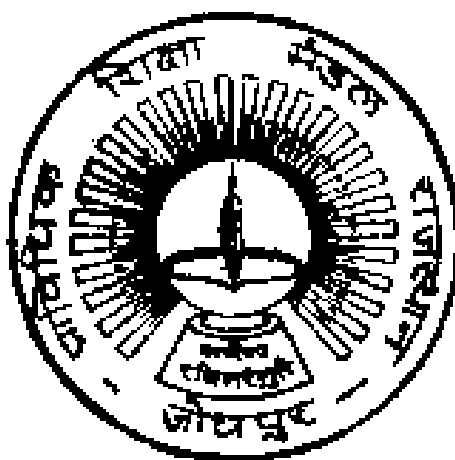


GOVERNMENT OF RAJASTHAN
BOARD OF TECHNICAL EDUCATION RAJASTHAN
JODHPUR

SEMESTER SCHEME-2020-21

(SESSION 2021-2022 & ONWARDS)



TEACHING AND EXAMINATION SCHEME
AND SYLLABUS

LOGISTIC TECHNOLOGY

(LS)

.....
Curriculum Development Cell
Board of Technical Education, Rajasthan
W-6 Residency Road,
Jodhpur

GOVERNMENT OF RAJASTHAN
BOARD OF TECHNICAL EDUCATION RAJASTHAN, JODHPUR
TEACHING AND EXAMINATION SCHEME
(SEMESTER SCHEME-2020-21)
FOR DIPLOMA III SEMESTER (LOGISTIC TECHNOLOGY) (LS)
SESSION 2022-2023& ONWARDS

Subject Category	Subject Code	Subjects	Distribution of Time				Distribution of Max. Marks/ Duration							Total Marks	Credits
			Hours per week				End Semester Exam				Internal Assessment				
			L	T	P	Tot	TH	Hrs	PR	Hrs.	CT	TU/Assi	PR(S)		
PC	LS 3001	Fundamentals of Logistics and Warehousing	2	1	--	3	60	3	--	--	20	20	--	100	3
PC	LS 3002	Container Logistics Cargo movement Visibility, Tracking and Tracing	2	1	--	3	60	3	--	--	20	20	--	100	3
PC	LS 3003	Material handling, Repair and Maintenance of Equipments	2	1	--	3	60	3	--	--	20	20	-	100	3
PC	LS 3004	Port terminals System-Conveyor and Equipment Maintenance	2	0	--	2	60	3	--	--	20	20	--	100	2
PC	LS 3005	Design, Retrofit and Maintenance of Cold Storages and Pack Houses.	2	1	--	3	60	3	--	--	20	20	--	100	3
PC	LS 3006	Material Handling, Repair and Maintenance of Equipments Lab	--	--	4	4	--	--	40	3	--	--	60	100	2
PC	LS 3007	Conveyor and Equipment Maintenance Lab	--	--	4	4	--	--	40	3	--	--	60	100	2
PC	LS 3008	Maintenance of Cold storages and Pack Houses Lab	--	--	4	4	--	--	40	3	--	--	60	100	2
SI	LS 3009	Summer Internship – I (4 weeks after II Sem)	--	--	--	--	--	--	100	--	--	--	--	100	2
VS	LS 3333	Anandam (Joy of Giving)	--	--	1	1	--	--	--	--	--	--	100	100	2
		Students Centered Activities	0	0	3	3	--	--	--	--	--	--	--	--	--
		Total	10	4	16	30	300	--	220	--	100	100	280	1000	24
Grand Total :													1000	24	

- | | |
|--|---|
| 1. L : Lecture | 5. PR : Marks for End Semester Exam for Practical |
| 2. T : Tutorial | 6. CT : Marks for class tests (Internal Assessment) |
| 3. P : Practical | 7. TU/Assi : Marks for tutorials/Assignment (Internal Assessment) |
| 4. TH : Marks for End Semester Exam for Theory | 8. PR(S) : Marks for practical and viva (Internal Assessment) |

1+LS 3333 is same in all branches of Engineering

Student Centered Activities will be graded as A, B, C & D on the basis of attendance and interest of the student in learning.

GOVERNMENT OF RAJASTHAN
BOARD OF TECHNICAL EDUCATION RAJASTHAN, JODHPUR
(SEMESTER SCHEME-2020-21)
TEACHING AND EXAMINATION SCHEME
FOR DIPLOMA IV SEMESTER (LOGISTIC TECHNOLOGY) (LS)
SESSION 2022-2023& ONWARDS

Subject Category	Subject Code	Subjects	Distribution of Time				Distribution of Max. Marks/ Duration							Total Marks	Credits
			Hours per week				End Semester Exam				Internal Assessment				
			L	T	P	Tot	TH	Hrs.	PR	Hrs.	CT	TU/Assi	PR(S)		
PC	LS 4001	Logistics Informatics	2	1	--	3	60	3	--	--	20	20	--	100	3
PC	LS 4002	E- Commerce	2	1	--	3	60	3	--	--	20	20	--	100	3
PC	LS 4003	Documentation	2	1	--	3	60	3	--	--	20	20	--	100	3
PC	LS 4004	Storage Containers	2	0	-	2	60	3	--	--	20	20	--	100	2
PC	LS 4005	Logistics Informatics Lab	--	--	4	4	--	--	40	3	--	--	60	100	2
PC	LS 4006	E- Commerce Lab	--	--	4	4	--	--	40	3	--	--	60	100	2
PC	LS 4007	Documentation Lab	--	--	4	4	--	--	40	3	--	--	60	100	2
PR	LS 4008	Minor Project	--	--	4	4	--	--	40	3	--	--	60	100	2
AU	+LS 4222	Essence of Indian Knowledge and Tradition	2	-	-	2	--	--	--	--	--	--	--	--	--
VS	+LS 4444	Anandam (Joy of Giving)	--	--	1	1	--	--	--	--	--	--	100	100	2
		Students Centered Activities	0	0	3	3	--	--	--	--	--	--	--	--	--
		Total	8	3	20	33	240	--	160	--	80	80	340	900	21
Grand Total :													900	21	

1. L : Lecture

2. T : Tutorial

3. P : Practical

4. TH : Marks for End Semester Exam for Theory

5. PR : Marks for End Semester Exam for Practical

6. CT : Marks for class tests (Internal Assessment)

7. TU/Assi : Marks for tutorials/Assignment (Internal Assessment)

8. PR(S) : Marks for practical and viva (Internal Assessment)

1.+LS4222 and +LS 4444 are same in all branches of Engineering

Student Centered Activities will be graded as A, B, C & D on the basis of attendance and interest of the student in learning.

Note: Students will go for 6 Weeks Summer Internship in the Summer Vacations after Fourth Semester. The assessment of the Summer Internship will be done in Fifth Semester

GOVERNMENT OF RAJASTHAN
BOARD OF TECHNICAL EDUCATION RAJASTHAN, JODHPUR
(SEMESTER SCHEME-2020-21)
TEACHING AND EXAMINATION SCHEME
FOR DIPLOMA V SEMESTER (LOGISTIC TECHNOLOGY) (LS)
SESSION 2023-2024& ONWARDS

Subject Category	Subject Code	Subjects	Distribution of Time				Distribution of Max. Marks/ Duration						Total Marks	Credits	
			Hours per week				End Semester Exam			Internal Assessment					
			L	T	P	Tot	TH	Hrs.	PR	Hrs	CT	TU/Assi			PR(S)
PC	LS 5001	Packaging	2	--	--	2	60	3	--	--	20	20	--	100	2
PC	LS 5002	Logistics in Manufacturing, Supply chain and Distribution	2	--	--	2	60	3	--	--	20	20	--	100	2
OE	+LS 5100	Open Elective-I +LS 51001- Economic Policies in India +LS51002- Engineering Economics & Accountancy	3	--	--	3	60	3	--	--	20	20	--	100	3
PC	LS 5003	Compliance- Insurance Regulations and Loss Preventions	2	--	--	2	60	3	--	--	20	20	--	100	2
PC	LS 5004	Material Handling Lab	--	--	4	4	--	--	40	3	--	--	60	100	2
PC	LS 5005	Warehousing Lab	--	--	4	4	--	--	40	3	--	--	60	100	2
PR	LS 5006	MIS Lab	--	--	12	12	--	--	40	3	--	--	60	100	6
SI	LS 5007	Summer Internship – II (6weeks after IV Sem)	--	--	--	--	--	--	100	--	--	--	--	100	3
PR	LS 5008	Major Project	0	0	2	2	--	--	--	--	--	--	--	--	--
VS	+LS 5555	Anandam (Joy of Giving)	--	--	1	1	--	--	--	--	--	--	100	100	2
		Students Centered Activities	--	--	3	3	--	--	--	--	--	--	--	--	--
		Total	9	00	26	35	240	--	220	--	80	80	280	900	24
Grand Total :													900	24	

- | | |
|--|---|
| 1. L : Lecture | 5. PR : Marks for End Semester Exam for Practical |
| 2. T : Tutorial | 6. CT : Marks for class tests (Internal Assessment) |
| 3. P : Practical | 7. TU : Marks for tutorials/Assignment (Internal Assessment) |
| 4. TH : Marks for End Semester Exam for Theory | 8. PR(S) : Marks for practical and viva (Internal Assessment) |

1. +LS51001, +LS51002, and +LS 5555 are same in all branches of Engineering

Student Centered Activities will be graded as A, B, C & D on the basis of attendance and interest of the student in learning.

Note:Major Project will be continued and Assesed in VI Semester

GOVERNMENT OF RAJASTHAN
BOARD OF TECHNICAL EDUCATION RAJASTHAN, JODHPUR
(SEMESTER SCHEME-2020-21)
TEACHING AND EXAMINATION SCHEME
FOR DIPLOMA VI SEMESTER (LOGISTIC TECHNOLOGY) (LS)
SESSION 2023-2024& ONWARDS

Subject Category	Subject Code	Subjects	Distribution of Time				Distribution of Max. Marks/ Duration						Total Marks	Credits	
			Hours per week				End Semester Exam			Internal Assessment					
			L	T	P	Tot	TH	Hrs.	PR	Hrs.	CT	TU			PR(S)
HS	+LS 6111	Entrepreneurship and Start-ups	3	1	--	4	60	3	--	--	20	20	--	100	4
OE	+LS 6200	Open Elective-II +LS 62001- Project Management +LS 62002- Renewable Energy Technologies	3	--	--	3	60	3	--	--	20	20	--	100	3
OE	+LS 6300	Open Elective-III +LS 63001- Product Design +LS 63002- Disaster Management	3	--	--	3	60	3	--	--	20	20	--	100	3
AU	LS 6333	Indian Constitution	2	--	--	2	--	--	--	--	--	--	--	--	--
PC	LS 6001	Dangerous Goods Management	3	--	--	3	60	3	--	--	20	20	--	100	3
PC	LS 6002	Marine logistics including Liquid Cargo and Bulk Cargo	3	--	--	3	60	3	--	--	20	20	--	100	3
PC	LS 6003	Quality Assurance in Logistics	2	--	--	2	60	3	--	--	20	20	--	100	2
PR	LS 6004	Major Project	--	--	6	6	--	--	40	--	--	--	60	100	4
SE	LS 6005	Seminar	1	--	--	1	--	--	--	--	--	--	100	100	1
VS	LS 6666	Anandam(Joy of Giving)	--	--	1	1	--	--	--	--	--	--	100	100	2
		Students Centered Activities	0	0	3	3	--	--	--	--	--	--	--	--	--
		Total	20	1	10	31	360	--	40	--	120	120	260	900	25
Grand Total :													900	25	

- | | |
|--|---|
| 1. L : Lecture | 5. PR : Marks for End Semester Exam for Practical |
| 2. T : Tutorial | 6. CT : Marks for class tests (Internal Assessment) |
| 3. P : Practical | 7. TU : Marks for tutorials/Assignment (Internal Assessment) |
| 4. TH : Marks for End Semester Exam for Theory | 8. PR(S) : Marks for practical and viva (Internal Assessment) |

1. +LS6111, +LS62001, +LS62002, +LS63001, +LS63002, +LS6333, and +LS 6666 are same in all branches of Engineering

Student Centered Activities will be graded as A, B, C & D on the basis of attendance and interest of the student in learning.

GOVERNMENT OF RAJASTHAN
BOARD OF TECHNICAL EDUCATION RAJASTHAN JODHPUR
SEMESTER SCHEME-2020-21



III SEMESTER
(SESSION 2021-2022 & ONWARDS)

FUNDAMENTALS OF LOGISTICS AND WAREHOUSING

Course Code	LS 3001
Course Title	Fundamentals of Logistics and Warehousing
Number of Credits	3(L: 2, T: 1, P: 0)
Prerequisites	NIL
Course Category	PC

Course Objectives:

Following are the objectives of this course:

1. To orient students in the field of Logistics
2. To make students to understand key activities of Logistics System
3. To develop competencies and knowledge of students to become Warehouse Professional

Course outcomes:

After competing this course, student will be able to:

1. Understand logistics and its subsectors
2. Understand the key activities of Logistics system and apply in real life situation.
3. Understand the Basic knowledge of warehousing operations and apply in the real life situation.

Course Content:**1. Logistics**

- 1.1. Introduction to Logistics
 - 1.1.1. Introduction, History of Logistics
 - 1.1.2. Cost and Productivity, Cost Savings and Productivity Improvement and Logistics Cost
- 1.2. Principle, Technology
 - 1.2.1. Principle of logistics
 - 1.2.2. Technology and logistics
 - 1.2.3. Informatics
- 1.3. Customer Service
 - 1.3.1. Logistics and Customer Service
 - 1.3.2. Definition of Customer Service and Element of Logistics Customer Service
- 1.4. Procurement and Outsourcing
 - 1.4.1. Procurement and Outsourcing, Definition of Procurement Outsourcing
 - 1.4.2. Benefits of Logistics Outsourcing

2. Subsector of Logistics

- 2.1. Subsectors
 - 2.1.1. Introduction** - Warehousing, Transportation, Courier and Express Services, E-Commerce, EXIM, Supply Chain, Cold Chain, Liquid Logistics and Rail Logistics
- 2.2. Warehousing
 - 2.2.1. Warehouse
 - 2.2.2. Types of Warehousing
 - 2.2.3. Benefits of Warehousing
- 2.3. Transportation
 - 2.3.1. Transportation
 - 2.3.2. Types, Transportation System and Benefits of Transportation System
- 2.4. Courier and Express Services
 - 2.4.1. Courier and Express Services -Meaning
 - 2.4.2. Categorization of Shipments and Courier Guidelines
 - 2.4.3. Express Sector for International and Domestic Shipping
- 2.5. E-Commerce
 - 2.5.1. E-Commerce - Meaning
 - 2.5.2. Brief on Fulfillment Centers and Reverse Logistics in E-Commerce Sector

- 2.6. EXIM
 - 2.6.1. Exim, Freight Forwarding and Custom Clearance
 - 2.6.2. Multi-Modal Transportation
- 2.7. Other Logistics
 - 2.7.1. Supply Chain and Cold Chain
 - 2.7.2. Liquid Logistics and Rail Logistics

3 Warehousing

- 3.1. Introduction to Warehousing
 - 3.1.1. Introduction Evolution, and functions of Warehousing
 - 3.1.2. The need for Warehousing and types of warehouses
 - 3.1.3. Classification of warehouses based on
 - 3.1.3.1. The ownership, The Products being stored and The special services they provide
 - 3.1.3.2. The Temperature, The Construction and The Structure
 - 3.1.4. Benefits of Warehousing

4. Activities in warehouse

- 4.1. Warehouse activities
 - 4.1.1. Receiving, Sorting, Loading and Unloading
 - 4.1.2. Picking, Packing, Dispatching and Returns
- 4.2. Cross Docking and Packaging
 - 4.2.1. Cross Docking Method
 - 4.2.2. Packaging, Packaging Material and Packaging Machines
 - 4.2.3. Reading Labels

5. Warehouse Operations

- 5.1. Material Handling and use of material handling Equipment's
- 5.2. Warehouse Inventory Management
- 5.3. Distribution
 - 5.3.1. Physical Distribution, Need and Components of Physical Distribution
 - 5.3.2. Functions, types and Selection of Right Distribution Channel
- 5.4. Warehouse Safety Rules and Procedures
 - 5.4.1. The Safety Rules to be observed in a Warehouse
 - 5.4.2. Handling of Hazardous cargo
 - 5.4.3. Classification and Identification of Dangerous Goods
 - 5.4.4. Safety Data Sheet, 5S Concept and Personal protective Equipment's (PPE) and their uses

References:

1. Fundamentals of Logistics Management, David Grant, Douglas M. Lambert, James R. Stock, Lisa M. Ellram, McGraw Hill Higher Education, 1997.
2. Vinod V. Sople (2009) Logistic Management (2nd Edn.) Pearson Limited.
3. J P. Saxena, Warehouse Management and Inventory Control- Vikas Publication House Pvt Ltd, First Edition, 2003.
4. Warehouse Management: Automation and Organization of Warehouse and Order Picking Systems [With CDROM], Michael Ten Hampel, Thorsten Schmidt, Springer-verlag, First Edition, 2006.
5. Online Resources: From LSC Web Site

CONTAINER LOGISTICS CARGO MOVEMENT VISIBILITY, TRACKING AND TRACING

Course Code	LS 3002
Course Title	Container Logistics Cargo movement visibility, Tracking and tracing
Number of Credits	3(L: 2, T: 1, P:0)
Prerequisites	NIL
Course Category	PC

Course Objectives:

Following are the objectives of this course:

- To make students to understand the importance of container in logistics Activities.
- To help students to understand cargo movements tracking and tracing of cargos
- To develop competencies and knowledge in the area of container logistics.

Course outcomes:

After completing this course, student will be able to:

- Develop basic knowledge of container and containerisation and apply
- Develop basic knowledge on cargo movements
- Develop basic knowledge on tracking and tracing of cargos

Course Content:**1. Reverse Logistics:**

1.1. Introduction

- 1.1.1. Meaning of reverse logistics (R.L) and its Need
- 1.1.2. circumstances for R.L, mode of R.L, freight and other expenses on R.L

1.2. return of goods

- 1.2.1. return of goods for recycle and for market place

1.3. Reverse logistics system

- 1.3.1. logistic and reverse logistics system, difficulty in R.L. and economy
- 1.3.2. disposal of goods in lieu of R.L, settlement of claim in R.L and demurrage on R.L goods

1.4. disposal of goods and process to be followed for disposal

2. Integrated logistics:

2.1. Introduction

- 2.1.1. Integrated logistics concept, meaning and advantages

2.2. Response logistics

- 2.2.1. Services response logistics, quick response logistics (QRL) and recovery efficient (RE)
- 2.2.2. Efficient consumer response (ECR)

2.3. evaluating of logistics executives

- 2.3.1. 360 degree evaluation, logistics training, training themes and forms of training

2.4. types of trailers

- 2.4.1. Types, low bed /Flat bed and their uses and
- 2.4.2. Intermodal and multi modal carriage.

3. Containerization:

3.1. Container

- 3.1.1. Meaning, design, international standard, material used and strength of container
- 3.1.2. Cost investments for container, life of container on using and stocking of container

3.2. Type of container

- 3.2.1. Hi –cube containers and reusable container

3.3. Container transport

- 3.3.1. Lifting and loading arrangement on container
- 3.3.2. Container terminal advantages and disadvantages in container transport
- 3.3.3. Observation of over head steering system in container transport.

3.4. Inspection of goods in container and container safety certificate

4. Service Logistics:

4.1. Service response logistics

- 4.1.1. Introduction, product verses services, intangibility, inseparability, variability and perish ability

4.2. Services response

- 4.2.1. Logistic model and intermediaries in services response logistics,
- 4.2.2. Equipment based,people based services and service response logistic strategic implications.

5. Tracking and Tracing:

5.1. Tracking

- 5.1.1. Meaning, purpose, needs and difficulty faced in transport system of rail, roads, sea , air
- 5.1.2. Information collection, tracking of delivery of goods and empty container tracking system
- 5.1.3. Process of information collection-various agencies from which information collected

5.2. Tracing

- 5.2.1. Necessary of tracing, information collection for tracing and its importance
- 5.2.2. Process of information collection-various agencies from which information collected
- 5.2.3. Tracing required for transport vehicles and goods transported
- 5.2.4. Tracing within the country, outside the country and tracing of container loads

Reference Books

- 1. Container Logistics, Rolf Neise, Kogan Publishers
- 2. Design and Operation of Automated Container Storage Systems,Nils Kemm, Springer Science & Business Media
- 3. Container Logistics and Its Management,Lars A. R. Hultén
- 4. Online Resources: From LSC Web Site

SEMESTER SCHEME 2021

MATERIAL HANDLING, REPAIR AND MAINTENANCE OF EQUIPEMENTS

Course Code	LS 3003
Course Title	Material Handling, Repair and Maintenance of Equipements
Number of Credits	3 (L: 2, T:1, P:0)
Prerequisites	NIL
Course Category	PC

Course Objectives:

Following are the objectives of this course:

- To make students to learn material handling and its importance
- To make students to understand the concept of Material handling and equipments involved.
- To make students to learn operations and maintenance of material handling equipments.

Course outcomes:

After competing this course, student will be able to:

- Know material handling and its importance
- Understand the concept of Material Handling and Equipments involved.
- learn and perform operations and maintenance of material handling equipments.

Course Content**1. Material Handling**

1.1. Introduction

1.1.1. Basis and need of material handling, need

1.1.2. Manual handling

1.2. Types of material handling

1.2.1. In terms of specifications, characteristic reach / Load/ maneuverability /prime mover types and control systems

1.2.2. For equipment without power and using handling machines (fixed / movable handling machines)

1.2.3. Using handling machines within and outside industry in warehousing

2. Material handling equipment:

2.1. Types of Material handling Equipment

2.1.1. For loading and unloading

2.1.2. Loading m/cs used for transportation vehicles, rail wagons, ships and automatic movement in line production

2.2. Material handling Equipment precaution

2.2.1. Safety precaution to be followed while loading

2.2.2. Precaution to be taken in gangways

3. Material handling equipment for storages :

3.1. Fork lifter, counter balanced rider, narrow aisle reach truck, bridge crane, jib crane, gantry crane

3.2. Pallet, straddle truck, reach trucks, order picker trucks, storage trucks, platform truck and hand truck

3.3. Conveyor: belt system and roller system, ropes, slings

3.4. Safe working loads and breaking strength, testing and calibration of equipment and gears

3.5. Assessment of loads before starting, Inspection for safety work and Emergency procedure

4. Manual handling Equipment Operations:

4.1. Manual Handling

4.1.1. Conditions for manual handling and precautions & safety in manual handling

4.1.2. Storage system - pallet storage, bin shelving, gravity flow racks and carousels

4.1.3. Overhead handling operations and loading operations on ship

4.1.4. Safe handling of chemicals toxic gases, radioactive material and corrosive materials

5. Maintenance of Equipments:

- 5.1. Maintenance schedule for loading machineries
 - 5.1.1. Daily, weekly, fortnightly, monthly, quarterly, half yearly, yearly maintenance
 - 5.1.2. Safety keeping and storing of lifting equipments and loading premises
 - 5.1.3. Preventive maintenance procedures and Procedure to generate maintenance and service report.
 - 5.1.4. Diagnose error on MHE and preventive measures taken

Reference Books

1. Introduction to Material Handling, Siddartha Ray, Newage Publishers, 2017
2. Aspects of material Handling, Keshav Chandra Arora, Vikas. V. Shinde, Lakshmi Publications (P) Ltd, .2007
3. Bulk Materials Handling HandBook, Jacob Fruchtbaum, Springer Science and Business Media,1988
4. Material Handling Equipment, Michael, G.Kay
5. Online Resources: From LSC Web Site

SEMESTER SCHEME 2020-21

PORT TERMINALS SYSTEM- CONVEYOR AND EQUIPMENT MAINTENANCE

Course Code	LS 3004
Course Title	Port Terminals System - Conveyor and Equipment Maintenance
Number of Credits	2 (L: 2, T: 0, P:0)
Prerequisites	NIL
Course Category	PC

Course Objectives:

Following are the objectives of this course:

- To make students to learn about Ports, Port Terminals and container yard their importance in logistics.
- To make students to understand the logistics activities carried out in Ports and Port Terminals.
- To make students to learn operations and maintenance of material handling equipments used in Port Terminals and container yard.

Course outcomes:

After completing this course, student will be able to:

- Identify different types of Ports, Port Terminal.
- Understand and carryout logistics activities in the Port and Port Terminals.
- Operate MHEs used in Port, Port Terminals and container yard.
- Carryout maintenance of MHEs used in Port Terminals and container yard.

Course Content**1. Terminal operation**

1.1. Terminal

1.1.1. Meaning of Terminal, Ports, Major ports and Minor ports

1.2. Terminal operations

1.2.1. Forecast, Unit and Factor (TEU), Throughput of Terminal, Water side area and Land side area Throughput of the stack

1.2.2. Storage capacity and Technical handling capacity

1.3. Design process

1.3.1. Layout calculations, Gate area, Cockpit sheet and General sea yard equipment sheet

1.3.2. Queuing theory sheet, Flow sheet, Summary sheet and Yard layout sheet

2. Material Handling Equipment

2.1. MHE at sea side, Ship to shore, STS Gantry crane (Single Trolley), Mobile Harbour Crane (MHC) And Wide Span Crane (WSC)

2.2. Horizontal transport, Passive vehicle, Port tracker and Automated Guide Vehicle (AGV) and Non Passive vehicle

2.3. Fork lift Truck and Rack stacker, Straddle carrier, rail mounted yard Gantry cranes, Multi Trailers and Tug master

2.4. Maintenance of MHE

2.4.1. Maintenance schedule for material handling equipment.

2.4.2. Preventive and breakdown maintenance

2.4.3. Procedure for handling Preventive and Break down maintenance

3. Container Yard

3.1. Stock yard and Port side yard, Loading and unloading procedures, Truck loading and Port side loading

3.2. Container cranes, Multipurpose crane, Lifting facilities on containers, Slings, Ropes and Blocks

3.3. Terminal Chassis, Road Chassis and Overhead Bridge Crane

3.4. Repair facilities of container in the yard, Safety load for container, Certification of containers safety

4. Conveyors

4.1. Meaning, Types of Conveyors: Belt, Roller, Chain, Bucket, Screw and Apron

4.2. Goods transported on Conveyors and Advantages of Conveyor system

4.3. Maintenance system of conveyors, Typical conveyor Hazards and Safeguarding conveyors

4.4. Mechanical Equipment of Conveyors, Electric outfit, Metal structure and Control system

5. Transportation – Informations

5.1. Interlocking of Rail, Road transport with harbour and Industries

- 5.2. Oil Storage Tankers, Transporting oils through pipe lines, Safety equipments on pipe lines and Oil pumping system on the port
- 5.3. Communication of discharge, Ship arrival /Departure information and Informations delivered to port authorities
- 5.4. Cost factor on unloading /Loading, Labour availability on shore, Govt procedure for coming out from ports and Documents required for safe transport

Reference Books

1. Major Port Trust Act – Government of India
2. Port Industry Statistics, American Association of Port Authorities
3. APMollorGuidebook on Terminal
4. Dubai Port Authorities Manual
5. Online Resources: From LSC Web Site

SEMESTER SCHEME 2020-21

DESIGN, RETROFIT AND MAINTENANCE OF COLD STORAGES AND PACK HOUSES

Course Code	LS 3005
Course Title	Design, Retrofit and Maintenance of cold Storages and Pack Houses
Number of Credits	3(L: 2, T: 1, P:0)
Prerequisites	NIL
Course Category	PC

Course Objectives:

Following are the objectives of this course:

- To make students to learn about cold chain logistics
- To make students to understand cold storages and pack Houses
- To make students to learn Design, Retrofit and maintenance of cold storages and pack Houses.

Course outcomes:

After completing this course, student will be able to:

- Know cold chain and its importance in logistics
- Identify logistics activities connected with cold storages and pack houses
- Design and retrofit of cold storage and pack houses.
- Carryout maintenance of cold storage and pack houses.

Course Content:**1. Cold chain Business Planning and Strategy**

- 1.1. Introduction to Cold Chain, Its importance, General warehouse and cold chain warehouse
- 1.2. Identify target Market, Quantity demand, Identify source points and Categories target volumes
- 1.3. Food supply and delivery system, Business model Strategic plan and Operating Model
- 1.4. Inventory and benefits of inventory in cold chain

2. Cold chain Application Frame work

- 2.1. Introduction, Cold Chain Management, Necessity, aim of Cold Chain and Smart Cold Chain System
- 2.2. RFID, WSN, SCCAF, BLE, Hadoop system, Spark system, HDFS, RPC and YARN
- 2.3. D Stream, Data Process Layer, Event groups and event names, FEFO
- 2.4. SCCAF functions, Device security SCCAF components, Input parameters and Architecture of CCAF

3. Cold Chain Design for Warehouse

- 3.1. Storage, Dry storage, Air cooling, Chilled storage, Frozen storage, Blast freezing
- 3.2. Design factors for cold storage
 - 3.2.1. Insulation, Floor protection, Building Loads, machine room, Power and Water consumption
 - 3.2.2. Stocking of perishable products, Dairy products, Meat, Poultry and fish and sea foods
 - 3.2.3. Man power requirements, Chamber sizing and capacity, Anti rooms, Utility areas, Storage doors, Air curtains, Cooling system configurations and Safety provisions
- 3.3. Maintenance control, break down and rectification, Preventive controls, Automatic Lighting systems and Health, safety and security measures to be carried out during operations.

4. Grading and Packing

- 4.1. Grading of Horticulture products
 - 4.1.1. General grading and Marketing Rules 1988, CODEX standards and Sea foods grading
- 4.2. Preservation of foods
 - 4.2.1. Methods of Packing, Re packing standards, Labelling, Marking
- 4.3. Packing
 - 4.3.1. Materials used for packing, Wax coated, water resistance packing, Reliability and strength for Packing, Sampling and Stacking
- 4.4. Storage
 - 4.4.1. Bulk bin, Storage crates, tote, bulk crates, Hygiene and safety aspects in packing house.

5. Transport System & Retrofit

- 5.1. Refrigerated Vehicles
 - 5.1.1. Container insulated, Insulated boxes, Refrigerated vehicles and Refrigerated Rigid Vehicles
 - 5.1.2. Refrigerated Containers, Machineries for Refrigerated vehicles and Power system to be used

5.2. EERS

5.2.1. Analysing development of EERS in cold chain project and decisions taken during accidents in transportation

5.3. Retrofit in Supply Chain Management

5.3.1. Replacement of out dated systems for energy savings, open loading area enclosure, to improve coolness and implement new state of refrigeration system

5.3.2. Advanced Control System, high Efficiency Evaporators and Condensers system

5.3.3. Minimising cooling load, Automatic usage of doors ,wind screen etc, and advantages of Retrofit

Reference Books

1. The Complete Book on Cold Storage, Cold Chain & Warehouse,NPCS Board of Consultants & Engineers 2018
2. Matt Wensing, A Guide to Cold Chain Logistics 2018
3. Dr. Jean-Paul Rodrigue and Dr. Theo NotteboomThe Cold Chain and its Logistics
4. Online Resources: From LSC Web Site

SEMESTER SCHEME 2020-21

MATERIAL HANDLING REPAIR AND MAINTENANCE OF EQUIPEMENTS - LAB

Course Code	LS 3006
Course Title	Material Handling Repair and Maintenance of Equipements - Lab
Number of Credits	2 (L: 0, T: 0, P: 4)
Prerequisites	NIL
Course Category	PC

Course Objectives:

Following are the objectives of this course:

- This practical course is intended to practice whatever is taught in theory class of “Material Handling Repair and Maintenance” and become proficient in handling material handling equipments and caring out their routine maintenance.

Course outcomes:

After competing this course, student will be able to:

- Comfortably work onhandling material handling equipments and caring out their routine maintenance.

S.No	List of Practical
1.	operation and working of forklift with packages.
2.	operation and working of Hand truck
3.	Stocking of packages in vertical racks
4.	Unloading of packages from vertical racks
5.	Operation of adjustable height turntable
6.	Preparation of Synthetic rope slings
7.	Preparation of wire rope slings
8.	Manual handling of bottle packages
9.	Preventive maintenance of Forklift and Preparation of spare parts lists for Forklift
10.	Dismantling and assembly of parts of Forklift

Reference Books

1. Introduction to Material Handling, Siddartha Ray, Newage Publishers, 2017
2. Aspects of material Handling, Keshav Chandra Arora, Vikas.V.Shinde, Lakshmi Publications (P) Ltd,
3. Bulk Materials Handling HandBook, Jacob Fruchtbaum, Springer Science and Business Media,1988
4. Material Handling Equipment, Michael, G.Kay
5. Online Resources: From LSC Web Site

CONVEYOR AND EQUIPMENT MAINTENANCE- LAB

Course Code	LS 3007
Course Title	Conveyor and Equipment Maintenance - Lab
Number of Credits	2 (L: 0, T: 0, P: 4)
Prerequisites	NIL
Course Category	PC

Course Objectives:

Following are the objectives of this course:

- This practical course is intended to practice whatever is taught in theory class of “Conveyor and Equipment Maintenance” and become proficient in handling Conveyor and Equipment and caring out their routine maintenance.

Course outcomes:

After competing this course, student will be able to:

- Comfortably work on handling Conveyor and Equipment Maintenance and caring out their routine maintenance.

S.No	List of Practical
1.	Preparation of a layout sheet for port terminal
2.	Preparation of drawing for a conveyor system adopted in a bottling company
3.	Overhauling of conveyor roller used in conveyor belt.
4.	Inspection of chain of chain conveyor and writing a report.
5.	Design of belt conveyor for transporting.
6.	Listing of a port terminal accommodating facility.
7.	Fabrication of a vertical Rack for stoking cartons.
8.	Over hauling of a chain block
9.	Preparation of weekly maintenance schedule for a belt conveyor system
10.	Preparation of monthly maintenance schedule for a belt conveyor system.

Reference Books

1. Major Port Trust Act – Government of India
2. Port Industry Statistics, American Association of Port Authorities
3. APMollorGuidebook on Terminal
4. Dubai Port Authorities Manual
5. Online Resources: From LSC Web Site

MAINTENANCE OF COLD STORAGE AND PACK HOUSES- LAB

Course Code	LS 3008
Course Title	Maintenance of Cold Storage and Pack houses- Lab
Number of Credits	2 (L: 0, T: 0, P: 4)
Prerequisites	NIL
Course Category	PC

Course Objectives:

Following are the objectives of this course:

- This practical course is intended to practice whatever is taught in theory class of “Maintenance of Cold storage and Packhouse” and become proficient in handling of Cold storage and Packhouse and caring out their routine maintenance.

Course outcomes:

After competing this course, student will be able to:

- Comfortably work on handling Cold storage and Packhouse and caring out their routine maintenance.

S.No	List of Practical
1.	Installation of a cold storage and listing of procedure
2.	Installation of a cold storage packhouse and listing of procedure
3.	Planning for material handling equipment for cold storage warehouse
4.	Planning for safety measures to be adopted at cold storage Warehouse/packhouse
5.	Planning for temperature control measures to be adopted at the anti room of a cold storage.
6.	Prepare a sidewall and floor sketch for a watery packhouse as per expert inspection agency
7.	Making of a carton box of 2kg capacity for packing seafood.
8.	Operations of cut off limit switch and list the procedure followed
9.	Design of a sorting table for segregating Horticulture product.
10.	Servicing of the plate freezer plates used in cold storages.

Reference Books

1. The Complete Book on Cold Storage, Cold Chain & Warehouse, NPCS Board of Consultants & Engineers 2018
2. Matt Wensing, A Guide to Cold Chain Logistics 2018
3. Dr. Jean-Paul Rodrigue and Dr. Theo Notteboom The Cold Chain and its Logistics
4. Online Resources: From LSC Web Site

GOVERNMENT OF RAJASTHAN
BOARD OF TECHNICAL EDUCATION RAJASTHAN JODHPUR
SEMESTER SCHEME-2020-21



IV SEMESTER
(SESSION 2021-2022 & ONWARDS)

LOGISTICS INFORMATICS

Course Code	LS 4001
Course Title	Logistics Informatics
Number of Credits	3 (L: 2, T:1, P: 0)
Prerequisites	NIL
Course Category	PC

Course Objectives:

Following are the objectives of this course:

- To develop competencies and knowledge of students in the area of logistics informatics
- To orient students in the field of Logistics and help them to understand MIS for Logistics

Course outcomes:

After completing this course, student will be able to:

- Apply the Basic knowledge of MIS for Logistics in the real-life situation
- Enhance their ability and professional skills in Logistics informatics.

1. Information

- 1.1. Introduction, Need for information and communication, information system, quality of information, right information, accuracy and effectiveness.
- 1.2. Integrated logistics information system, order processing system, research and intelligent system, decision support system, report and output system and information flow system
- 1.3. Electronic data system, importance of information, security process and procedure requirements
- 1.4. Dedicated devices, device management, encryption, network and remote access, screen locks and scans for confidential data.

2. Transport Information

- 2.1. Road transport vehicles: Communication involved, capacity of vehicle, type, travel between places, usual goods loaded, date of availability and duration.
- 2.2. Truck owner information, condition of vehicle, loading and unloading facilities and freight details
- 2.3. Safety and security of loaded goods, container loads and container terminal details.

3. Rail Wagon Information

- 3.1. Rail goods wagon: Communication involved, type of wagon and availability of date and time for loading
- 3.2. Loading facility available in the yard and booking of goods between stations
- 3.3. Availability of warehousing facilities at the loading and delivery stations, cost of freight and loading and unloading charges
- 3.4. Connecting road transport vehicle available and wagon/container availability.

4. Water Transport Information

- 4.1. Sea transport : Details of availability of ship, type capacity, draught of ship and sea worthiness of ship
- 4.2. Ship owner particulars, port of registration, GRT and NRT
- 4.3. Port touched by ship, loading and unloading time, facilities availability in the ship, regulation imposed and freight information.
- 4.4. Communication about air cargo availability, air craft, cargo capacity for transport and information regarding arrival and departure of air craft.

5. Digitalisation

- 5.1. Digitalization and logistics informatics
- 5.2. E freight suites, customs Ice gate, E way bill, GST filing, E insurance, various cargo optimization techniques used in the country and a discussion on start up company such as revigoLynk etc
- 5.3. Negative list of items
- 5.4. Value and quantity of goods handled annually from road, rail, air and sea.

Reference Books

1. Kenneth C. L., Jane P. L., &RajanishDass (2001) Management Information System -Managing the Digital Firm. Pearson Education: New Delhi.
2. Ravi, K., &Aandrew, B. W. Frontiers of Electronic Commerce. Pearson Education: New Delhi.
3. Sadagopan S. (2003) Management Information System. Prentice Hall India: New Delhi.
4. EFF, O.Z. (2003) Management Information Systems. Vikas Publishing House Pvt. Ltd.: New Delhi.
5. Online Resources: From LSC Web Site

SEMESTER SCHEME 2020-21

E-COMMERCE

Course Code	LS 4002
Course Title	E- Commerce
Number of Credits	3 (L: 2, T:1, P: 0)
Prerequisites	NIL
Course Category	PC

Course Objectives:

Following are the objectives of this course:

- To develop competencies and knowledge in the area of E-commerce.
- To orient students in the field of E-commerce and help them to E-commerce

Course outcomes:

After completing this course, student will be able to:

- To develop competencies to become E-commerce professionals
- Get oriented students in the field of Logistics and E-commerce

1. E commerce:

- 1.1. Meaning, examplytypes, B2B, B2C, C2C, C2B, C2A, benefits of E commerce
- 1.2. Customers, retailers, digital India campaign, E commerce activity, contract
- 1.3. Tender system, Orderprocessing, buying of products, sales promotions, delivery status of goods and price information
- 1.4. Warehousing information's, advertising product quality, E commerce levels, order fulfilment in E commerce and E commerce in logistics and reverse logistics

2. Global Activities

- 2.1. Global logistics, need, global operating strategy, technology manufacturing, marketing, logistic and using third party
- 2.2. General trading co-export trading co-management strategy and transportation
- 2.3. Warehousing, Packaging, inventory management and material handling information system
- 2.4. Global ocean freight, global air freight, global intermodalism, global intermediaries, international freight forwarders and functions.

3. Export Management

- 3.1. Non vessel operating company carriers, export management company and export trading companies export packers
- 3.2. Customs brokers, ship brokers, ship agents, term of sales, inco terms 2000 and ex works
- 3.3. FCA – FOB – CPT – CIP – CFR – CIF – DAF – DES – DEQ – DDU – DDP
- 3.4. Global trade documents, letter of credit, operation of letter of credit and E commerce in export and import trades.

4. Selection:

- 4.1. Selection factors for logistic personals and factors in organizational design, centralized and decentralized
- 4.2. Strategic versus operation focus, line verses staff, scope of authority and performance measurements
- 4.3. Suitable knowledge for each management system, basic reporting procedures, carryout end of day activities and maintaining data privacy
- 4.4. Reporting structure on breach of protocols, cultivation of positive attitude, elements of work ethic creativity and innovation characteristic

5. Maintenance:

- 5.1. Vehicle maintenance, short haul vehicle maintenance and two wheeler maintenance
- 5.2. Stock of spare parts, quick repairing system, inventory arrangement for quick delivery, responsibility of the personal incharge of delivery and delivery reports
- 5.3. Maintenance of personal records and Incentive system on work performance

Reference Books

1. Ray, Supply Chain Management for Retailing, TMH, 2010.
2. James B. Ayers, Retail Supply Chain Management, Auerbach Publications, 2007
3. Online Resources: From LSC Web Site

SEMESTER SCHEME 2020-21

DOCUMENTATION

Course Code	LS 4003
Course Title	Documentation
Number of Credits	3 (L: 2, T:1, P: 0)
Prerequisites	NIL
Course Category	PC

Course Objectives:

Following are the objectives of this course:

- To develop competencies and knowledge in the area of Documentation process required for import and export.
- To orient students in the field of import and export.

Course outcomes:

After completing this course, student will be able to:

- To develop competencies to become Documentation professionals
- Get oriented students in the field of Logistics, import and export.

1. Logistics management Process:

- 1.1. Logistics Management Process and various types of industries engaged in logistics process
- 1.2. Supplier of raw materials, Product manufacturing industry, Transporting organisations engaged, Market place and customers
- 1.3. Warehousing, Basis of Documentation explanation, Importance of documentation, Usage of documents and document assistant
- 1.4. Preparation of various documents, process involved, Types of document and Circumstance in which used.

2. Raw Material Documents:

- 2.1. Documents for raw material supplier and Documents for product supplier
- 2.2. Documents for transport organisations, Warehousing Import / export documents, Documents for inland traders and Overseas traders,
- 2.3. Documents required for Govt process, Chamber of commerce, certificate of origin.

3. Documents for Transport :

- 3.1. Documents, Proforma Invoice, Commercial Invoice, Delivery challan, CST forms, TIN services, way bill, Bill of lading, sea way bill and Customs Ice gate
- 3.2. Rail goods way bill, Entry tax form, Octroi forms, Transit pass, Packaging list, Log book, R C book, Tax paid certificate and transport permit
- 3.3. Protection authentication, Nature of goods transported, Weight of goods information, Container safety certificate, Health certificate, Customs clearing certificate, Warehousing dues paid certificate and Crew qualification certificate
- 3.4. Insurance policy(E Insurance), In bound consignment process, outbound consignment process, GST, Documents, E waybill, Documents relating to accidents and claims

4. Documents for sea transport

- 4.1. Bill of lading, types, crew passenger health certificate and Port due, Light house due clearing certificate
- 4.2. Cargo information documents, Dutiable, Non dutiable list, Crew qualification certificate, List of life saving appliances certificate and Dry docking certificate
- 4.3. Classification societies certificate, Stability booklet, Certificate of inspection of goods and Documents for marine loss insurance claim.

5. Documents with in the Organisation

- 5.1. Truck maintenance certificate, Warehousing safety certificate and Warehousing material handling equipment safety certificate
- 5.2. Rail goods wagon safety maintenance certificates and Air Cargo maintenance certificate, Cargo ships sea worthiness certificate

- 5.3. Staffs health regulation, Up keeping of premises certificate, Routine maintenance of building records and Dos and Donts while handling different documents.

Reference Books

1. B.B. Mitra, Bill of Lading “ Chareteristics Contract of Afereightment
2. Khuspats Jain, Export Import Procedures and Documentation
3. CA.K. Ramakrishnan, E- Way bill an in – Depth Analysis
4. Online Resources: From LSC Web Site

SEMESTER SCHEME 2020-21

STORAGE CONTAINERS

Course Code	LS 4004
Course Title	Storage Containers
Number of Credits	2(L: 2, T: 0, P:0)
Prerequisites	Nil
Course Category	PC

Course Objectives:

Following are the objectives of this course:

- To make students to learn about Storage containers
- To make students to understand types of various containers used in stockyard and container terminals
- To make students to know inspection of storage container its maintenance

Course outcomes:

After completing this course, student will be able to:

- Identify the storage container
- Identify storage container for stockyard and container terminals
- Carryout inspection of storage container
- Carryout maintenance of storage container

Course Content:**1. Container Types:**

1.1. Types of container

- 1.1.1. Dry cargo type, Bulk container, Reefer, Flat rack, portable tank container. Open top container flat form type, Refrigerated container and ventilated
- 1.1.2. Adjustable height lifting provisions in container hooks, welded hole plates and standard size of containers
- 1.1.3. Marking of container, necessity types of marking, transfer, pressure, sensitive film, advantages and disadvantages in the types of marking, film composition, vinyl classes of Flexibility, plasticizer type, mandatory marking, company name and address, painting of container and cleaning and use of quality paints.
- 1.1.4. Storage container. Fixed, Movable container, Types of fixed container / storage tanks for liquids, LNG,LPG chemicals, 1.29. tank arrangement at terminals, Connected pipelines for intake and outlet, prevention of leakage and Safety arrangement upkeeping of premises of information technology of intake / out let of products.

2. Container Maintenance:

2.1. Container inspection

- 2.1.1. Container routine inspection, visual inspection, periodical inspection, annual inspection, inspection by classification societies, damage inspection, at repair yard inspection, inspection after completion of repair and container equipment inspection fixing life span.

2.2. Lease

- 2.2.1. Taking on lease, Lease agreement, conditions on lease, conditions on safety and return, insurance of container and settlement of claims

3. Handling equipments:

3.1. Handling equipments

- 3.1.1. At sea side, ship to shore, STS gantry crane (single trolley) and mobile harbor crane (MHC) wide span crane (WSC)
- 3.1.2. Horizontal transport, passive vehicle, port tractor and automated guide vehicle (AGV) non passive vehicle
- 3.1.3. Fork lift truck and reach stacker, straddle carrier, ships derrick,ship mounted jip crane and ship mounted gantry crane.
- 3.1.4. At air cargo side unit load device (ULD) system and group trolley system

4. Equipments at stock yard:

4.1. Equipments at stock yard

- 4.1.1. Rubber tyred gantry (RTG) rail mounted gantry (RMG), Automated stacking crane (ASC) Horizontal transport equipment, straddle carrier, portal gantry crane and jib crane.
- 4.1.2. Multipurpose crane, mobile crane, spreader, overheads bridge crane, side picks, shuttle carrier-automated lifting vehicles (ALVS)

5. Equipments at container terminal:

5.1. Equipments at container terminal

- 5.1.1. Quay side gantry crane, tractor tailor sets, straddle carries, rubber tyred yard
- 5.1.2. Gantry cranes, rail mounted yard gantry crane, lift trucks, handling system, chassis system and straddles carrier direct system
- 5.1.3. Lift truck system, combination system, multi trailer system, terminal chassis, road chassis

Reference Books

- 1. Rolf Neise, Container Logistics, Kogan Publishers
- 2. Nils Kemme Design and Operation of Automated Container Storage Systems, Springer Science & Business Media
- 3. Lars A. R. Hultén, Container Logistics and Its Management
- 4. Hans-Otto Günther, Container Terminals and Automated Transport Systems, Springer Science & Business
- 5. Craig Martin, Shipping Container 2017
- 6. Online Resources: From LSC Web Site

LOGISTICS INFORMATICS LAB

Course Code	LS 4005
Course Title	Logistics Informatics Lab
Number of Credits	2 (L: 0, T: 0, P:4)
Prerequisites	NIL
Course Category	PC

Course Objectives:

Following are the objectives of this course:

- This practical course is intended to practice whatever is taught in theory class of “Logistics Informatics” and become proficient in handling MIS for logistics.

Course outcomes:

After competing this course, student will be able to:

- Perform MIS activities for logistics.

Course Content

Practical on: **Logistics Informatics**

S.No	List of Practical
1.	Prepare an information system for raw material purchase.
2.	Prepare an information system for route selection on road for a truck from one place to another place.
3.	Availability of loading & unloading facilities at a truck terminal - Prepare a data sheet
4.	Use of logistics information techniques.
5.	Register a ship in a port with needed particulars.
6.	Preparation of an E- insurance claim
7.	Collection of information about ports in India.
8.	Collection of information about any one container terminal in India.
9.	The arrival and departure of a ship – Prepare and Publish information
10.	Collect the information about the type of rail wagon available at good wagon yard.

Reference Books

1. Kenneth C. L., Janep P. L., &Rajanish Dass (2001) Management Information System -Managing the Digital Firm. Pearson Education: New Delhi.
2. Ravi, K., & Andrew, B. W. Frontiers of Electronic Commerce. Pearson Education: New Delhi.
3. Sadagopan, S. (2003) Management Information System. Prentice Hall India: New Delhi.
4. EFF, O.Z. (2003) Management Information Systems. Vikas Publishing House Pvt. Ltd.: New Delhi.
5. Online Resources: From LSC Web Site

E-COMMERCE LAB

Course Code	LS4006
Course Title	E-Commerce Lab
Number of Credits	2(L: 0, T: 0, P: 4)
Prerequisites	NIL
Course Category	PC

Course Objectives:

Following are the objectives of this course:

- This practical course is intended to practice whatever is taught in theory class of “E-commerce” and become proficient in handling E-Commerce activities.

Course outcomes:

After competing this course, student will be able to:

- Perform E-commerce activities for logistics.

Practicals

S.No	List of Practical
1.	Prepare an order for the purchase of a goods using E Commerce system
2.	Prepare a tender for publication for the sale of a machinery.
3.	Fix the EMD tender application fee and security deposit amount for the sale of a used m/c.
4.	Prepare an advertisement for sale of a product.
5.	Prepare a list of work ethics.
6.	Prepare the rules & regulation for a shipping agent.
7.	Prepare a report of a goods booked.
8.	Prepare an inventory for warehousing.
9.	Calculate the freight of a packed goods using various methods and select the economy freight
10.	Using computer prepare a list and forecast the arrival date for a product which is to be called back.

Reference Books

1. Ray, Supply Chain Management for Retailing, TMH, 2010.
2. James B. Ayers, Retail Supply Chain Management, Auerbach Publications, 2007
3. Online Resources: From LSC Web Site

DOCUMENTATION LAB

Course Code	LS4007
Course Title	Documentation – Lab
Number of Credits	2 (L: 0, T: 0, P: 4)
Prerequisites	NIL
Course Category	PC

Course Objectives:

Following are the objectives of this course:

- This practical course is intended to practice whatever is taught in theory class of “Documentation” and become proficient in handling Documentation for Export and Import (EXIM).

Course outcomes:

After competing this course, student will be able to:

- Perform Documentation activities for Export and Import (EXIM).

S.No	List of Practical
1.	Prepare proforma invoice for a product
2.	Prepare an invoice for a product
3.	Prepare a lorry way bill for a packing material
4.	Prepare a bill of lading for a cargo on board ship
5.	Prepare a routine maintenance list for the office building
6.	Prepare a inward and outward of a product in a warehouse
7.	Prepare a packing list for a pack of goods.
8.	Prepare a proposal form for insuring a cargo
9.	Prepare a OGL for importing a spare parts
10.	Prepare a Export documents for exporting of spare parts

Reference Books

1. B.B. Mitra, Bill of Lading “ Characteristics Contract of Affreightment
2. Khuspats Jain, Export Import Procedures and Documentation
3. CA.K. Ramakrishnan, E- Way bill an in – Depth Analysis
4. Online Resources: From LSC Web Site

ESSENCE OF INDIAN KNOWLEDGE AND TRADITION

Course Code	LS 4222 (Common in all branches of Engg.)
Course Title	Essence of Indian Knowledge and Tradition
Number of Credits	0(L-2,T-0, P-0)
Prerequisites	None
Course Category	AU

COURSE CONTENTS:

Basic Structure of Indian Knowledge System:

- (i) वेद,
- (ii) उन्नवेद (आयुर्वेद, धनुर्वेद, गन्धर्वेद, स्थानतत्त्वआदद)
- (iii) वेदशाखांग (शिक्षा, कलन, ननरुत, व्याकरण, ज्योनतषछथांद),
- (iv) उन्नथाइग (धर्मशास्त्र, र्ीथांसांथा, नुरथाण, तकशाशास्त्र)
- Modern Science and Indian Knowledge System
- Yoga and Holistic Health care
- Case Studies.

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. V. Sivarama Krishna, " Cultural Heritage of India- Course Material", Bhartiya Vidya Bhavan, Mumbai, fifth Edition, 2014.
2. Swami Jitmanand, " Modern Physics and Vedant", Bhartiya Vidya Bhavan.
3. Fritz of Capra, " The wave of Life".
4. Fritz of Capra, " Tao of Physics".
5. V N Jha, " Tarkasangraha of Annam Bhatta, International" Cinmay Foundation, Velliarnad, Amakum.
6. R N Jha, " Science of Consciousness Psychotherapy and Yoga Practices" VidyavidhiPrakasham, Delhi, 2016.

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BOARD OF TECHNICAL EDUCATION RAJASTHAN JODHPUR
SEMESTER SCHEME-2020-21



V SEMESTER
(SESSION 2021-2022 & ONWARDS)

PACKAGING

Course Code	LS 5001
Course Title	Packaging
Number of Credits	2(L: 2, T: 0, P:0)
Prerequisites	NIL
Course Category	PC

Course Objectives:

Following are the objectives of this course:

- To make students to learn about Packaging and its importance in logistics
- To make students to understand various types of packaging and their appropriate place of application
- To make students to understand safety precautions for packaging used for exportable goods and dangerous goods.

Course outcomes:

After completing this course, student will be able to:

- Identify the relevant packaging for the given application
- Identify the packing for special products, exportable goods and dangerous goods
- Observe safety precautions in packaging for shipment, air cargo and rail transport etc.

1. Packaging:

1.1. Packaging

- 1.1.1. Need, necessity, nature of Packaging, various materials used, reusable materials used and type of Packaging
- 1.1.2. Cost involved, component of cost involved, economy in Packaging, freight vs Packaging, material handling vs Packaging and weight constraint
- 1.1.3. Consumer attracting Packaging, Packaging for safety, Packaging to boost sale, strengthening methods and Packaging functions.

2. Special Packaging:

2.1. Packaging for special product

- 2.1.1. Packaging for cold product, freezing product, dairy product and Packaging for hot products
- 2.1.2. Fruits /vegetable Packaging, Packaging of grains, Packaging of pharmacy products and food products
- 2.1.3. Packaging of liquids, water, edible oil, Packaging of cosmetics and powdered articles
- 2.1.4. Packaging guide lines, single box and box in box Packaging –storing in cold / frozen storage.

3. Safety precautions:

3.1. Precautions

- 3.1.1. Safety precautions in Packaging, difficulty in Packaging, defects in Packaging, label mixing, label error, lot no, missing lot no, date of Packaging & manufacture
- 3.1.2. Storage instruction, supervision and examination, investigation on discrepancies and tamper evident.
- 3.1.3. Packaging for shipment, Packaging for air cargo, rail transport, requirements sensitivity of Packaging for air cargo and performance oriented Packaging.
- 3.1.4. Warehouse labeling, Hygroscopic protection to be taken care, IATA regulations and lashing and securing in air transport.

4. Exportable goods Packaging:

4.1. Packaging for exportable goods.

- 4.1.1. Packaging for export, precaution in Packaging, quality Packaging, country's labeling, country's language, colour restrictions, provision country of origin, ISO standard
- 4.1.2. Physical protection, quality protection, product information, machinability, storage and transport, recyclability-ventilation of package, cushioning materials and moisture absorbing system.

5. Dangerous goods Packaging:

5.1. Packaging for dangerous goods

- 5.1.1. Packaging of dangerous goods, Packaging of chemicals, oils, toxic gasses, LPG,LNG. Can,

- drum cylinder Packaging, portable tanker Packaging, grating of tanker
- 5.1.2. Packaging of radioactive materials, inner container, outer container and Packaging groups I,II,III
 - 5.1.3. Pressure receptacles for liquids and solids, Packaging instruction of UN3373,UN3245. Labelling of dangerous goods, signs /symbols to be used and IATA regulations for dangerous goods

Reference Books

1. S. Natarajan, M. Govindarajan and B. Kumar., Fundamentals of Packaging Technology, PHI, Delhi - 2009
2. Griffin, RC and Sakharov, S. Principles of Package Development. The AVI Publishing Co. Inc
3. Heiss, R. Principles of Food Packaging. P. Keppeler Verlag KG, Germany
4. Paine, FA and Paine HY. A Handbook of Packaging
5. Coles and McDowell, Food Packaging technology, CRC Press
6. Online Resources: From LSC Web Site

SEMESTER SCHEME 2020-21

LOGISTICS IN MANUFACTURING, SUPPLY CHAIN AND DISTRIBUTION

Course Code	LS 5002
Course Title	Logistics in Manufacturing, Supply chain and Distribution
Number of Credits	2 (L: 2, T: 0, P:0)
Prerequisites	NIL
Course Category	PC

Course Objectives:

Following are the objectives of this course:

- To make students to understand the importance of logistics in manufacturing.
- To make students to understand the logistics part of supply chain management

Course outcomes:

After completing this course, student will be able to:

- Understand the importance of logistics in manufacturing
- Understand supply chain, its role and IT enabled supply chain management
- Understand key factors in optimizing delivery and distribution system of supply chain

1. Logistics in Manufacturing:

1.1. Types of Products & Units

1.1.1. Consumable product, non consumable product, reusable, recycling product and industrial product

1.1.2. Large scale production unit, medium scale production unit, small scale production unit, structure of manufacturing units, sole proprietor, partnership shareholding company and listing of company.

1.2. Senses point, cottage industrial products, Raw material supply system, Selection of Transport for material supply and Time factor involved

1.3. Line production and Batch production

1.4. Finished goods transportation

1.4.1. Transporting of waste products, Storing of finished goods and storing and disposal of waste product.

2. Demand and supply system:

2.1. Demand System

2.1.1. Study on pricing or competitive pricing study, study on consumers satisfaction, occasional demand, seasonal demand, compulsory demand and essential commodity demands

2.2. Supply system

2.2.1. Difficulty in supply system, raw material supply study, manufacturing difficulty, transport difficulty and warehousing difficulty

2.3. Lack of information in the field, importance of quality control study, reduction in rejection study and profit study.

3. Supply chain:

3.1. Objective, definition, primary responsibility and logistic part of supply chain management

3.2. Supply chain flow, product flow, information flow, finance flow and flow charts various types

3.3. Key issue, evolution of strategic logistic management and logistic policy

3.4. Changing supply chain roles and IT enabled supply chain management.

4. Purchasing and supply chain:

4.1. Introduction, important of purchasing and sale, arriving cost effective supply chain, Freight rates, Spot rates and versus contract rates, vehicle owner versus common carrier rates

4.2. Trip costing, Impact of over loading on vehicles, purchasing process need, identifying a supplier and qualifying and placing an order

4.3. Ordering a product, tender systems, terms & conditions on agreements\contracts and monitoring delivery process

4.4. Evaluating the purchaser and supplier and selection of export market.

5. Distribution:

- 5.1. Key factors in optimising Delivery system, Freight, cost & Service Management and Total Transportation, cost and services
- 5.2. Operations, Outsourcing, Administrative services, Load planning, Mode selection, load building and Load consolidation
- 5.3. Cross Dock planning, Routing and Scheduling, Fleet Management, Fuel cost study, Better selection of Transport system, Information about Distribution system

Reference Books

1. Logistic and Supply Chain Management by Donald J. Bowerson, Publisher: Prentice Hall of India
2. Introduction to Supply chain Management, Handfield and Nicholas. 2015
3. Operations and Supply chain Management, Richard B. Chase, Ravishankar And Robert Jacob., 2018
4. Online Resources: From LSC Web Site

SEMESTER SCHEME 2020-21

ECONOMIC POLICIES IN INDIA

Course Code	LS 51001 (Same in All Branches of Engg.)
Course Title	Economic Policies in India
Number of Credits	3 (L:3, T:0, P:0)
Prerequisites	NIL
Course Category	OE

COURSE LEARNING OBJECTIVES:

The objective of this course is to familiarize the students of different streams with the basic concepts, structure, problems and issues concerning Indian economy.

CO1	Understand Indian economics policy, planning strategies
CO2	It will enable to students to comprehend theoretical and empirical development across countries and region for policy purposes
CO3	Development Economics as a discipline encompasses different approaches to the problems of unemployment, poverty, income generation, industrialization from different perspectives
CO4	Able to identify the problems and capable to decide the application for future development
CO5	Analyze economic issues and find solutions to complex economic problems and take correct economic judgment

COURSE CONTENTS:**1. BASIC FEATURES AND PROBLEMS OF INDIAN ECONOMY:**

- 1.1. Economic History of India;
- 1.2. Nature of Indian Economy
- 1.3. Demographic features and Human Development Index,
- 1.4. Problems of Poverty, Unemployment, Inflation, income inequality, Blackmoney in India.

2. SECTORAL COMPOSITION OF INDIAN ECONOMY:

- 2.1. Issues in Agriculture sector in India,
- 2.2. land reforms
- 2.3. Green Revolution
- 2.4. agriculture policies of India,
- 2.5.

3. INDUSTRIAL DEVELOPMENT;

- 3.1. Small scale and cottage industries,
- 3.2. Industrial Policy,
- 3.3. Public sector in India,
- 3.4. Service sector in India.

4. ECONOMIC POLICIES:

- 4.1. Economic Planning in India,
- 4.2. Planning commission v/s NITI Aayog,
- 4.3. Five Year Plans,
- 4.4. Monetary policy in India,
- 4.5. Fiscal Policy in India,
- 4.6. Centre state Finance Relations,
- 4.7. Finance commission in India
- 4.8. LPG policy in India

5. EXTERNAL SECTOR IN INDIA

- 5.1. India's foreign trade value composition and direction,
- 5.2. India Balance of payment since 1991,
- 5.3. FDI in India,
- 5.4. Impact of Globalization on Indian Economy,
- 5.5. WTO and India.

REFERENCE BOOKS:

1. Dutt Rudder and K.P.M Sunderam (2017). Indian Economy .S Chand & Co.Ltd. New Delhi.
2. Mishra S. K & V. K Puri (2017). Indian Economy and Its Development Experience. Himalaya Publishing House.
3. Singh, Ramesh, (2016): Indian Economy, Tata-McGraw Hill Publications, New Delhi.
4. Dhingra, I.C., (2017): March of the Indian Economy, Heed Publications Pvt. Ltd.
5. Karam Singh Gill, (1978): Evolution of the Indian Economy, NCERT, NewDelhi
6. Kaushik Basu (2007): The Oxford Companion to Economics of India ,Oxford University Press.

SEMESTER SCHEME 2020-21

ENGINEERING ECONOMICS & ACCOUNTANCY

Course Code	LS51002 (Same in All Branches of Engg.)
Course Title	Engineering Economics & Accountancy
Number of Credits	3 (L:3,T:0,P:0)
Prerequisites	NIL
Course Category	OE

COURSE OBJECTIVES

- To acquire knowledge of basic economic of a facilitate the process of economic decision making.
- To acquire knowledge on basic financial management aspects.
- To develop the basic skills to analyze financial statements.

COURSE OUTCOMES:

At the end of the course, the student will be able to:

CO1	Understand the macro-economic environment of the business and its impact on enterprise
CO2	Understand cost elements of the product and its effect on decision making
CO3	Prepare accounting records and summarize and interpret the accounting data for managerial decisions
CO4	Understand accounting systems and analyze financial statements using ratio analysis
CO5	Understand the concepts of financial management and investment

COURSE CONTENTS**1. INTRODUCTION:**

- 1.1. Managerial Economics;
- 1.2. Relationship with other disciplines;
- 1.3. Firms: Types, objectives and goals;
- 1.4. Managerial decisions;
- 1.5. Decision analysis.

2. DEMAND & SUPPLY ANALYSIS:

- 2.1. Demand;
 - 2.1.1. Types of demand;
 - 2.1.2. Determinants of demand;
 - 2.1.3. Demand function;
 - 2.1.4. Demand elasticity;
 - 2.1.5. Demand forecasting;
- 2.2. Supply;
 - 2.2.1. Determinants of supply;
 - 2.2.2. Supply function;
 - 2.2.3. Supply elasticity.

3. PRODUCTION AND COST ANALYSIS:

- 3.1. Production function;
- 3.2. Returns to scale;
- 3.3. Production optimization;
- 3.4. Least cost input; Iso quants;
- 3.5. Managerial uses of production function;
- 3.6. Cost Concepts;
 - 3.6.1. Cost function;
 - 3.6.2. Types of Cost;
 - 3.6.3. Determinants of cost;
 - 3.6.4. Short run and Long run cost curves;
 - 3.6.5. Cost Output Decision;
 - 3.6.6. Estimation of Cost.

4. PRICING:

- 4.1. Determinants of Price;
- 4.2. Pricing under different objectives and different market structures;
- 4.3. Price discrimination;
- 4.4. Pricing methods in practice;
- 4.5. Role of Government in pricing control.

5. FINANCIAL ACCOUNTING (ELEMENTARY TREATMENT):

- 5.1. Balance sheet and related concepts;
- 5.2. Profit & Loss Statement and related concepts;
- 5.3. Financial Ratio Analysis;
- 5.4. Cash flow analysis;
- 5.5. Funds flow analysis;
- 5.6. Comparative financial statements;
- 5.7. Analysis & Interpretation of financial statements;
- 5.8. Investments;
- 5.9. Risks and return evaluation of investment decision;
- 5.10. Average rate of return;
- 5.11. Payback Period;
- 5.12. Net Present Value;
- 5.13. Internal rate of return,

REFERENCE BOOKS:

1. Mc Guigan, Moyer and Harris, 'Managerial Economics; Applications, Strategy and Tactics', Thomson South Western, 10th Edition, 2005.
2. Prasanna Chandra. 'Fundamentals of Financial Management', Tata Mcgraw Hill Publishing Ltd., 4th edition, 2005.
3. Samuelson. Paul A and Nordhaus W. D., 'Economics', Tata Mcgraw Hill Publishing Company Limited, New Delhi, 2004.
4. Paresh Shah, 'Basic Financial Accounting for Management', Oxford University Press, New Delhi, 2007.
5. Salvatore Dominick, 'Managerial Economics in a global economy'. Thomson South Western, 4th Edition, 2001.

SEMESTER SCHEME 2020-21

COMPLIANCE – INSURANCE, REGULATIONS AND LOSS PREVENTIONS

Course Code	LS 5003
Course Title	Compliance – Insurance, Regulations and Loss Prevention
Number of Credits	2 (L: 2, T: 0, P:0)
Prerequisites	NIL
Course Category	PC

Course Objectives:

Following are the objectives of this course:

- To make students to understand need and importance of insurance
- To make students to understand types of insurances, risk covered, premium payment etc.
- To make students to understand Insurance, Regulations and Loss preventions

Course outcomes:

After completing this course, student will be able to:

- Understand need and importance of insurance and its compliance
- Understand Insurance, Regulations and Loss preventions and act accordingly

1. Insurance:

- 1.1. History of insurance, need for insurance, definition, rules for insurance, principles of insurance, insurable interest, utmost good faith and proximate cause
- 1.2. Indemnity, subrogation, loss prevention association of India ltd and institute of underwriters
- 1.3. Insurance agents, insurance surveyors, valuer and average adjusters
- 1.4. Various insurance, various losses, traffic advisory committee, proposal form, content policy, risk covered, premium payment terms and conditions, institute warranty, stamp duty.

2. Allied Information:

- 2.1. Transit Insurance, Accidents, information to insurance companies, time frame for accident information and appointment of surveyors
- 2.2. Procedure for rectifications, rectification reports, scrutinizing the report and settlement of claim
- 2.3. Deductibles, breach of warranty, termination and general average salvages
- 2.4. P and I club, duty of assured (sue and labour), new for old, return for lay, exclusions.

3. Basic rules for Industry and Road Transport:

- 3.1. Factory act, industrial dispute act, minimum wages act, payment of wages act and negotiable instrument act.
- 3.2. Shops act, ESI act, EPF act, motor vehicles act and motor vehicles maintenance rules
- 3.3. Regulation regarding qualifications for running staffs, cargo rules and rules regarding interstate activities.

4. Basic rules for Sea Transport

- 4.1. Carriage of goods act by sea, merchant shipping act 1958, marpol act 1973/73 pertaining to oil spillage only
- 4.2. International maritime organization and international maritime dangerous goods act.
- 4.3. Control of pollution by harmful substances, limitation of liability for maritime claims and SOLAS

5. Basic Rules for warehousing:

- 5.1. Rules and regulations for warehousing construction and rules for stocking and protection of goods
- 5.2. Rules for stocking of chemicals, toxic gases, radioactive goods and Rules for safety methods at warehousing
- 5.3. Rules for up keeping of warehouse premises, rules regarding safety road transport system, rail transport system and keeping of good sheds for rail transport
- 5.4. Rules regarding air cargo transportation and rules for currency transport.

Reference Books

1. ICSI Insurance – Law & Practice, Module 3, Elective Paper 9.2, 2019
2. M. N. Srinivasan : Principles of Insurance Law, Wadhwa & Co.
3. Taxmann : Insurance Manual, Taxmann Publication Private Limited
4. Dr. Avtar Singh : Law of Insurance, Universal Publication Pvt. Limited
5. George E. Rejda : Principles of Risk Management and Insurance
6. Online Resources: From LSC Web Site

SEMESTER SCHEME 2020-21

MATERIAL HANDLING LAB

Course Code	LS 5004
Course Title	Material Handling Lab
Number of Credits	2 (L: 0, T: 0, P: 4)
Prerequisites	NIL
Course Category	PC

Course Objectives:

Following are the objectives of this course:

- This practical course is intended to practice whatever is taught in theory class of “Material Handling Repair and Maintenance” in the industry and become proficient in handling material handling equipments and caring out their routine maintenance.

Course outcomes:

After competing this course, student will be able to:

- Perform Material Handling activities, operate material handling equipments and caring out their routine maintenance.

Course Content

Practical on: **Material Handling – Practical - I**

S.No	List of Practical
1.	Study of various material handling machines
2.	Study of various material handling equipments
3.	Study of manual handling and safety
4.	Wheeled equipments operations and maintenance
5.	Lifting equipments operation and maintenance
6.	Fixed crane operation and checking of lifting equipment
7.	Security check for lifting equipments
8.	Getting of safety certificate for loading / unloading machines
9.	Safety preparations to be followed for trucks
10.	Study of information systems and prepare information Report in logistics
11.	Study of facility of warehousing
12.	Checklist for maintenance activity

Reference Books

1. Introduction to Material Handling, Siddartha Ray, Newage Publishers, 2017
2. Aspects of material Handling, Keshav Chandra Arora, Vikas.V.Shinde, Lakshmi Publications (P) Ltd,
3. Bulk Materials Handling HandBook, Jacob Fruchtbaum, Springer Science and Business Media, 1988
4. Material Handling Equipment, Michael, G.Kay
5. Online Resources: From LSC Web Site

WAREHOUSING LAB

Course Code	LS 5005
Course Title	Warehousing Lab
Number of Credits	2 (L: 0, T: 0, P: 4)
Prerequisites	NIL
Course Category	PC

Course Objectives:

Following are the objectives of this course:

- This practical course is intended to practice in the industry whatever is taught in the theory class of “Fundamental of Logistics and Warehousing” and become proficient in handling Warehousing activities.

Course outcomes:

After competing this course, student will be able to:

- Perform Warehousing activities in an actual warehouse.

Course Content

Practical on: **Warehousing**

S.No.	List of Practical
1.	Study and prepare a report on Warehousing location
2.	Study of facilities available in warehousing and prepare a Report.
3.	Study of warehousing storing and prepare a Plan
4.	Study of Loading methods used in warehousing prepare a plan
5.	Operation of handling equipment used in warehousing
6.	Study of information system available in warehousing
7.	Study of incoming and outgoing Cargoes in warehousing
8.	Perform packing and labelling of goods for warehousing
9.	Labelling of goods for warehousing
10.	Product symbols, barcode study and furnish the information
11.	Housekeeping in warehouse
12.	Inventory control in warehousing
13.	Use of Safety equipment, in warehousing

Reference Books

1. J P Saxena, Warehouse Management and Inventory Control- Vikas Publication House Pvt Ltd, First Edition, 2003.
2. Warehouse Management: Automation and Organisation of Warehouse and Order Picking Systems [With CDROM], Michael Ten Hompe, Thorsten Schmidt, Springer-verlag, First Edition, 2006.
3. Kapoor Satish K., and KansalPurva, ‘Basics of Distribution Management: A Logistical Approach’, Prentice HALL of India.
4. Online Resources: From LSC Web Site

MIS LAB

Course Code	LS 5006
Course Title	MIS LAB
Number of Credits	6(L: 0, T: 0, P:12)
Prerequisites	NIL
Course Category	PR

Course Objectives:

Following are the objectives of this course:

1. Describe the concept of ERP and the ERP model; define key terms; explain the transition from MRP to ERP; identify the levels of ERP maturity.
2. Explain how ERP is used to integrate business processes; define and analyze a process; create a process map and improve and/or simplify the process; apply the result to an ERP implementation.

Course outcomes:

After completion of this course, students will become skilled and able to:

1. Develop model for ERP for large projects
2. Develop model for E-commerce architecture for any application
3. Describe the advantages, strategic value, and organizational impact of utilizing an ERP system for the management of information across the functional areas of a business: sales and marketing, accounting and finance, human resource management, and supply chain.

Course Content:**1. MIS - INTRODUCTION**

The meaning and use MIS, System View of Business, Process of MIS, Development of MIS within the organization, Management Process, Information Needs, System Approach in Planning Organizing and Controlling MIS.

2. PLANNING

Planning, Implementation and Controlling of Management Information System. Fundamentals of Data Processing, Computer Operation of Manual Information System, Components of Computer Systems, Flow Chart, and Conversion of Manual to Computer Based Systems, Computer Systems Software, Application Software, and Telecommunication Modem.

3. DECISION MAKING

Managerial Decision Making, characteristics and components of Decision Support System. System design consideration, input/output design, forms design, file organization and database, data management, file design, program design, control and security.

4. ERP- INTRODUCTION

ERP Introduction- Benefits, Origin, Evolution and Structure: Conceptual Model of ERP, the Evolution of ERP, the Structure of ERP. Business Process Reengineering, Data ware Housing, Data Mining, Online Analytic Processing (OLAP), Product Life Cycle Management (PLM), LAP, Supply chain Management.

5. ERP DYNAMICS

ERP Marketplace and Marketplace Dynamics: Market Overview, Marketplace Dynamics, the Changing ERP Market. ERP- Functional Modules: Introduction, Functional Modules of ERP Software, Integration of ERP, Supply chain and Customer Relationship Applications.

Reference Books

1. Jayant, Management Information System- Nirali Prakashan Pune India- 7th edition
2. Alexis Leon, Enterprise Resource Planning, second edition, Tata McGraw-Hill, 2008.
3. Vinod Kumar Grag and N.K. Venkitakrishnan, ERP- Concepts and Practice, Prentice Hall of India, 2nd edition, 2006.
4. Joseph A Brady, Ellen F Monk, Bret Wagner, "Concepts in Enterprise Resource Planning", Thompson Course Technology, USA, 2001.
5. Online Resources. From LSC Web Site.

GOVERNMENT OF RAJASTHAN
BOARD OF TECHNICAL EDUCATION RAJASTHAN JODHPUR
SEMESTER SCHEME-2020-21



VI SEMESTER
(SESSION 2021-2022 & ONWARDS)

ENTREPRENEURSHIP AND START-UPS

Course Code	LS 6111(Common in all branches of Engg.)
Course Title	Entrepreneurship and Start-ups
Number of Credits	4 (L-3,T-1, P-0)
Prerequisites (Course code)	None
Course Category	HS

COURSE LEARNING OBJECTIVES:

1. Acquiring Entrepreneurial spirit and resourcefulness.
2. Familiarization with various uses of human resource for earning dignified means of living.
3. Understanding the concept and process of entrepreneurship-its contribution and role in the growth and development of individual and the nation.
4. Acquiring entrepreneurial quality, competency, and motivation.
5. Learning the process and skills of creation and management of entrepreneurial venture.

LEARNING OUTCOME:

Upon completion of the course, these students will be able to demonstrate knowledge of the following topics:

1. Understanding the dynamic role of entrepreneurship and small businesses
2. Organizing and Managing a Small Business
3. Financial Planning and Control
4. Forms of Ownership for Small Business
5. Strategic Marketing Planning
6. New Product or Service Development
7. Business Plan Creation

COURSE CONTENTS:**1. INTRODUCTION TO ENTREPRENEURSHIP AND START-UPS**

- 1.1. Definitions, Traits of an entrepreneur, Intrapreneurship, Motivation
- 1.2. Types of Business Structures,
- 1.3. Similarities / differences between entrepreneurs and managers.

2. BUSINESS IDEAS AND THEIR IMPLEMENTATION

- 2.1. Discovering ideas and visualizing the business
- 2.2. Activity map
- 2.3. Business Plan

3. IDEA TO START-UP

- 3.1. Market Analysis– Identifying the target market,
- 3.2. Competition evaluation and Strategy Development,
- 3.3. Marketing and accounting,
- 3.4. Risk analysis

4. MANAGEMENT

- 4.1. Company's Organization Structure,
- 4.2. Recruitment and management of talent.
- 4.3. Financial organization and management

5. FINANCING AND PROTECTION OF IDEAS

- 5.1. Financing methods available for start-ups in India
- 5.2. Communication of Ideas to potential investors– Investor Pitch
- 5.3. Patenting and Licenses

6. EXIT STRATEGIES FOR ENTREPRENEURS ,BANKRUPTCY, AND SUCCESSION ANDHARVESTING STRATEGY

SUGGESTED LEARNING RESOURCES:

S.No.	Title of Book	Author	Publication
1.	The Startup Owner's Manual: The Step by-Step Guide for Building a Great Company	Steve Blank and Bob Dorf	K & S Ranch ISBN-978-0984999392
2.	The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses	Eric Ries	Penguin UK ISBN-978-0670921607
3.	Demand: Creating What People Love Before They Know They Want It	Adrian J. Slywotzky with Karl Weber	Headline Book Publishing ISBN-978-0755388974
4.	The Innovator's Dilemma: The Revolutionary Book That Will Change the Way You Do Business	Clayton M. Chris Tensen	Harvard business ISBN:978-142219602

SUGGESTED SOFTWARE/LEARNING WEBSITES:

- a. <https://www.fundable.com/learn/resources/guides/startup>
- b. <https://corporatefinanceinstitute.com/resources/knowledge/finance/corporatestructure/>
- c. <https://www.finder.com/small-business-finance-tips>
- d. <https://www.profitbooks.net/funding-options-to-raise-startup-capital-for-your-business/>

SEMESTER SCHEME 2020-21

PROJECT MANAGEMENT

CourseCode	LS 62001(Common in all branches of Engg.)
CourseTitle	Project Management
NumberofCredits	3(L:3,T:0,P:0)
Prerequisites	NIL
CourseCategory	OE

COURSE LEARNING OBJECTIVES

- To develop the idea of project plan, from defining and confirming the project goals and objectives, identifying tasks and how goals will be achieved.
- To develop an understanding of key project management skills and strategies.

COURSE OUTCOMES

At the end of the course, the student will be able to:

CO1	Understand the importance of projects and its phases.
CO2	Analyze projects from marketing, operational and financial perspectives.
CO3	Evaluate projects based on discount and non-discount methods.
CO4	Develop network diagrams for planning and execution of a given project.
CO5	Apply crashing procedures for time and cost optimization.

COURSE CONTENTS**1. CONCEPT OF A PROJECT:**

- 1.1. Classification of projects
- 1.2. Importance of project management
- 1.3. The project Life cycle
- 1.4. Establishing project priorities (scope-cost-time)
- 1.5. Project priority matrix
- 1.6. Work break down structure.

2. CAPITAL BUDGETING PROCESS:

- 2.1. Planning -Analysis-Selection-Financing-Implementation-Review.
- 2.2. Generation and screening of project ideas
- 2.3. Market and demand analysis
- 2.4. Demand forecasting techniques.
- 2.5. Market planning and marketing research process
- 2.6. Technical analysis

3. FINANCIAL ESTIMATES AND PROJECTIONS:

- 3.1. Cost of projects
- 3.2. Means of financing
- 3.3. Estimates of sales and production-cost of production
- 3.4. Working capital requirement and its financing
- 3.5. Profitability project , cash flow statement and balance sheet.
- 3.6. Breakeven analysis.

4. BASIC TECHNIQUES IN CAPITAL BUDGETING:

- 4.1. Non discounting and discounting methods
- 4.2. pay-back period
- 4.3. Accounting rate of return
- 4.4. Net present value
- 4.5. Benefit cost ratio
- 4.6. Internal rate of return.
- 4.7. Project risk.
- 4.8. Social cost benefit analysis and economic rate of return.

- 4.9. Non-financial justification of projects.

5. PROJECT ADMINISTRATION:

- 5.1. Progress payments,
- 5.2. Expenditure planning,
- 5.3. Project scheduling and network planning,
- 5.4. Use of Critical Path Method(CPM),
- 5.5. Schedule of payments and physical progress,
- 5.6. time-cost trade off.
- 5.7. Concepts and uses of PERT
- 5.8. Cost as a function of time,
- 5.9. Project Evaluation and Review Techniques
- 5.10. Cost mechanisms.
- 5.11. Determination of least cost duration.
- 5.12. Post project evaluation.
- 5.13. Introduction to various Project management softwares.

REFERENCE BOOKS

- 1.Project planning, analysis, selection, implementation and review –Prasannachandra–Tata McGraw Hill
- 2.Project Management – the Managerial Process– Clifford F. Gray& Erik W. Larson-McGrawHill
- 3.Project management- David I Cleland- Mcgraw Hill International Edition, 1999
- 4.Project Management– Gopalakrishnan– Mcmillan India Ltd.
- 5.Project Management- Harry – Maylor – Peason Publication

SEMESTER SCHEME 2020-21

RENEWABLE ENERGY TECHNOLOGIES

Course Code	LS 62002 (Common in all branches of Engg.)
Course Title	Renewable Energy Technologies
Number of Credits	3 (L:3,T:0,P:0)
Prerequisites	NIL
Course Category	OE

COURSE LEARNING OBJECTIVES

- To understand present and future scenario of world energy use.
- To understand fundamentals of solar energy systems.
- To understand basics of wind energy.
- To understand bio energy and its usage in different ways.
- To identify different available non-conventional energy sources.

COURSE OUTCOMES

At the end of the course, the student will be able to:

C01	Understand present and future energy scenario of the world.
C02	Understand various methods of solar energy harvesting.
C03	Identify various wind energy systems.
C04	Evaluate appropriate methods for Bio energy generations from various Bio wastes.
C05	Identify suitable energy sources for a location.

COURSE CONTENTS**1. INTRODUCTION:**

- 1.1. World Energy Use;
- 1.2. Reserves of Energy Resources;
- 1.3. Environmental Aspects OF Energy Utilisation;
- 1.4. Renewable Energy Scenario in India and around the World;
- 1.5. Potentials, Achievements/ Applications;
- 1.6. Economics of renewable energy systems.

2. SOLAR ENERGY:

- 2.1. Solar Radiation;
- 2.2. Measurements of Solar Radiation;
- 2.3. Flat Plate and Concentrating Collectors;
- 2.4. Solar direct Thermal Applications;
- 2.5. Solar thermal Power Generation
- 2.6. Fundamentals of Solar Photo Voltaic Conversion;
- 2.7. Solar Cells;
- 2.8. Solar PV Power Generation;
- 2.9. Solar PV Applications.

3. WIND ENERGY:

- 3.1. Wind Data and Energy Estimation;
- 3.2. Types of Wind Energy Systems;
- 3.3. Performance; Site Selection;
- 3.4. Details of Wind Turbine Generator;
- 3.5. Safety and Environmental Aspects.

4. BIO-ENERGY:

- 4.1. Bio mass direct combustion;
- 4.2. Bio mass gasifiers;

- 4.3. Bio gas plants;
- 4.4. Digesters;
- 4.5. Ethanol production;
- 4.6. Bio diesel;
- 4.7. Cogeneration;
- 4.8. Bio mass Applications.

5. OTHER RENEWABLE ENERGY SOURCES:

- 5.1. Tidal energy;
- 5.2. Wave Energy;
- 5.3. Open and Closed OTEC Cycles;
- 5.4. Small Hydro Geothermal Energy;
- 5.5. Hydrogen and Storage;
- 5.6. Fuel Cell Systems;
- 5.7. Hybrid Systems.

REFERENCE BOOKS

1. Non-Conventional Energy Sources, Rai. G. D., Khanna Publishers, New Delhi, 2011.
2. Renewable Energy Sources, Twidell, J.W. & Weir, A., EFN SponLtd.,UK,2 006.
3. Solar Energy, Sukhatme. S. P., Tata McGraw Hill Publishing CompanyLtd. ,New Delhi, 1997.
4. Renewable Energy, Power for a Sustainable Future, Godfrey Boyle, Oxford University Press, U.K., 1996.
5. Fundamental of Renewable Energy Sources, G N Tiwari and M K Ghoshal, Narosa, New Delhi, 2007.
6. Renewable Energy and Environment A Policy Analysis for India ,NHRavindranath, U K Rao, B Natarajan, P Monga, Tata McGraw Hill.
7. Energy and The Environment, R A Ristinen and J JKraushaar, second edition, John Willey & Sons, New York, 2006.
8. Renewable Energy Resources, J W T widell and A D Weir, ELBS, 2006.

SEMESTER SCHEME 2020-21

PRODUCT DESIGN

CourseCode	LS 63001(Common in all branches of Engg.)
CourseTitle	Product Design
NumberofCredits	3 (L:3,T:0,P:0)
Prerequisites	NIL
CourseCategory	OE

COURSE LEARNING OBJECTIVES

- To acquire the basic concepts of product design and development process
- To understand the engineering and scientific process in executing a design from concept to finished product
- To study the key reasons for design or redesign.

COURSE OUTCOMES

At the end of the course, the student will be able to:

C01	Understand the basic concepts of product design and development process.
C02	Illustrate the methods to define the customer needs.
C03	Describe an engineering design and development process.
C04	Understand the intuitive and advanced methods used to develop and evaluate a concept.
C05	Apply modelling and embodiment principles in product design and development process.

COURSE CONTENTS**1. DEFINITION OF A PRODUCT**

- 1.1. Types of product;
- 1.2. Levels of product;
- 1.3. Product-market mix;
- 1.4. New product development (NPD) process;
- 1.5. Idea generation methods;
- 1.6. Creativity;
 - 1.6.1. Creative attitude;
 - 1.6.2. Creative design process;
- 1.7. Morphological analysis;
- 1.8. Analysis of inter-connected decision areas;
- 1.9. Brain storming.

2. PRODUCT LIFECYCLE;

- 2.1. The challenges of Product development;
- 2.2. Product analysis;
- 2.3. Product characteristics;
- 2.4. Economic considerations;
- 2.5. Production and Marketing aspects;
- 2.6. Characteristics of successful Product development;
- 2.7. Phases of a generic product development process;
- 2.8. Customer need identification;
- 2.9. Product development practices and industry-product strategies.

3. PRODUCT DESIGN

- 3.1. Design by evolution;
- 3.2. Design by innovation;
- 3.3. Design by imitation;
- 3.4. Factors affecting product design;
- 3.5. Standards of performance and environmental factors;

- 3.6. Decision making and iteration;
- 3.7. Morphology of design (different phases);
- 3.8. Role of aesthetics in design.

4. INTRODUCTION TO OPTIMIZATION IN DESIGN

- 4.1. Economic factors in design;
- 4.2. Design for safety and reliability;
- 4.3. Role of computers in design;
- 4.4. Modeling and Simulation;
- 4.5. The role of models in engineering design;
- 4.6. Mathematical modeling;
- 4.7. Similitude and scale models;
- 4.8. Concurrent design;
- 4.9. Six sigma and design for six sigma;
- 4.10. Introduction to optimization in design;
- 4.11. Economic factors and financial feasibility in design;
- 4.12. Design for manufacturing;
- 4.13. Rapid Proto typing (RP);
- 4.14. Application of RP in product design;
- 4.15. Product Development versus Design.

5. DESIGN OF SIMPLE PRODUCTS DEALING WITH VARIOUS ASPECTS OF PRODUCT DEVELOPMENT;

- 5.1. Design Starting from need till the manufacture of the product

REFERENCE BOOKS

- 1.Product Design and Development, Karl T.Ulrichand Steven D.Eppinger, TataMcGraw–Hill edition.
- 2.Engineering Design– George E. Dieter.
- 3.An Introduction to Engineering Design methods Vijay Gupta.
- 4.Merie Crawford: New Product management, McGraw-Hill Irwin.
- 5.Chitale A K and Gupta R C,“ Product Design and Manufacturing”, Prentice Hall of India, 2005.
- 6. Kevin Otto and Kristin Wood, Product Design, Techniques in Reverse Engineering and New Product Development, Pears on education.

DISASTER MANAGEMENT

Course Code	LS 63002 (Common in all branches of Engg.)
Course Title	Disaster Management
Number of Credits	3 (L: 3, T: 0 ,P :0)
Prerequisites	NIL
Course Category	OE

COURSE LEARNING OBJECTIVES

Following are the objectives of this course:

- To learn about various types of natural and man-made disasters.
- To know pre and post-disaster management for some of the disasters.
- To know about various information and organizations in disaster management in India.
- To get exposed to technological tools and their role in disaster management.

COURSE OUTCOMES:

- 1.1. After competing this course, student will be:
- 1.2. Acquainted with basic information on various types of disasters
- 1.3. Knowing the precautions and awareness regarding various disasters
- 1.4. Decide first action to be taken under various disasters
- 1.5. Familiarised with organization in India which are dealing with disasters
- 1.6. Able to select IT tools to help in disaster management

COURSE CONTENTS**1. UNDERSTANDING DISASTER**

- 1.1. Understanding the Concepts and definitions of Disaster,
- 1.2. Hazard,
- 1.3. Vulnerability,
- 1.4. Risk,
- 1.5. Capacity–Disaster and Development,
- 1.6. Disaster management.

2. TYPES, TRENDS, CAUSES, CONSEQUENCES AND CONTROL OF DISASTERS

- 2.1. Geological Disasters (earth quakes, land slides, tsunamis, mining);
- 2.2. Hydro-Meteorological Disasters (floods, cyclones, lightning, thunder-storms, hailstorms, avalanches, droughts, cold and heat waves)
- 2.3. Biological Disasters (epidemics, pest attacks, forest fire);
- 2.4. Technological Disasters (chemical, industrial, radiological, nuclear)
- 2.5. Manmade Disasters (building collapse, rural and urban fire, road and rail accidents, nuclear, radiological, chemicals and biological disasters)
- 2.6. Global Disaster Trends
- 2.7. Emerging Risks of Disasters
- 2.8. Climate Change and Urban Disasters.

3. DISASTER MANAGEMENT CYCLE AND FRAME WORK

- 3.1. Disaster Management Cycle
- 3.2. Paradigm Shift in Disaster Management.
- 3.3. Pre-Disaster
- 3.4. Risk Assessment and Analysis,
- 3.5. Risk Mapping,
- 3.6. Zonation and Microzonation,
- 3.7. Prevention and Mitigation of Disasters,
- 3.8. Early Warning System
 - 3.8.1. Preparedness,
 - 3.8.2. Capacity Development;
 - 3.8.3. Awareness.
- 3.9. During Disaster
 - 3.9.1. Evacuation
 - 3.9.2. Disaster Communication
 - 3.9.3. Search and Rescue
 - 3.9.4. Emergency Operation Centre
 - 3.9.5. Incident Comm and System

- 3.9.6. Relief and Rehabilitation
- 3.10. Post-disaster
 - 3.10.1. Damage and Needs Assessment,
 - 3.10.2. Restoration of Critical Infra structure
 - 3.10.3. Early Recovery Reconstruction and Redevelopment;
 - 3.10.4. IDNDR, Yokohama Strategy, Hyogo Framework of Action.

4. DISASTER MANAGEMENT IN INDIA

- 4.1. Disaster Profile of India
- 4.2. Mega Disasters of India and Lessons Learnt.
- 4.3. Disaster Management Act 2005
- 4.4. Institutional and Financial Mechanism,
- 4.5. National Policy on Disaster Management,
- 4.6. National Guidelines and Plans on Disaster Management;
- 4.7. Role of Government (local, state and national),
- 4.8. Non-Government and Inter Governmental Agencies

5. APPLICATIONS OF SCIENCE AND TECHNOLOGY FOR DISASTER MANAGEMENT

- 5.1. Geo informatics in Disaster Management (RS, GIS, GPS and RS).
- 5.2. Disaster Communication System (Early Warning and Its Dissemination).
- 5.3. Land Use Planning and Development Regulations,
- 5.4. Disaster Safe Designs and Constructions,
- 5.5. Structural and Non Structural Mitigation of Disasters
- 5.6. S & T Institutions for Disaster Management in India

REFERENCES

- 1.Publications of National Disaster Management Authority (NDMA) on Various Templates and Guide lines for Disaster Management
- 2.Bhandani, R. K., An over view on natural & man-made disasters and their reduction, CSIR, New Delhi
- 3.Srivastava, H. N., and Gupta G. D. , Management of Natural Disasters in developing countries, Daya Publishers, Delhi
- 4.Alexander, David, Natural Disasters, Kluwer Academic|London
- 5.Ghosh, G .K. ,Disaster Management, APH Publishing Corporation
- 6.Murthy, D. B. N., Disaster Management: Text & Case Studies, Deep & Deep Pvt. Ltd.

INDIAN CONSTITUTION

CourseCode	LS 6333(Common in all branches of Engg.)
CourseTitle	Indian Constitution
NumberofCredits	0 (L:2,T:0;P:0)
Prerequisites(Coursecode)	None
CourseCategory	AU

COURSE CONTENT

1. THE CONSTITUTION –

- 1.1. Introduction
- 1.2. The History of the Making of the Indian Constitution
- 1.3. Preamble and the Basic Structure, and its interpretation
- 1.4. Fundamental Rights and Duties and their interpretation
- 1.5. State Policy Principles

2. UNION GOVERNMENT

- 2.1. Structure of the Indian Union
- 2.2. President– Role and Power
- 2.3. Prime Minister and Council of Ministers
- 2.4. Lok Sabha and Rajya Sabha

3. STATE GOVERNMENT

- 3.1. Governor– Role and Power
- 3.2. Chief Minister and Council of Ministers
- 3.3. State Secretariat

4. LOCAL ADMINISTRATION

- 4.1. District Administration
- 4.2. Municipal Corporation
- 4.3. Zila Panchayat

5. ELECTION COMMISSION

- 5.1. Role and Functioning
- 5.2. Chief Election Commissioner
- 5.3. State Election Commission

SUGGESTED LEARNING RESOURCES:

S.No.	Title of Book	Author	Publication
1.	Ethics and Politics of the Indian Constitution	Rajeev Bhargava	Oxford University Press, New Delhi, 2008
2.	The Constitution of India	B.L.Fadia	Sahitya Bhawan; New edition(2017)
3.	Introduction to the Constitution of India	D DBasu	Lexis Nexis; Twenty-Third 2018 edition

SUGGESTED SOFTWARE / LEARNING WEBSITES:

1. <https://www.constitution.org/cons/india/const.html>
2. <http://www.legislative.gov.in/constitution-of-india>
3. <https://www.sci.gov.in/constitution>
4. <https://www.toppr.com/guides/civics/the-indian-constitution/the-constitution-of-india/>

DANGEROUS GOODS MANAGEMENT

Course Code	LS 6001
Course Title	Dangerous goods Management
Number of Credits	3(L:3, T: 0, P:0)
Prerequisites	NIL
Course Category	PC

Course Objectives:

Following are the objectives of this course:

- To make students to learn about Dangerous goods Management
- To make students to understand Protection afforded by dangerous goods management standards
- To make students to understand packaging and transport of dangerous goods and special goods.

Course outcomes:

After completing this course, student will be able to:

- Understand dangerous goods management
- Identify the packing and transport for special products, exportable goods and dangerous goods
- Observe safety precautions in packaging and transport of special goods and dangerous goods

1. Dangerous goods:

1.1. Dangerous goods management

- 1.1.1. Growing need, goods, definition of dangerous goods, different forms, classes, explosives, Gases, flammable goods, explosives and gases flammable liquids
- 1.1.2. Dammable solids and emitting flammable gases, oxidizing substance and organic peroxides, toxic or infectious substance, radioactive material and corrosives.

1.2. Miscellaneous transportation ways

- 1.2.1. Road, rail, sea and air
- 1.2.2. Organizations and their regulatory guidelines and route restrictions

2. Protection:

2.1. Protection afforded by dangerous goods management standards

- 2.1.1. Competency based training and assessment plan, IATA, CBTA base line, 6criteria, 6complexities(products vs materials) and packaging
- 2.1.2. Transportation method, borders, storage disposal C2C and B2C dangerous goods and discrete service and benefits of better D.G management
- 2.1.3. Protection plain in warehousing and segregation of goods.

2.2. Production against fire and natural calamities, good Packaging, product stocking and stocking density

3. Transport of Dangerous Goods:

3.1. Dangerous goods transport

- 3.1.1. Provisions concerning transport operations, offering strategy, acceptance of D.G by carriers, conditions for transport, loading and unloading conditions and segregation.
- 3.1.2. Conditions for explosive transport and groups A and K category.

3.2. Conditions for mixed transport of goods of class I with D.G

- 3.2.1. Gases transport provisions
- 3.2.2. Self reactive substances and organic peroxides and radioactive material temperature control provision

3.3. Single mechanical and combined refrigerated system

3.4. Provisions for toxic and infectious substance and action to be taken in the event of damage or leakage.

4. Packaging:

4.1. Dangerous goods Packaging

- 4.1.1. Special attention, need for Packaging, Intermediate bulk container (IBC) and Large Packaging
- 4.1.2. Parts of Packaging, inner Packaging, outer Packaging, precautions in combined D.G venting devices

4.2. Test pressure for Packaging, use of salvage Packaging, Packaging volume and alphanumeric code using, various Packaging forms (drums, boxes, bags composite, crate, flexible plastics), substance of

Packaging group I, II, III

- 4.3. Pressure receptacles for liquids and solids, unpacked articles, Packaging instructions of UN 3373 and UN 3245.

5. Packaging and Transport of Special Goods:

- 5.1. Transport of Special Goods
 - 5.1.1. Compressed gas transport, gas cylinders, gas tanker ships and gas tanker trucks
- 5.2. Packaging of special goods
 - 5.2.1. Precautions to be taken in Packaging, closed cryogenic products Packaging, open cryogenic receptacles, transporting of portable D.G tanks and Degree of filling.
- 5.3. Bulk container transport marking on D.G Packaging, play carding, documents for D.G periodic inspection and testing of containers, vessels and certification.

Reference Books

1. Roger Wrapson Dangerous Goods: A Guide to Exemptions from the Carriage of Dangerous Goods by Road Regulations
2. IATA Dangerous Goods Regulations (DGR) Bound Manual 2010
3. Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria 2015
4. Online Resources: From LSC Web Site

SEMESTER SCHEME 2020

MARINE LOGISTICS INCLUDING LIQUID CARGO AND BULK CARGO

Course Code	LS 6002
Course Title	Marine Logistics including Liquid Cargo and Bulk Cargo
Number of Credits	3 (L: 0, T: 0, P:3)
Prerequisites	NIL
Course Category	PC

Course Objectives:

Following are the objectives of this course:

- To make students to understand sea transport of goods and process
- To make students to understand Safety in stowage and cargo securing
- To make students to understand Bulk cargo handling.

Course outcomes:

After completing this course, student will be able to:

- Understand sea transport of goods and follow the process
- Understand Safety in stowage and cargo securing and apply
- Understand Bulk cargo handling and act accordingly.

1. Sea Transport of Goods:

- 1.1. Ocean transport, cargo ships, passenger cum cargo ships, container ships, dry bulk cargo ship and liquid cargo ship
- 1.2. Chemical carriers, gas carriers and radioactive material carrier ship
- 1.3. RO RO ships, air craft carrier ship and various types of dry bulk cargo
- 1.4. Sugar, salt, grains, rubber, cement, pulp and paper rolls and coal, coal powder, iron, ore, iron and steel, wheeled vehicles.

2. Sea Transport Process:

- 2.1. Shipper, consigner, shipping line, freight forwarders, packer, haulier and tracker
- 2.2. Container, terminals, feeder line, liner agent, letter of credit, sea way bill, mate receipt, cargo plan and bill of lading
- 2.3. EDI, functional description of EDI, EDI FACT, VLD, IMO, IMDG, ILO and MEPC
- 2.4. Allotment of booking, manifest of cargo, certificate of origin, Packaging slip, FCL and LCL

3. Stowage Safety:

- 3.1. Safety in stowage, cargo securing, impact and force of hard weather, typical factors of sea transport consequences of poor cargo securing and regulations and standards
- 3.2. IMO's, CSS codes of 7 chapters and 13 annexes for stowage and rules and regulations of classification society, safe Packaging of cargo transporting
- 3.3. Blocking, locking, top over lashing, loop lashing, spring lashing and straight /cross lashing
- 3.4. Fencing, dunnage bags and separation of goods from dangerous goods

4. Tanker Ships:

- 4.1. Main type of tanker ships, shuttle tanker, product tanker, chemical tanker and liquefied gas tanker
- 4.2. LPG, LNG, VLCC, ULCC, characteristic of cargo, crude oil, clean oil, white product and black product
- 4.3. Cargo system, pump room, bow loading system (BLS), stern discharge system (SDS), stern loading and discharged system (SLDS), submerged turret loading (STL), submerged turret production (STP) inert gas system (IGS) and crude oil washing system (COW)
- 4.4. Emergency towing arrangement (ETA) and international tanker safety guide for oil tankers and terminals (ISGOTT).

5. Bulk cargo handling:

- 5.1. Blu code, self unloading vessels, cargo holds, conveyor pulleys, transfer chute and discharge chute
- 5.2. Pneumatic conveying system, ship unloading and loading, crane crabs, screw conveyors, reception hoppers and loading chute
- 5.3. Port handling facilities vibro feeders, chain conveyors, discharge screws, stock out conveyors and reclaim buckets
- 5.4. Weight hoppers, conveyors pulleys, loading facilities, rail loading hoppers, truck loading hoppers,

pneumatic pipe work system and front loading buckets.

Reference Books

1. Aylin Caliskan and YucelOzturkoglu, Maritime Logistics 2016
2. Cargo operations Learners Guide, Western Austrila.
3. Captain J. IsbesterBulk Carrier Practice
4. UNCTD Review of Maritime Transport
5. T. Sepulveda Whittle, Basic Concepts of maritime Transport
6. Online Resources: From LSC Web Site

SEMESTER SCHEME 2020-21

QUALITY ASSURANCE IN LOGISTICS

Course Code	LS 6003
Course Title	Quality Assurance in Logistics
Number of Credits	2 (L: 2, T: 0, P:0)
Prerequisites	NIL
Course Category	PE

Course Objectives:

Following are the objectives of this course:

- To make students to understand Quality, need for quality and basic concept of total quality.
- To make students to understand TQM and its implementation
- To make students to understand quality of service, quality system and quality implementation in logistics.

Course outcomes:

After completing this course, student will be able to:

- Understand Quality and basic concept of total quality
- Understand TQM and implement
- Understand quality of service, quality system and implementation of quality assurance in logistics.

1. Quality:

- 1.1. Introduction, need for quality, definition of quality, evolution of quality and dimensions of service quality
- 1.2. Basic concept of total quality, definition of total quality management, TQM frame work, principles of TQM and TQM applications.

2. Implementation Process

- 2.1. TQM implementation
 - 2.1.1. TQM implementation in logistic industry, finding of products for logistics
 - 2.1.2. Finding out customer for end products and searching of warehousing
 - 2.1.3. Analyzing of transport system and economical system selection
- 2.2. Analyzing freight economy system
- 2.3. Analyzing manpower
- 2.4. Material handling system for loading and unloading.

3. Services:

- 3.1. Quality of service, customer focus, customer orientation, customer satisfaction and customer complaints
- 3.2. Customer retention, attracting of new customer and employee involvement in the process and selection of team and teamwork
- 3.3. Recognition and reward, performance appraisal and continuous process improvement
- 3.4. PDCA cycle, benefits and 5W2H method analyzing pertaining to logistics.

4. Quality system:

- 4.1. Quality System, need for ISO9000, introduction, definitions, ISO and BIS
- 4.2. ISO9000 standards, main benefits of implementing IS/ISO 9001-2000 QMS requirements and how ISO helps in logistic industry
- 4.3. Source where ISO can be implemented and elements of ISO 9001-2000 standards applicable to logistics industry.

5. Quality implementation in logistics:

- 5.1. Selection of products for logistics and selection of storing, stocking of goods
- 5.2. Selection of transport system and material handling system with quality implication, process control equipments and inventory management
- 5.3. Maintenance and validity certification of fire fighting equipments, Safety SOPs and their importance
- 5.4. Time frame work activities in the logistics, Customer quality satisfaction in Logistics Industry

Reference Books

1. [Pradip V. Mehta](#), An Introduction to Quality Assurance for the Retailers New Age International (P) Ltd., Publishers
2. Yiannis Nikolaidis, Quality Management in Reverse Logistics: A Broad Look on Quality Issues and Their Interaction with Closed-Loop Supply Chains, October 2012
3. Online Resources: From LSC Web Site

SEMESTER SCHEME 2020-21