualize the students on the basic concepts materials management
C2	Discover the techniques of inventory management
C3	Learn on the evaluation of vendors and organize procurement
C4	Learn and evaluate the importance of materials handling
C5	Inspect and Integrate all the quality management audits

SYLLABUS

UNIT	Details	No. of Hours	Course Objectives
I	**INTRODUCTION** Introduction to Materials Management, Production Planning: Demand Forecasting Aggregate planning, Master Scheduling, BOM, MRP, Capacity Planning, Production Scheduling.	9	C1
II	**INVENTORY MANAGEMENT** Stores and Warehousing, Stock assessment, Cost of Inventory, Selective Inventory Control, MUSIC 3D, JIT Inventory Management.	9	C2
III	**PROCUREMENT & VENDOR MANAGEMENT** Foundations of Strategic Sourcing and Supply Management, P2P Process, Strategy Development; Procurement: Ordering Quantity, Procurement Types, Steps of Procurement, Tendering & Bid evaluation process, Negotiation & Ordering, Importing, Procurement Cost; Vendor Management: Vendor Development, Vendor Rating, and Selection and Analytics Hierarchy Process (AHP), Supplier Performance Management.	9	C3
IV	**MATERIAL HANDLING** Material Handling System: Cranes, Conveyors, Feeders, Pipelines, Processing of materials and Cost.	9	C4
V	**QUALITY MANAGEMENT** Quality Management and Audit; Supply Quality Management; Inspection, Acceptance Sampling, Quality Control of supplies; Supply Base Integration.	9	C5
	Total	**45**	

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Course Outcomes		
Course Outcomes	On completion of this course, students will;	**Program Outcomes**
CO1	Visualize the basic concepts materials management	PO1, PO2, PO5, PO7, PO8
CO2	Discover the techniques of inventory management	PO1, PO3, PO5, PO6
CO3	Learn on the evaluation of vendors and organize procurement	PO2, PO4, PO6, PO7
CO4	Learn and evaluate the importance of materials handling	PO1, PO3, PO6, PO8
CO5	Inspect and Integrate all the quality management audits	PO1, PO2, PO5, PO6
Reading List		
1.	International Journal of Purchasing and Materials Management - Science gate	
2.	Introduction to materials management - JRT Arnold, SN Chapman - books.google.com	
3.	International Journal of Purchasing and Materials Management	
4.	Handbook of materials management – By Gopalakrishnan.	
References Books		
1.	Saravanavel. P and Kavitha G, (2019) Materials Management, 1st edition, Margham Publications	
2.	Saravanvel P and Sumathi S, (2019), Production and Materials Management, 2nd Edition, Margham Publications	
3.	Materials Management: An Integrated Approach. Gopalakrishanan. Paperback	
4.	Fred B. Sollish, John Semanik, (2012),The Procurement and Supply Manager's Desk Reference, 2nd edition, NJ: John Wiley & Sons.	
5.	Hiroyuki Hirano, (2009), JIT Implementation Manual (Series), 2nd edition, FL: CRC Press.	
6.	Robert Handfield, (2006), Supply Market Intelligence, Auerbach Publications (Taylor and Francis).	

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**
CO 1	3	2			3		3	3
CO 2	3		2		3	3		
CO 3		3		2		3	2	
CO 4	2		3			2		3
CO 5	3	2			2	2		

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Subject Code	Subject Name	Category	L	T	P	O	Credits	Inst. Hours	Marks		
									CIA	External	Total
934E913E	**Service Operations Management**	Elective	3	-	-	-	3	3	25	75	100

Course Objectives	
C1	To familiarize and recognize service operations and strategy
C2	To determine and establish a good service design
C3	To calculate waiting time and organize efficient waiting time management
C4	To appraise on the service quality, managing service experience, six sigma for service process improvement, and yield management
C5	To compile knowledge on queuing models and capacity planning.

SYLLABUS

UNIT	Details	No. of Hours	Course Objectives
I	**Introduction to Services:** Introduction to Services - Service Operations and Strategy-Formulating Strategy-New Service Development and Managing Service	9	C1
II	**Service Design:** Designing the Service Delivery System - Selecting the Location for a Service Operation-Managing the Service Experience-Service Site Performance Evaluation-Outsourcing and Offshoring	9	C2
III	**Waiting Time Management:** Waiting Time Management -Front-Office / Back-Office Interface-Team Meeting/Work Time- Using Technology in Service Operations	9	C3
IV	**Quality Management** - Revenue, Quality - Service Quality & Strategy – SERVQUAL - Managing Service Experience- Six Sigma for service process improvement, Managing Capacity and Demand-Yield Management	9	C4
V	**Queuing Models** Queuing Models and Capacity Planning-Tools for Managing Service	9	C5
	Total	**45**	

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Course Outcomes		
Course Outcomes	On completion of this course, students will;	
CO1	Familiarize and recognize service operations and strategy	PO1, PO2, PO5, PO6, PO7
CO2	Determine and establish a good service design	PO1, PO2, PO5, PO6, PO7
CO3	Calculate waiting time and organize efficient waiting time management	PO5, PO6
CO4	Appraise on the service quality, managing service experience, six sigma for service process improvement, and yield management	PO2, PO6
CO5	Compile knowledge on queuing models and capacity planning.	PO6, PO7
Reading List		
1.	Stephen Mclaughlin, Service Operations Management, Researchgate	
2.	Johnston Robert, Clark Graham, Shulver Michael, Service Operations Management: Improving Service Delivery, Pearson Education, 2017	
3.	Journal of Service Management, Emerald Insight	
4.	Journal of Operations Management, Wiley Publications.	
References Books		
1.	Collier, Evans, Ganguly, (2016), Operations management– A South Indian Perspective, 3rd edition, Cengage Learning.	
2.	Johnston (2017), Service Operations Management Improving Service Delivery, 4Th Edition, Pearson India.	
3.	Richard D Metters, (2012), Successful Service Operations Management, 2nd edition, Cengage Learning.	
4.	James A. Fitzsimmons, Mona J. Fitzsimmons, (2014), Service Management: Operations, Strategy, Information Technology, 8th edition, McGraw Hill.	
5.	Haksever C, Render B, Russell S. R,Murdick R. G, (2007), Service Management and Operations, 2nd edition, Prentice Hall.	

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**
CO 1	2	2			3	3	3	
CO 2	2	2			3	3	3	
CO 3					3	2		
CO 4		2				3		
CO 5						3	3	

3-Strong 2-Medium 1-Low

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Subject Code	Subject Name	Category	L	T	P	O	Credits	Inst. Hours	Marks		
									CIA	External	Total
934E913F	**Process Management**	Elective	3	-	-	-	3	3	25	75	100

Course Objectives	
C1	To familiarize students with fundamentals of process management
C2	To provide inputs on the process flow, variability and principles
C3	To anzluze process modelling and simulation
C4	To summarize innovative manufacturing concepts
C5	To develop process dash boards, process metrics, benchmarking and employ data analytics.

UNIT	Details	No. of Hours	Course Objectives
I	**Introduction:** The Process View of Organizations - Service and manufacturing processes – Nature of Service Processes, process structure in services, Process structure in Manufacturing, Value Chain – Core and support processes, adding value with processes; Managing Processes – process strategy –organization perspective, major process decisions; Embedding strategy into Manufacturing Processes - Process Competencies, Process Design – major factors, technology choice	9	C1
II	**Process Flow:** Process Flow, Key Measures, Flow Time, Flow Rate, Process flow analysis – tools; process-Mapping, Inventory Analysis, Process Flow Chart, Flow Time Measurement, Flow-Rate and Capacity Analysis, Managing Flow Variability; Work flow design principles and flows	9	C2
III	**Process Modeling:** Process Modeling - empirical models, deterministic models, stochastic models; simulating business, Process – Application, simulation process, discrete event simulation, computer simulation	9	C3
IV	**Process Planning:** Constraint Management – theory of constraints, measuring capacity, Utilization, and Performance in /TOC, key principles; Strategic Capacity Management –Tools for capacity Planning, cycle time and capacity analysis; process layout – designing flexible flow layouts; Lean Systems – Toyota production system, characteristics of lean systems, continuous Improvement, Kanban system Value stream mapping, JIT II; Process Synchronization and Improvement.	9	C4

V	**Process Optimization:** Optimizing business process performance, Process Metrics, Business Intelligence, Process Dashboards – creating flexible organizations – optimization process– early management –capability development, sustainability; process benchmarking with data envelopment analysis	9	C5
	Total	**45**	

Course Outcomes

Course Outcomes	On completion of this course, students will;	**Program Outcomes**
CO1	Get familiarized on the fundamentals of process management	PO4, PO6, PO7
CO2	Be provided with inputs on the process flow, variability and principles	PO2, PO6, PO7
CO3	Analyze process modelling and simulation	PO1, PO2, PO5, PO6
CO4	Summarize innovative manufacturing concepts	PO2, PO6, PO7
CO5	Develop process dash boards, process metrics, benchmarking and employ data analytics.	PO6, PO7

Reading List

1.	Fundamentals of Business Process Management, Springer, 2011
2.	Business Process Management, Routledge, 2013
3.	Business Process Management Journal, Emerald Publishing
4.	International Journal of Business Process Integration and Management, Inderscience Publishers.

References Books

1.	Burlton, Roger. Business Process Management: Profiting from Process. Indianapolis, IN: Sams Publishing, May 2001.
2.	Hammer, Michael, and James Champy. Reengineering the Corporation: A Manifesto for Business Revolution. New York, NY: HarperCollins Publishers, 1993
3.	Harrington, H.J. Business Process Improvement: The Break-through Strategy for Total Quality, Productivity, and Competitiveness. New York, NY: McGraw-Hill, 1991.
4.	Garvin, David A. Managing Quality: The Strategic and Competitive Edge. New York, NY: Free Press, 1988
5.	Out of the Crisis. Cambridge, MA: MIT Center for Advanced Engineering Study, 1986.
6.	Crosby, Philip. Quality without Tears. New York: McGraw-Hill, 1984.

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**
CO 1				3		3	3	
CO 2		3				3	3	
CO 3	3	3			3	2		
CO 4		3				3	3	
CO 5						3	2	

3-Strong 2-Medium 1-Low

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Subject Code	Subject Name	Category	L	T	P	O	Credits	Inst. Hours	Marks		
									CIA	External	Total
934E913G	**Product Design**	Elective	3	-	-	-	3	3	25	75	100

Course Objectives	
C1	To enable students understand product design & development with its process, concept generation evaluation
C2	To interpret the product concept
C3	To apply the concepts of product data management
C4	To get appraised with design tools
C5	To explore and gain knowledge on patent

UNIT	Details	No. of Hours	Course Objectives
I	**PRODUCT DESIGN & DEVELOPMENT** Product design & development - characteristics, duration and cost, challenges; Development Process - Generic Process, Concept development, adapting to product types; Product planning - Process, Understanding customer need, Product Specification; Concept Generation Evaluation - decay curve, cost expenditure curve; Technology Life Cycle; Disruptive Technologies.	9	C1
II	**PRODUCT CONCEPT** Concept Selection – Importance, Methodology, concept Screening, Concept Scoring, Concept Testing; Product Architecture - Definition, Modularity, implication, Establishment, Delayed Differentiation, Platform Planning.	9	C2
III	**PRODUCT DATA MANAGEMENT (PDM)** PDM - concept and benefits, functions, Product data and workflow, Product reliability, CIM Data, Architecture of PDM systems, Product data interchange, Portal integration, PDM Acquisition and implementation; Product Life Cycle management - strategy, Change Management for PLM.	9	C3
IV	**DESIGN TOOLS** Design Approaches - Industrial Design, Design for Manufacturing, Value Engineering, Ergonomics, Robust Design, Design for Excellence; Collaborative Product development-Prototyping, failure rate curve, product use testing-Product development economics, scoring	9	C4

	Model, financial analysis.		
V	**PATENTS** Intellectual Property and Patents -Definitions, Patent Searches, Application, Patent Ownership and Transfer, Patent Infringement, New Developments and International Patents.	9	C5
	Total	**45**	

Course Outcomes		
Course Outcomes	On completion of this course, students will;	**Program Outcomes**
CO1	Understand product design & development with its process, concept generation evaluation	PO1
CO2	Interpret the product concept	PO4, PO5
CO3	Apply the concepts of product data management	PO5,PO6
CO4	Get appraised with design tools	PO1,PO2
CO5	Explore and gain knowledge on patent	PO7,PO8

Reading List	
1.	Karl Ulrich, Steven Eppinger, Product Design and Development,5th edition Mc graw hill
2.	**Rajiv D. Banker**,**Indranil Bardhan**,**Ozer Asdemir**, Understanding the Impact of Collaboration Software on Product Design and Development informs pubs onlie
3.	Karl T. lrich, Steven D. Eppinger, product design and development fifth edition, Mcg raw hill
4.	A.J. Peters**,** E.M. Rooney**,** J.H. Rogerson**,** R.E. McQuater**,** M. Spring**,** B.G. Dale , New product design and development: a generic model The TQM Magazine, 1999

References Books	
1.	Karl T. Ulrich, Steven D. Eppinger, Anita Goyal Product Design and Development, Tata McGraw – Hill, Fourth Edition, reprint 2009.
2.	Kenneth B.Kahn, New Product Planning, Sage, 2010.
3.	A.K. Chitale and R.C. Gupta, Product Design and Manufacturing, PHI, 2008.
4.	Deborah E. Bouchoux, Intellectual Property Rights, Delmar, Cengage Learning, 2005.
5.	Product Design And Manufacturing, Chitale, Avinash K. GUPTA, R. C., SIXTH EDITION, PHI

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**
CO 1	3							
CO 2				2	3			
CO 3					3	2		
CO 4	2	2						
CO 5							3	2

3-Strong 2-Medium 1-Low

UNIVERSITY OF MADRAS

MASTER OF BUSINESS ADMINISTRATION (MBA) DEGREE PROGRAMME

SYLLABUS WITH EFFECT FROM 2023-2024

Subject Code	Subject Name	Category	L	T	P	O	Credits	Inst. Hours	Marks		
									CIA	External	Total
934E913H	**Supply Chain Analytics**	Elective	3	-	-	-	3	3	25	75	100

Course Objectives

C1	To understand the importance of the basics of Supply Chain Analytics and Optimization
C2	To apply the warehousing using Mathematical Programming Models
C3	To analyze the various inventory tools and strategies for analytics deployment depending on supply chain drivers.
C4	To educate on the concept of Transportation Network Models and their applications.
C5	To evaluate the various techniques for analytics based on the multi criteria decision-making model.

SYLLABUS

UNIT	Details	No. of Hours	Course Objectives
I	**Introduction:** Introduction to analytics – descriptive, predictive and prescriptive analytics, Data Driven Supply Chains – Basics, transforming supply chains, Barriers to implementation, Road Map.	9	C1
II	**Warehousing Decisions:** Mathematical Programming Models - P-Median Methods - Guided LP Approach - Balmer – Wolfe Method, Greedy Drop Heuristics, Dynamic Location Models, Space Determination and Layout Methods	9	C2
III	**Inventory Management:** Inventory aggregation Models, Dynamic Lot sizing Methods, Multi-Echelon Inventory models, Aggregate Inventory system and LIMIT, Risk Analysis in Supply Chain - Measuring transit risks, supply risks, delivering risks, Risk pooling strategies.	9	C3
IV	**Transportation Network Models:** Notion of Graphs, Minimal Spanning Tree, Shortest Path Algorithms, Maximal Flow Problems, Multistage Transshipment and Transportation Problems, Set covering and Set Partitioning Problems, Traveling Salesman Algorithms, Advanced Vehicle Routing Problem Heuristics, Schedulin g Algorithms-Deficit function Approach and Linking Algorithms	9	C4
V	**MCDM Models:** Analytic Hierarchy Process (AHP),	9	C5

	Data Envelopment Analysis (DEA), Fuzzy Logic and Techniques, the analytical network process (ANP), TOPSIS-Application in SCM.		
		45	
Course Outcomes	On completion of this course, students will;	**Program Outcomes**	
CO1	Understand the importance of the basics of Supply Chain Analytics and Optimization	PO2, PO7	
CO2	Apply the warehousing using Mathematical Programming Models	PO1, PO2,	
CO3	Analyze the various inventory tools and strategies for analytics deployment depending on supply chain drivers.	PO5, PO6, PO7	
CO4	Get educated on the concept of Transportation Network Models and their applications.	PO4, PO7	
CO5	Evaluate the various techniques for analytics based on the multi criteria decision-making model.	PO1, PO6	
Reading List			
1.	https://scg-lm.s3.amazonaws.com/pdfs/opentext-wp-dummies-guide-to-sca-100318.pdf		
2.	https://library.oapen.org/bitstream/id/4398d7e1-4779-44bb-ab90-d9e7e54f829c/2021_Book_NextGenerationSupplyChains.pdf		
3.	Wendy Tate, Journal of Supply Chain Management,2022		
4.	Yuan Li, Journal of Management Analytics,2021		
References Books			
1.	Chopra S, Meindl P, Supply Chain Management: Strategy, Planning and Operation, Pearson Education, USA, 6th Edition, 2016.		
2.	Muthu Mathirajan, Chandrasekharan Rajendran, SowmyanarayananSadagopan, Arunachalam Ravindran, Parasuraman Balasubramanian, Analytics in Operations/Supply Chain Management, I.K. International Publishing House Pvt. Ltd., 1st Edition, 2016.		
3.	Feigin G, Supply Chain Planning and Analytics: The right product to the right place at the right time, Business Expert Press, New York, USA, 1st Edition, 2011.		
4.	Tayur S,Ganeshan R, Michael,M. Quantitative Models for Supply Chain Management. Kluwer Academic Publishers. 1st Edition, 1999.		
5.	Joel D Wisner, G. Keong Leong, Keah-Choon Tan, (2012), Supply Chain Management – A Balanced Approach, 3rd edition Cengage Learning,3rd Edition, 2012.		
6.	Handfield R, Supply Market Intelligence: A managerial handbook for building sourcing strategies, Taylor and Francis Group, Auerbach Publications, New York, USA, 1st Edition, 2006.		

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**
CO 1		3					2	
CO 2	2	3						
CO 3					3	2	3	
CO 4				2			3	
CO 5	3					2		

3-Strong 2-Medium 1-Low

UNIVERSITY OF MADRAS

MASTER OF BUSINESS ADMINISTRATION (MBA) DEGREE PROGRAMME

SYLLABUS WITH EFFECT FROM 2023-2024

Subject Code	Subject Name	Category	L	T	P	O	Credits	Inst. Hours	Marks		
									CIA	External	Total
934E913I	**Operations Strategy**	Elective	3	-	-	-	3	3	25	75	100

Course Objectives	
C1	To familiarize students with the fundamentals of business strategies
C2	To provide inputs on developing operations strategy
C3	To orient students on the impact of technology in strategy formulation.
C4	To enable students, understand strategy implementation
C5	To acquaint students with financial perspectives in operations strategy.

SYLLABUS

UNIT	Details	No. of Hours	Course Objectives
I	**Introduction:** Role and Objectives of Operations Strategy; Operations Strategy Framework: Incorporating Operations Strategy in the Corporate Strategy; Operations performance essentials; Competition, Competencies & Operations; Defining Operations Strategy in Overall Environment; Process of Operations Strategy Formulation	9	C1
II	**Principles of Operations Strategy:** Principles and Concepts of Developing Operations Strategy; Methodology of Developing Operations Strategy; Capacity Strategy: Capacity Types, Flexibility & Consolidation, Capacity Timing & Expansion, Capacity Sizing & Investment; Facility Strategy & Globalization: Infrastructure Development; Supply Network Strategy: Capacity Location, Global Network & Off-shoring, Strategic Sourcing, Coordinating the Supply Chain.	9	C2
III	**Process Technology Strategy:** Effect of Technology Advancement and Technology Management, Integration of Operations Strategy Planning and Technology Planning, Production Implications of Corporate Marketing Decisions; Strategy Development and Practices; Improvement & Innovation; New Product & New Service Development; Product Variety Impact in Operations Strategy; Operations Strategy Process – Sustainable Alignment.	9	C3
IV	**Implementation:** Implementation of Operations Strategy; Business Implication of Process Choice: Dynamics of process-product life cycles, Product	9	C4

	Profiling, Improving Operations Process by Process Positioning; Cross-Cutting Capability; Operations Strategy Process – Implementation; Pre-requisites of Organized and Focused Operations Strategy & Unit; Principles and Concepts of Factory-within Factory; Involvement of Human Aspects		
V	Operations Redefining & Restructuring; Demand and Revenue Management; Operations Strategy Process – Substitutes: BPR, TQM, Lean, Six Sigma: Business Process Focused Strategies & Organization Development: Quality Planning and Controlling System, Improving Response Time with IT, Operations Audit Approach; Risk Management & Hedging: Accounting & Financial Perspectives and Operations System, Business Continuity Planning, Disaster Recovery strategy.	9	C5
		45	

Course Outcomes	On completion of this course, students will;	**Program Outcomes**
CO1	Become familiarized and have good understanding on the fundamentals of business strategies	PO4, PO6, PO7
CO2	Have valuable inputs and understanding on developing operations strategy	PO1, PO2, PO5, PO6
CO3	Have an orientation on the impact of technology in strategy formulation.	PO5, PO6
CO4	Have a better understanding on strategy implementation	PO4, PO5, PO6, PO7
CO5	Be acquainted with financial perspectives in operations strategy.	PO1, PO2, PO6, PO7

Reading List	
1.	Nigel Slack, Michael Lewis, Mohita Gangwar Sharma, Operations Strategy, Pearson Education, 2018
2.	Robert H. Hayes, Gary P.Pisano, Strategic Operations: Competing Through Capabilities, Free Press, 1996
3.	Journal of Operations and Strategic Planning, Sage Publications
4.	Journal of Operations Management, ScienceDirect
References Books	
1.	Beckman / Barry. Operations Strategy: competing in the 21st Century, McGraw-Hill Higher Ed 2007
2.	Brown / Lamming / Bessant / Jones. Strategic Operations Management, Elsevier-India (Butterworth-Heinemann 2004
3.	Hayes / Pisano / Upton / Wheelwright. Operations, Strategy, and Technology: Pursuing the Competitive Edge, Wiley 2011
4.	Lowson. Strategic Operations Management, Routledge, Taylor & Francis, 2015
5.	Jay Heizer, Barry Render, et al. Operations Management Twelfth Edition | By

	Pearson, 2017

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**
CO 1				3		3	3	
CO 2	3	3			3	3		
CO 3					3	3		
CO 4				2	3	3	3	
CO 5	2	2				3	3	

3-Strong 2-Medium 1-Low