SYLLABUS

FOR

DIPLOMA IN

LOGISTICS TECHNOLOGY

(DIPLOMA COURSES IN ENGINEERING / TECHNOLOGY)

C23 REGULATION

TAMILNADU GOVERNMENT POLYTECHNIC COLLEGE

(AUTONOMOUS), MADURAI – 625 011

C-23 REGULATION

Program Structure

Diploma in Logistics Technology (Full Time)

Program Outcomes (PO's)

POs are statements that describe what students are expected to know and be able to do upon graduating from the program. These relate to the skills, knowledge, analytical ability, attitude, and behavior that students acquire through the program.

The POs essentially indicate what the students can do from subject-wise knowledge acquired by them during the program. As such, POs define the professional profile of an engineering diploma graduate.

NBA has defined the following seven POs for an Engineering diploma graduate:

PO1: Basic and Discipline-specific knowledge: Apply knowledge of basic mathematics, science and engineering fundamentals and an engineering specialization to solve the engineering problems.

PO2: Problem analysis: Identify and analyse well-defined engineering problems using codified standard methods.

PO3: Design/ development of solutions: Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.

PO4: Engineering Tools, Experimentation, and Testing: Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.

PO5: Engineering practices for society, sustainability and environment: Apply appropriate technology in the context of society, sustainability, environment and ethical practices.

PO6: Project Management: Use engineering management principles individually, as a team member or as a leader to manage projects and effectively communicate about well-defined engineering activities.

PO7: Life-long learning: Ability to analyse individual needs and engage in updating in the context of technological changes.

Credit Distribution

Semester	No of Courses	Periods	Credits
Semester I	8	640	20
Semester II	9	640	20
Semester III	9	640	25
Semester IV	8	640	24
Semester V	2	635#	15
Semester VI	2	660	16
		Total	**120**

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Semester I								
#	**Course Category**	**Course Type**	**Code**	**Course Title**	**L-T-P**	**Period**	**Credit**	**End Exam**
1	Humanities & Social Science	Theory	10010	Tamil Marabu	2-0-0	30	2	Theory
2	Basic Science	Theory	10020	Basic Mathematics	3-1-0	60	4	Theory
3	Basic Science	Practicum	10030	Basic Physics	2-0-2	60	3	Theory
4	Basic Science	Practicum	10040	Basic Chemistry	2-0-2	60	3	Theory
5	Engineering Science	Practical	10050	Digital Workplace Skills	0-0-4	60	2	Practical
6	Humanities & Social Science	Practicum	10060	Communicative English I	1-0-2	45	2	Practical
7	Engineering Science	Practicum	10070	Basic Workshop Practices	1-0-2	45	2	Practical
8	Open Elective	Advanced Skill Certification	10080	Basic English for Employability	0-0-4	60	2	Practical
9	Humanities & Social Science	Integrated Learning Experience	10090	Growth Lab	-	15	0	-
10	Audit Course	Integrated Learning Experience	100A0	Induction Program - I	-	40	0	-
11	Audit Course	Integrated Learning Experience	100B0	I&E/ Club Activity/ Community Initiatives	-	30	0	-
12	Audit Course	Integrated Learning Experience	100C0	Shop Floor Immersion	-	8	0	-
13	Audit Course	Integrated Learning Experience	100D0	Student-Led Initiative	-	22	0	-
14	Audit Course	Integrated Learning Experience	100E0	Health & Wellness	-	30	0	-
					Test & Revisions	60		NA
					Library	15		
					Total	**640**	**20**	

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Semester II								
#	**Course Category**	**Course Type**	**Code**	**Course Title**	**L-T-P**	**Period**	**Credit**	**End Exam**
1	Humanities & Social Science	Theory	20010	Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	20023	Basics of Mechanical Engineering	3-0-0	45	3	Theory
3	Engineering Science	Lab	20031	Drafting Practices	0-0-4	60	2	Practical
4	Basic Science	Practicum	20041	Applied Mathematics – I	1-0-4	75	3	Practical
5	Basic Science	Practicum	20051	Applied Physics – I	1-0-2	45	2	Practical
6	Basic Science	Practicum	20060	Applied Chemistry – I	1-0-2	45	2	Practical
7	Engineering Science	Practicum	20070	Basic Engineering Practices	1-0-2	45	2	Practical
8	Humanities & Social Science	Practicum	20080	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	20090	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	200A0	Growth Lab	-	30	0	-
11	Audit Course	Integrated Learning Experience	200B0	I&E/ Club Activity / Community Initiatives	-	30	0	-
12	Audit Course	Integrated Learning Experience	200C0	Shop Floor Immersion	-	8	0	-
13	Audit Course	Integrated Learning Experience	200D0	Student Led Initiative	-	24	0	-
14	Audit Course	Integrated Learning Experience	200E0	Emerging Technology Seminars	-	8	0	-
15	Audit Course	Integrated Learning Experience	200F0	Health & Wellness	-	30	0	-
					Test & Revisions	60		NA
					Library	15		
					Total	**640**	**20**	

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Semester III								
#	**Course Category**	**Course Type**	**Code**	**Course Title**	**L-T-P**	**Period**	**Credit**	**End Exam**
1	Program Core	Theory	94310	Fundamentals of Logistics and warehousing	4-0-0	60	4	Theory
2	Program Core	Theory	94320	Documentation	4-0-0	60	4	Theory
3	Program Elective	Theory		ELECTIVE- I	3-0-0	45	3	Theory
4	Program Core	Practical/Lab	94340	Documentation Practical	0-0-4	60	2	Practical
5	Program Core	Practicum	94350	Container Logistics - Cargo movement visibility, Tracking and tracing	1-0-4	75	3	Practical
6	Program Elective	Practicum		ELECTIVE- II	1-0-4	75	3	Practical
7	Open Elective	Practicum	94370	Basic accounting	1-0-4	75	3	Practical
8	Open Elective	Advanced Skill Certification	94380	Advanced Skills Certification - III	1-0-2	60	2	NA
9	Humanities & Social Science	Integrated Learning Experience	94390	Growth Lab	0-0-2	30	0	-
10	Audit Course	Integrated Learning Experience	943A0	Induction Program - II	-	15	0	-
11	Audit Course	Integrated Learning Experience	943B0	I&E/ Club Activity/ Community Initiatives	-	40	0	-
12	Audit Course	Integrated Learning Experience	943C0	Shop floor Immersion	-		0	-
13	Audit Course	Integrated Learning Experience	943D0	Student-Led Initiative	-		0	-
14	Audit Course	Integrated Learning Experience	943E0	Emerging Technology Seminars	-		0	-
15	Audit Course	Integrated Learning Experience	943F0	Health & Wellness	0-0-2	30	1	-
					Test & Revisions	0*		NA
					Library	15		
					Total	**640**	**25**	

*Test and revision will be conducted in the respective subject syllabus hours

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Semester IV								
#	**Course Category**	**Course Type**	**Code**	**Course Title**	**L-T-P**	**Period**	**Credit**	**End Exam**
1	Program Core	Theory	94410	Material Handling Equipments	4-0-0	60	4	Theory
2	Program Core	Theory	94420	E- Commerce	4-0-0	60	4	Theory
3	Program Elective	Theory		ELECTIVE III	3-0-0	45	3	Theory
4	Program Elective	Theory		ELECTIVE IV	3-0-0	45	3	Theory
5	Program Core	Practical/Lab	94450	Material Handling Equipment Maintenance Practical	0-0-4	60	2	Practical
6	Program Core	Practicum	94460	Logistics Informatics	1-0-4	75	3	Practical
7	Open Elective	Practicum	94470	Cold chain-Logistics and maintenance of cold storages	1-0-4	75	3	Practical
8	Open Elective	Advanced Skill Certification	94480	Advanced Skills Certification - IV	1-0-2	60	2	NA
9	Audit Course	Integrated Learning Experience	94490	I&E/ Club Activity/ Community Initiatives	-	40	0	-
10	Audit Course	Integrated Learning Experience	944A0	Shop floor Immersion	-		0	-
11	Audit Course	Integrated Learning Experience	944B0	Student-Led Initiative	-		0	-
12	Audit Course	Integrated Learning Experience	944C0	Emerging Technology Seminars	-	15	0	-
13	Audit Course	Integrated Learning Experience	944D0	Health & Wellness	-	30	0	-
14	Audit Course	Integrated Learning Experience	944E0	Special Interest Groups (Placement Training)	-	30	0	-
					Test & Revisions	30		
					Library	15		
					Total	**640**	**24**	

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Semester V								
#	**Course Category**	**Course Type**	**Code**	**Course Title**	**L-T-P**	**Period**	**Credit**	**End Exam**
1	Program Core	Practical/Lab	94510	(a) Ware housing Practical	0-0-6	90	3	Practical
2	Program Core	Internship	94520	(b) Industrial training - I	-	540	12	Viva- Voce
					Total	**630**	**15**	

Note : The duration of Apprenticeship training is for a period of one full semester.

The apprenticeship training consists of following two components.

a) One practical on domain subject with duration of 64 hours. (Material handling practical)

b) On – job- training The above practical will be performed along with the apprenticeship training which will be in the actual work place (in Industries).

The examinations will be conducted at the end of the semester.

Training report and Practical records should be submitted for the examinations.

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Semester VI								
#	**Course Category**	**Course Type**	**Code**	**Course Title**	**L-T-P**	**Period**	**Credit**	**End Exam**
1	Program Core	Practical/Lab	94610	(a)Material Handling Practical	0-0-4	60	2	Practical
2	Program Elective	Project	94620	(b)Mini project	-	60	2	Viva- Voce
3	Program Core	Internship	94630	(c)Industrial training - II	-	540	12	Viva- Voce
					Total	**660**	**16**	

Note :

1. For all semesters, the type of End Semester examination for practicum subjects is based on the higher credits towards the theory or practical component of the respective course.
2. Some of the audit courses are non-credited but compulsory courses that are a part of the program initiative and the implementation process has to be recorded.
3. Credit for Projects is equivalent to 45 periods for projects/internships/fellowship.

   Note : The duration of Apprenticeship training is for a period of one full semester.

   The apprenticeship training consists of following two components.

   a) One practical on domain subject with duration of 64 hours. (Ware housing Practical)

   b) On – job- training.

   The above practical will be performed along with the apprenticeship training which will be in the actual work place (in Industries).

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The examinations will be conducted at the end of the semester. Training report and Practical records should be submitted for the examinations.

Elective - I

#	Course Category	Course Type	Code	Course Title	L-T-P	Period	Credit	End Exam
1	Program Elective	Theory	94331	Logistics in Manufacturing, Supply chain and Distribution	3-0-0	45	3	Theory
2	Program Elective	Theory	94332	Storage Containers; types, usage, Maintenance and Repair	3-0-0	45	3	Theory

Elective - II

#	Course Category	Course Type	Code	Course Title	L-T-P	Period	Credit	End Exam
1	Program Elective	Practicum	94361	Port Terminals system- Conveyor and Equipment Maintenance	1-0-4	75	3	Practical
2	Program Elective	Practicum	94362	Marine Logistics including Liquid cargo and Bulk cargo documentation	1-0-4	75	3	Practical

Elective - III

#	Course Category	Course Type	Code	Course Title	L-T-P	Period	Credit	End Exam
1	Program Elective	Theory	94431	Dangerous goods Managements	3-0-0	45	3	Theory
2	Program Elective	Theory	94432	Quality Assurance in Logistics	3-0-0	45	3	Theory

Elective - IV

#	Course Category	Course Type	Code	Course Title	L-T-P	Period	Credit	End Exam
1	Program Elective	Theory	94441	Compliance – Insurance, Regulations and Loss preventions	3-0-0	45	3	Theory
2	Program Elective	Theory	94442	Liquid Terminals, Storage and transportation	3-0-0	45	3	Theory
3	Program Elective	Theory	94443	Packaging	3-0-0	45	3	Theory

 # Courses from other programmes with the same credit can be considered after proper approval from the Chairman Board of Examinations.

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Open Elective								
#	**Course Category**	**Course Type**	**Code**	**Course Title**	**L-T-P**	**Period**	**Credit**	**End Exam**
1	Open Elective	Practicum	94370	Basic accounting	1-0-4	75	3	Practical
2	Open Elective	Practicum	94470	Cold chain-Logistics and maintenance of cold storages	1-0-4	75	3	Practical
# Courses from other programmes with the same credit can be considered after proper approval from the Chairman Board of Examinations								

EQUIVALENT SUBJECTS:

III SEMESTER:

REGULATION N 20		**REGULATION C 23**	
Subject Code	**SUBJECT**	**Subject Code**	**SUBJECT**
40LS310	Fundamentals of Logistics and warehousing	94310	Fundamentals of Logistics and warehousing
40LS320	Logistics in Manufacturing, Supply chain and Distribution	94331	Logistics in Manufacturing, Supply chain and Distribution
40LS330	Documentation	94320	Documentation
40LS340	Container Logistics - Cargo movement visibility, Tracking and tracing	94350	Container Logistics - Cargo movement visibility, Tracking and tracing
40LS350	Port Terminals system-Conveyor and equipment Maintenance	94361	Port Terminals system- Conveyor and Equipment Maintenance
40LS360	Basic accounting	94370	Basic accounting
40LS370	Documentation Practical	94340	Documentation Practical

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IV SEMESTER:

REGULATION N 20		REGULATION C 23	
Subject Code	**SUBJECT**	**Subject Code**	**SUBJECT**
40LS410	Material Handling Equipments	94410	Material Handling Equipments
40LS420	Cold chain-Logistics and maintenance of cold storages	94470	Cold chain-Logistics and maintenance of cold storages
40LS430	E- Commerce	94420	E- Commerce
40LS440	Logistics Informatics	94460	Logistics Informatics
40LS450	Dangerous goods Managements	94431	Dangerous goods Managements
40LS460	Compliance – Insurance, Regulations and Loss preventions	94441	Compliance – Insurance, Regulations and Loss preventions
40LS470	Material Handling Equipment Maintenance Practical	94450	Material Handling Equipment Maintenance Practical

V SEMESTER:

REGULATION N 20		REGULATION C 23	
Subject Code	**SUBJECT**	**Subject Code**	**SUBJECT**
40LS510	Apprenticeship – On the Job training	94520	Industrial training - I
40LS520	Ware housing Practical	94510	Ware housing Practical

VI SEMESTER:

REGULATION N 20		REGULATION C 23	
Subject Code	**SUBJECT**	**Subject Code**	**SUBJECT**
40LS610	Apprenticeship – On the Job training	94630	Industrial training - II
40LS620	Material Handling Practical	94610	Material Handling Practical

94310	FUNDAMENTAL OF LOGISTICS AND WAREHOUSING	L	T	P	C
THEORY		4	0	0	4

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 activates 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.

Assessment Methodology:

	Continuous Assessment (40 marks)				**End Semester Examination (60 marks)**
	CA1	**CA2**	**CA3**	**CA4**	
Mode	Written test	Written test	Quiz MCQ	Model Examination	Written Examination
Portion	Two units	Another Two units	Online / Offline	All units	All units
Duration	2 Periods	2 Periods	1 Hour	3 Hours	3 Hours
Exam Marks	50	50	60	100	100
Converted to	15	15	5	20	60
Marks	15		5	20	60
Tentative Schedule	6th Week	12th Week	13-14th Week	16th Week	

Note:

- **CA1 and CA2: W**ritten test should be conducted for 50 Marks for two units. The marks scored will be converted to 15 Marks. Best of one will be considered for the internal assessment of 15 Marks.
- **CA1 and CA2 Question Pattern:**

  FOUR questions should be asked from each unit. Students shall write any **FIVE** questions out of **EIGHT** questions. Each question carries 10 marks each. (5 X 10 Marks = 50 Marks)

  Each question may have subdivisions. Maximum two subdivisions shall be permitted.
- **CA3:** 60 MCQ can be asked by covering the entire portion. It may be conducted by Online / Offline. The marks scored should be converted to 5 marks for the internal assessment.
- **CA4:** Model examination should be conducted as per the end semester question pattern. The marks should be converted to 20 marks for the internal assessment.

Question Pattern: Model Examination and End Semester Examination

Answer ten questions by selecting two questions from each unit. Each question carries 10 marks each. (5 X 20 Marks = 100 Marks)

Four questions will be asked from every unit. Students should write any two questions from each unit. The question may have two subdivisions only.

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

94320	DOCUMENTATION	L	T	P	C
THEORY		4	0	0	4

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.

Assessment Methodology:

	Continuous Assessment (40 marks)				**End Semester Examination (60 marks)**
	CA1	**CA2**	**CA3**	**CA4**	
Mode	Written test	Written test	Quiz MCQ	Model Examination	Written Examination
Portion	Two units	Another Two units	Online / Offline	All units	All units
Duration	2 Periods	2 Periods	1 Hour	3 Hours	3 Hours
Exam Marks	50	50	60	100	100
Converted to	15	15	5	20	60
Marks	15		5	20	60
Tentative Schedule	6th Week	12th Week	13-14th Week	16th Week	

Note:

- **CA1 and CA2: W**ritten test should be conducted for 50 Marks for two units. The marks scored will be converted to 15 Marks. Best of one will be considered for the internal assessment of 15 Marks.
- **CA1 and CA2 Question Pattern:**

  FOUR questions should be asked from each unit. Students shall write any **FIVE** questions out of **EIGHT** questions. Each question carries 10 marks each. (5 X 10 Marks = 50 Marks)

  Each question may have subdivisions. Maximum two subdivisions shall be permitted.
- **CA3:** 60 MCQ can be asked by covering the entire portion. It may be conducted by Online / Offline. The marks scored should be converted to 5 marks for the internal assessment.
- **CA4:** Model examination should be conducted as per the end semester question pattern. The marks should be converted to 20 marks for the internal assessment.

Question Pattern: Model Examination and End Semester Examination

Answer ten questions by selecting two questions from each unit. Each question carries 10 marks each. (5 X 20 Marks = 100 Marks)

Four questions will be asked from every unit. Students should write any two questions from each unit. The question may have two subdivisions only.

CONTENT:

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 way bill, 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

94340	DOCUMENTATION - PRACTICAL	L	T	P	C
PRACTICAL/ LAB		0	0	4	2

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).

Assessment Methodology:

	Continuous Assessment (40 marks)			**End Semester Examination (60 marks)**
	CA1	**CA2**	**CA3**	
Mode	Practical Test	Practical Test	Practical Document	Practical Examination
Portion	Part A/ Cycle 1 Exercises	Part B/ Cycle 2 Exercises	All Exercises	All Exercises
Duration	3 Periods	3 Periods	Regularly	3 Hours
Exam Marks	60	60	Each Practical 10 Marks	100
Converted to	15	15	10	60
Marks	30		10	60
Tentative Schedule	7th Week	14th Week	15th Week	

Note:

- **CA1 and CA2:** All the exercises/experiments as per the portions mentioned above should be completed and kept for the practical test. The students shall be permitted to select any one by lot for the test. The practical test should be conducted as per the pattern to be decided by the departments.

  The marks awarded will be converted to 15 Marks for each assessment test. Addition of CA1 and CA2

will be considered for the internal assessment of 30 Marks.

- **CA 3:** Practical document should be maintained for every exercise / experiment immediately after completion of the practice. The same should be evaluated for 10 Marks. The total marks awarded should be converted to 10 Marks for the internal assessment. The practical document should be submitted for the Practical Test and End Semester Examination with a bonafide certificate.

Course Content

Practical on: **Documentation**

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

94350	Container Logistics Cargo movement visibility, Tracking and tracing	L	T	P	C
PRACTICUM/ PRACTICAL		1	0	4	3

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

Assessment Methodology:

	Continuous Assessment (40 marks)			**End Semester Examination (60 marks)**
	CA1	**CA2**	**CA3**	
Mode	Practical & Written Test	Practical & Written Test	Practical Test	Practical Examination
Portion	PART A/Cycle 1 Exercises & Two units	PART B/Cycle 2 Exercises & another two units	All Exercises	All Exercises
Duration	3 Periods	3 Periods	3 Hours	3 hours
Exam Marks	60	60	100	100
Converted to	15	15	10	60
Marks	30		10	60
Tentative Schedule	7th Week	14th Week	16th Week	

Note:

- **CA1 and CA2:**.The practical and written test should be conducted as per the portion above and the scheme of evaluation can be decided by the departments. Assessment written & Practical test should be conducted for 60 Marks. The marks awarded will be converted to 15 Marks for each assessment test. Addition of CA1 and CA2 will be considered for the internal assessment of 30 Marks.
- **CA 3:** All the exercises/experiments should be completed and kept for the practical test. The students shall be permitted to select any one by lot for the test. The practical test should be conducted and the scheme of evaluation can be decided by the departments. The marks awarded should be converted to 10 Marks for the internal assessment.

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

S.No	LIST OF PRACTICALS
1.	Prepare a proforma invoice return of goods for recycle and market place.
2.	Prepare a proforma for disposable of goods in reverse logistics.
3.	Prepare a proposal for settlement of claim in reverse logistics
4.	Prepare a preforma invoice for a service response logistics.
5.	Prepare a chart for inspection of goods in container
6.	Prepare a chart for inspection of container safety certificate.
7.	Prepare a report for tracking of delivery of goods
8.	Prepare a report for tracking system of empty container.
9.	Prepare a list of various agencies from which information to be collected for tracking.
10.	Prepare a list of various agencies from which information to be collected for tracing.
11	Prepare a proforma for tracing of loaded container within the country.
12	Prepare a proforma for tracing of loaded container outside the country.

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

Course Code 94370	Basic Accounting	L	T	P	C
Practicum/Practical		1	0	4	3

Course Objectives:

Following are the objectives of this course:

- To understand the Basic Accounting
- To know the Preparation of Journal Entries from transactions.
- To prepare Ledger accounts from Journal Entries and prepare Trial Balance from Ledger balances and from transactions.
- To prepare various Subsidiary Books.
- To prepare Trading account to find out Gross profit, Net profit and Balance sheet.

Course outcomes:

After completing this course, student will be able to:

- The subject Basic Accounting – Practical makes strong foundation for understanding the basic concepts of accounts.
- It gives full focus on fundamental steps to be followed through journal, Ledger, Trail Balance, Subsidiary Book and Trading Account.
- This will help for the preparation of accounts for any type of business.

Assessment Methodology:

	Continuous Assessment (40 marks)			**End Semester Examination (60 marks)**
	CA1	**CA2**	**CA3**	
Mode	Practical & Written Test	Practical & Written Test	Practical Test	Practical Examination
Portion	PART A/Cycle 1 Exercises & Two units	PART B/Cycle 2 Exercises & another two units	All Exercises	All Exercises
Duration	3 Periods	3 Periods	3 Hours	3 hours
Exam Marks	60	60	100	100
Converted to	15	15	10	60
Marks	30		10	60
Tentative Schedule	7th Week	14th Week	16th Week	

Note:

- **CA1 and CA2:**.The practical and written test should be conducted as per the portion above and the scheme of evaluation can be decided by the departments. Assessment written & Practical test should be conducted for 60 Marks. The marks awarded will be converted to 15 Marks for each assessment test. Addition of CA1 and CA2 will be considered for the internal assessment of 30 Marks.
- **CA 3:** All the exercises/experiments should be completed and kept for the practical test. The students shall be permitted to select any one by lot for the test. The practical test should be conducted and the scheme of evaluation can be decided by the departments. The marks awarded should be converted to 10 Marks for the internal assessment.

COURSE CONTENT:

1. INTRODUCTION TO ACCOUNTING:

Meaning of Accounting – Definition of Accounting – Accounting Concepts and Conventions – Objectives of Accounting – Advantages and Limitations of Accounting – Principles of Double Entry System –Accounting Terms – Assets, Liabilities, Expenses and Incomes - Accounting Equations (With Exercises).

2. JOURNAL : Types of Accounts – Personal Account – Real Account – Nominal Account – Golden Rules of Accounting - Journal – Meaning – Proforma – Passing of Journal – Simple Exercises.

3. LEDGER ACCOUNT AND TRIAL BALANCE:

Ledger – Account - Distinction between Journal and Ledger – Posting of Journal to Ledger - Balancing of Ledger – Trial Balance – Meaning - Objectives of Trial Balance – Preparation of Trial Balance from Ledger Account Balances – Simple Exercises.

4. SUBSIDIARY BOOKS:

Subsidiary Books – Benefits of Subsidiary Book System – Purchase Book – Purchase Returns Book – Sales Book – Sales Returns Book– Cash Book – Objectives - Kinds of Cash Book – Simple Cash Book – Double Column Cash Book – Three Column Cash Book – Petty Cash Book- Imprest System of Petty Cash Book–Ledger Posting–Simple Exercises. Computerized Accounting – Introduction – Different Voucher Entries

5. FINAL ACCOUNTS:

Final Account–Meaning–Objectives–Advantages–Trading Account–Trading Account Proforma–Preparation–Profit and Loss Account–Profit and Loss Account Proforma–Preparation–Balance sheet–Objectives–Assets & Liabilities– Preparation–Adjustments – Journal Entries–Simple Problems.

S.No	List of Practical
1.	Preparation of journal entry for a private limited company using Tally.ERP 9 or Office Document.
2.	Preparation of an accounting equation for a private limited company by using Office Document.
3.	Preparation of ledger accounts for a private limited company using Tally.ERP 9 or Office Document
4.	Preparation of trial balance for a private limited company using Tally.ERP 9 or Office Document.
5.	Preparation of purchase day book OR return book for a private limited company using Tally.ERP 9 or Office Document
6.	Preparation of sales day book OR sales return book for a private limited company using Tally.ERP 9 or Office Document
7.	Preparation of single column cash book for a private limited company using Tally.ERP 9 or Office Document
8.	Preparation of double column cash book for a private limited company using Tally.ERP 9 or Office Document.

REFERENCE BOOKS

1. Principles of Accountancy-K.L.Nagarajan, .Vinayagam &P.L.Mani

2. Financial Accounting - T.S.Reddy&A.Murthy
3. Advanced Accountancy-R.L. Gupta &Radhaswamy.
4. Advanced Accountancy-Jain &Narang.

Course Code 94410	MATERIAL HANDLING EQUIPMENTS	L	T	P	C
THEORY		4	0	0	4

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.

Assessment Methodology:

	Continuous Assessment (40 marks)				**End Semester Examination (60 marks)**
	CA1	**CA2**	**CA3**	**CA4**	
Mode	Written test	Written test	Quiz MCQ	Model Examination	Written Examination
Portion	Two units	Another Two units	Online / Offline	All units	All units
Duration	2 Periods	2 Periods	1 Hour	3 Hours	3 Hours
Exam Marks	50	50	60	100	100
Converted to	15	15	5	20	60
Marks	15		5	20	60
Tentative Schedule	6th Week	12th Week	13-14th Week	16th Week	

Note:

- **CA1 and CA2: W**ritten test should be conducted for 50 Marks for two units. The marks scored will be converted to 15 Marks. Best of one will be considered for the internal assessment of 15 Marks.
- **CA1 and CA2 Question Pattern:**

  FOUR questions should be asked from each unit. Students shall write any **FIVE** questions out of **EIGHT** questions. Each question carries 10 marks each. (5 X 10 Marks = 50 Marks)

  Each question may have subdivisions. Maximum two subdivisions shall be permitted.
- **CA3:** 60 MCQ can be asked by covering the entire portion. It may be conducted by Online / Offline. The marks scored should be converted to 5 marks for the internal assessment.
- **CA4:** Model examination should be conducted as per the end semester question pattern. The marks should be converted to 20 marks for the internal assessment.

Question Pattern: Model Examination and End Semester Examination

Answer ten questions by selecting two questions from each unit. Each question carries 10 marks each. (5 X 20 Marks = 100 Marks)

Four questions will be asked from every unit. Students should write any two questions from each unit. The question may have two subdivisions only.

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

Course Code 94420	E- COMMERCE	L	T	P	C
THEORY		4	0	0	4

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

Assessment Methodology:

	Continuous Assessment (40 marks)				**End Semester Examination (60 marks)**
	CA1	**CA2**	**CA3**	**CA4**	
Mode	Written test	Written test	Quiz MCQ	Model Examination	Written Examination
Portion	Two units	Another Two units	Online / Offline	All units	All units
Duration	2 Periods	2 Periods	1 Hour	3 Hours	3 Hours
Exam Marks	50	50	60	100	100
Converted to	15	15	5	20	60
Marks	15		5	20	60
Tentative Schedule	6th Week	12th Week	13-14th Week	16th Week	

Note:

- **CA1 and CA2: W**ritten test should be conducted for 50 Marks for two units. The marks scored will be converted to 15 Marks. Best of one will be considered for the internal assessment of 15 Marks.
- **CA1 and CA2 Question Pattern:**
  FOUR questions should be asked from each unit. Students shall write any **FIVE** questions out of **EIGHT** questions. Each question carries 10 marks each. (5 X 10 Marks = 50 Marks)
  Each question may have subdivisions. Maximum two subdivisions shall be permitted.
- **CA3:** 60 MCQ can be asked by covering the entire portion. It may be conducted by Online / Offline. The marks scored should be converted to 5 marks for the internal assessment.
- **CA4:** Model examination should be conducted as per the end semester question pattern. The marks should be converted to 20 marks for the internal assessment.

Question Pattern: Model Examination and End Semester Examination

Answer ten questions by selecting two questions from each unit. Each question carries 10 marks each. (5 X 20 Marks = 100 Marks)

Four questions will be asked from every unit. Students should write any two questions from each unit. The question may have two subdivisions only.

COURSE CONTENT:

1. E commerce:

1.1. Meaning, example types, B2B, B2C, C2C, C2B, C2A, benefits of E commerce.

1.2. Customers, retailers, digital India campaign, E commerce activity, contract.

1.3. Tender system, Order processing, 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, in co 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

Course Code 94450	MATERIAL HANDLING EQUIPMENT MAINTENANCE PRACTICAL	L	T	P	C
PRACTICAL/LAB		0	0	4	2

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 on handling material handling equipments and caring out their routine maintenance.

Assessment Methodology:

	Continuous Assessment (40 marks)			**End Semester Examination (60 marks)**
	CA1	**CA2**	**CA3**	
Mode	Practical Test	Practical Test	Practical Document	Practical Examination
Portion	Part A/ Cycle 1 Exercises	Part B/ Cycle 2 Exercises	All Exercises	All Exercises
Duration	3 Periods	3 Periods	Regularly	3 Hours
Exam Marks	60	60	Each Practical 10 Marks	100
Converted to	15	15	10	60
Marks	30		10	60
Tentative Schedule	7th Week	14th Week	15th Week	

Note:

- **CA1 and CA2:** All the exercises/experiments as per the portions mentioned above should be completed and kept for the practical test. The students shall be permitted to select any one by lot for the test. The practical test should be conducted as per the pattern to be decided by the departments.

The marks awarded will be converted to 15 Marks for each assessment test. Addition of CA1 and CA2 will be considered for the internal assessment of 30 Marks.

- **CA 3:** Practical document should be maintained for every exercise / experiment immediately after completion of the practice. The same should be evaluated for 10 Marks. The total marks awarded should be converted to 10 Marks for the internal assessment. The practical document should be submitted for the Practical Test and End Semester Examination with a bonafide certificate.

Course content:

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

Course Code 94460	LOGISTICS INFORMATICS	L	T	P	C
PRACTICUM/ PRACTICAL		1	0	4	3

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.

Assessment Methodology:

	Continuous Assessment (40 marks)			**End Semester Examination (60 marks)**
	CA1	**CA2**	**CA3**	
Mode	Practical & Written Test	Practical & Written Test	Practical Test	Practical Examination
Portion	PART A/Cycle 1 Exercises & Two units	PART B/Cycle 2 Exercises & another two units	All Exercises	All Exercises
Duration	3 Periods	3 Periods	3 Hours	3 hours
Exam Marks	60	60	100	100
Converted to	15	15	10	60
Marks	30		10	60
Tentative Schedule	7th Week	14th Week	16th Week	

Note:

- **CA1 and CA2:**.The practical and written test should be conducted as per the portion above and the scheme of evaluation can be decided by the departments. Assessment written & Practical test should be conducted for 60 Marks. The marks awarded will be converted to 15 Marks for each assessment test. Addition of CA1 and CA2 will be considered for the internal assessment of 30 Marks.

- **CA 3:** All the exercises/experiments should be completed and kept for the practical test. The students shall be permitted to select any one by lot for the test. The practical test should be conducted and the scheme of evaluation can be decided by the departments. The marks awarded should be converted to 10 Marks for the internal assessment.

COURSE CONTENT:

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 revigo Lynk etc.

5.3. Negative list of items.

5.4. Value and quantity of goods handled annually from road, rail, air and sea.

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., Jane P. L., & Rajanish Dass (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.

Course Code 94470	COLD CHAIN-LOGISTICS AND MAINTENANCE OF COLD STORAGES	L	T	P	C
PRACTICUM/ PRACTICAL		1	0	4	3

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.

Assessment Methodology:

	Continuous Assessment (40 marks)			**End Semester Examination (60 marks)**
	CA1	**CA2**	**CA3**	
Mode	Practical & Written Test	Practical & Written Test	Practical Test	Practical Examination
Portion	PART A/Cycle 1 Exercises & Two units	PART B/Cycle 2 Exercises & another two units	All Exercises	All Exercises
Duration	3 Periods	3 Periods	3 Hours	3 hours
Exam Marks	60	60	100	100
Converted to	15	15	10	60
Marks	30		10	60
Tentative Schedule	7th Week	14th Week	16th Week	

Note:

CA1 and CA2:.The practical and written test should be conducted as per the portion above and the scheme of evaluation can be decided by the departments. Assessment written & Practical test should be conducted for 60

Marks. The marks awarded will be converted to 15 Marks for each assessment test. Addition of CA1 and CA2 will be considered for the internal assessment of 30 Marks.

CA 3: All the exercises/experiments should be completed and kept for the practical test. The students shall be permitted to select any one by lot for the test. The practical test should be conducted and the scheme of evaluation can be decided by the departments. The marks awarded should be converted to 10 Marks for the internal assessment

COURSE CONTENT:

1. Cold chain Business Planning and Strategy and Application Frame work

Introduction to Cold Chain, Its importance, General warehouse and cold chain warehouse.- Identify target Market, Quantity demand-Food supply and delivery system, Business model Strategic plan and Operating Model-Inventory and benefits of inventory in cold chain - RFID, WSN, SCCAF, BLE, Hadoop system, Spark system, HDFS, RPC and YARN - D Stream, Data Process Layer, Event groups and event names, FEFO -SCCAF functions, Device security SCCAF components, Input parameters and Architecture of CCAF.

2. Cold Chain Design for Warehouse

Storage, Dry storage, Air cooling, Chilled storage, Frozen storage, Blast freezing - Design factors for cold storage - Stocking of perishable products, Dairy products, Meat, Poultry and fish and sea foods- Cooling system configurations and Safety provisions - Maintenance control, break down and rectification, Preventive controls, Automatic Lighting systems and Health, safety and security measures to be carried out during operations.

3. Grading and Packing

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

4. Transport System & Retrofit

Refrigerated Vehicles - Container insulated, Insulated boxes, refrigerated vehicles and Refrigerated Rigid Vehicles - Refrigerated Containers, Machineries for Refrigerated vehicles, and Power system to be used – EERS - Analysing development of EERS in cold chain project and decisions taken during

accidents in transportation.

Retrofit in Supply Chain Management -Replacement of outdated systems for energy savings, open loading area enclosure, to improve coolness and implement new state of refrigeration system - Advanced Control System, high Efficiency Evaporators and Condensers system - Minimising cooling load, Automatic usage of doors, wind screen etc, and advantages of Retrofit.

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 antiroom 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

Course Code 94510	WAREHOUSING PRACTICAL	L	T	P	C
PRACTICAL/LAB		0	0	6	3

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.

Assessment Methodology:

	Continuous Assessment (40 marks)			**End Semester Examination (60 marks)**
	CA1	**CA2**	**CA3**	
Mode	Practical Test	Practical Test	Practical Document	Practical Examination
Portion	Part A/ Cycle 1 Exercises	Part B/ Cycle 2 Exercises	All Exercises	All Exercises
Duration	3 Periods	3 Periods	Regularly	3 Hours
Exam Marks	60	60	Each Practical 10 Marks	100
Converted to	15	15	10	60
Marks	30		10	60
Tentative Schedule	7th Week	14th Week	15th Week	

Note:

- **CA1 and CA2:** All the exercises/experiments as per the portions mentioned above should be completed and kept for the practical test. The students shall be permitted to select any one by lot for the test. The practical test should be conducted as per the pattern to be decided by the departments.

  The marks awarded will be converted to 15 Marks for each assessment test. Addition of CA1 and CA2 will be considered for the internal assessment of 30 Marks.

- **CA 3:** Practical document should be maintained for every exercise / experiment immediately after completion of the practice. The same should be evaluated for 10 Marks. The total marks awarded should be converted to 10 Marks for the internal assessment. The practical document should be submitted for the Practical Test and End Semester Examination with a bonafide certificate.

COURSE CONTENT

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 Hompel, 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

Course Code 94520	INDUSTRIAL TRAINING - I	L	T	P	C
INTERNSHIP		-	-	-	12

Course Objectives:

Following are the objectives of this course:

- This Apprenticeship course is intended to practice whatever is taught in the institute in theory classes

  during the IIIrd & IVth Semester, in the related industry in real life situation and become skilled in handling Material Handling Equipments/Conveyors/Cold storage & Packhouses and caring out their routine maintenance and become employable in these areas in the industry after successful completion of this course.

Course outcomes:

After competing this course, student will become skilled and able to:

- Perform the various functions in warehouse, activities connected with material handling/Supply chain &

  Distribution/container logistics and cold chain.
- Identify the appropriate MHE for different types of cargo and Cargo handling operations and Perform

  the routine maintenance of Material Handling Equipments/Conveyors/Cold storage & Packhouses.

Course Content:

1. Warehousing

Perform the various functions in warehousing, Perform the different activities associated with inbound, in plant and outbound logistics. Perform loading, unloading, receiving, sorting, storing activities in a plant /warehouse house. Perform receiving and storage processes. Perform allocation of goods as per storage location. Operate the automation solutions such as picking automation, barcode labels, scanning automation, automated vehicles, inventory automation etc. as per SOP.

2. Material handling

Material handling activities. Plan sequence of operations to minimize time and distance travelled. Perform inspection of MHE before starting operations. Choose the appropriate PPE for operating the various types of MHEs.. Operate MHE to move the pallet to the specified location and to move damaged/spilled goods to quarantine area. Report breakages, spillages, count mismatch, packaging defects etc.. Demonstrate safe parking of MHE.. Perform preventive and breakdown maintenance checks

3. Containerization

Demonstrate understanding of the basic concepts of container logistics, design, lifting and loading arrangement of container. Perform Inspection of goods in container and transportation of container. Analyze major logistics issues concerning containerization. Reverse, integrated and service logistics. Perform tracking and tracing of containers

4. Conveyer and equipment maintenance

Identify the appropriate MHE for different types of cargo and Cargo handling operations. Prepare cargo movement route plan. Follow signaling standards. Inspect preparedness of MHE for loading/unloading. Use the appropriate PPE for cargo movement. Operate MHE as per SOP. Identify maintenance requirements of MHE. Perform preventive and first-line maintenance of MHE at ports

5. Design Retrofit, maintenance of colds storages and Pack Houses

Perform the various activities in a cold chain warehouse. Identify the various refrigeration equipments and theirs uses and operational thresholds. Identify various engineering equipments used in cold chain. Design cold storage by considering important parameters. Implement safety factors while designing a refrigeration system. Choose refrigerants by considering economic parameters. Plan and schedule maintenance of refrigeration equipment, monitor maintenance activities and Supervision of repairs and services.

Reference Books

1. Online Resources: From LSC Web Site

Course Code 94610	MATERIAL HANDLING PRACTICAL	L	T	P	C
PRACTICAL/LAB		0	0	4	2

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.

Assessment Methodology:

	Continuous Assessment (40 marks)			**End Semester Examination (60 marks)**
	CA1	**CA2**	**CA3**	
Mode	Practical Test	Practical Test	Practical Document	Practical Examination
Portion	Part A/ Cycle 1 Exercises	Part B/ Cycle 2 Exercises	All Exercises	All Exercises
Duration	3 Periods	3 Periods	Regularly	3 Hours
Exam Marks	60	60	Each Practical 10 Marks	100
Converted to	15	15	10	60
Marks	30		10	60
Tentative Schedule	7th Week	14th Week	15th Week	

Note:

- **CA1 and CA2:** All the exercises/experiments as per the portions mentioned above should be completed and kept for the practical test. The students shall be permitted to select any one by lot for the test. The practical test should be conducted as per the pattern to be decided by the departments.

  The marks awarded will be converted to 15 Marks for each assessment test. Addition of CA1 and CA2 will be considered for the internal assessment of 30 Marks.

- **CA 3:** Practical document should be maintained for every exercise / experiment immediately after completion of the practice. The same should be evaluated for 10 Marks. The total marks awarded should be converted to 10 Marks for the internal assessment. The practical document should be submitted for the Practical Test and End Semester Examination with a bonafide certificate.

Course Content

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

Course Code 94620	MINI PROJECT	L	T	P	C
PROJECT/ INTERNSHIP		-	-	-	2

Important points to consider to select the mini project.

- Selecting a project work in Diploma Engineering is a significant decision that can greatly influence your learning experience and future career prospects.
- Choose a project that aligns with your career aspirations and interests within the field of engineering. Consider how the project can contribute to your professional development and future opportunities.
- Ensure the project aligns with your coursework and specialization within the Diploma program. It should complement and build upon the knowledge and skills you have acquired in your studies.
- Evaluate the scope of the project to ensure it is manageable within the given timeframe, resources, and constraints. Avoid projects that are overly ambitious or impractical to complete effectively.
- Assess the availability of resources needed to conduct the project, such as equipment, materials, laboratory facilities, and access to relevant software or tools. Lack of resources can hinder project progress.
- Select a project that genuinely interests and motivates you. A project that captures your curiosity and passion will keep you engaged and committed throughout the project duration.
- Consider the availability and expertise of faculty advisors or industry mentors who can provide guidance and support throughout the project. Effective mentorship is crucial for success.
- Clearly define the learning objectives and expected outcomes of the project. Ensure that the project will help you achieve specific learning goals related to technical skills, problem-solving, and professional development.
- Look for opportunities to propose innovative solutions or explore new methodologies within your project. Projects that encourage creativity can set you apart and enhance your learning experience.
- Consider ethical implications related to the project, such as safety protocols, environmental impact, and compliance with ethical guidelines in research and engineering practices.

- Evaluate whether the project offers opportunities for collaboration with peers, experts from other disciplines, or industry partners. Interdisciplinary projects can broaden your perspective and enhance your teamwork skills.
- Consider the potential impact of your project on society or the engineering community. Projects that address significant challenges or contribute to social good can be highly fulfilling and make a meaningful difference.

By carefully considering these points, Diploma Engineering students can make informed decisions when selecting project work that not only enhances their academic learning but also prepares them for successful careers in engineering.

Duties Responsibilities of the internal faculty advisor.

Each group should have an internal faculty advisor assigned by the HOD/Principal.

- The project should be approved by the project monitoring committee constituted by the Chairman Board of Examinations.
- The project should be selected in the sixth semester itself. Each project shall have a maximum of four students in the project group.
- Provide comprehensive academic advising to help in the selection of appropriate project that align with their interests and career goals.
- Offer expertise and feedback to ensure rigorous methodology, innovative approaches, and meaningful contributions to the field.
- Assist in developing technical and professional skills through hands-on projects, laboratory work, and practical applications of theoretical knowledge.
- Provide personal mentorship, fostering a supportive relationship that encourages growth, resilience, and a positive academic experience.
- Facilitate connections between students and industry professionals, alumni, and other relevant networks to enhance their professional opportunities and industry exposure.
- Ensure students have access to necessary resources, including research materials, lab equipment, software, and academic literature.
- Regularly monitor and evaluate the progress of the project, providing constructive feedback and guidance to help them stay on track and achieve their goals.
- Instill and uphold high ethical and professional standards, encouraging students to practice integrity and responsibility in their work.

- Assist in preparing progress reports, writing recommendation letters, and facilitating grant applications.
- Organize and participate in workshops, seminars, and other educational events that enhance the learning experience and professional development .
- Address any issues or conflicts that arise, providing mediation and support to ensure a positive and productive academic environment.

Instructions to the students.

- Regularly meet with your internal faculty advisor for guidance on academic progress, research projects, and career planning. Be proactive in seeking advice and support from your faculty advisor.
- Use planners, calendars, and task management tools to keep track of assignments, project deadlines, and study schedules. Prioritize tasks to manage your time efficiently.
- Take advantage of opportunities to participate in projects and hands-on activities. These experiences are crucial for applying your theoretical knowledge and gaining practical skills.
- Focus on improving essential professional skills such as communication, teamwork, problem-solving, and leadership. Participate in workshops and seminars that enhance these competencies.
- Actively seek networking opportunities through industry events, seminars, and meetings. Establish connections with peers, alumni, and professionals in your field to build a strong professional network.
- Seek internships, co-op programs, or part-time jobs related to your field of study. Real-world experience is invaluable for understanding industry practices and enhancing your employability.
- Uphold high ethical standards in all your academic and professional activities. Practice integrity, honesty, and responsibility. Adhere to the ethical guidelines and standards set by your institution and the engineering profession.
- Adopt a mindset of lifelong learning. Stay updated with the latest developments and trends in engineering by reading industry journals, attending conferences, and taking additional courses.

Documents to be submitted by the student for a project.

Submit a printed report of your project work along with the fabrication model / analysis report for the End Semester Examination.

Rubrics for Mini Project Work

Sl. No.	Topics	Description
1	Objectives	Clearly defined and specific objectives outlined. Objectives align with the project's scope and purpose.
2	Literature Review	Thorough review of relevant literature. Identification of gaps and justification for the project's contribution.
3	Research Design and Methodology	Clear explanation of the research design. Appropriateness and justification of chosen research methods.
4	Project Management	Adherence to project timeline and milestones. Effective organization and planning evident in the project execution.
5	Documentation	Comprehensive documentation of project details. Clarity and completeness in recording methods, results, and challenges.
6	Presentation Skills	Clear and articulate communication of project findings. Effective use of visuals, if applicable.
7	Analysis and Interpretation	In-depth analysis of data. Clear interpretation of results in the context of research questions.
8	Problem-Solving	Demonstrated ability to identify and address challenges encountered during the project. Innovative solutions considered where applicable.
9	Professionalism and Compliance	Adherence to ethical standards in research. Compliance with project guidelines and requirements.
10	Quality of Work	Overall quality and contribution of the project to the field. Demonstrated effort to produce high-quality work.

SCHEME OF EVALUATION

The mark allocation for Internal and End Semester Viva Voce are as below.

Internal Mark Split (40 Marks)*		
Review 1 (10 Marks)	Review 2 (15 Marks)	Review 3 (15 marks)
Committee: 5 Marks. Supervisor: 5 Marks	Committee: 7.5 Marks Supervisor: 7.5 Marks	Committee: 7.5 Marks Supervisor: 7.5 Marks

Note: * The rubrics should be followed for the evaluation of the internal marks during reviews.

END SEMESTER EXAMINATION - Project Exam

The performance of each student in the project group would be evaluated in a viva voce examination conducted by a committee consisting of an external examiner and the Department project supervisor and an internal examiner.

End Semester (100)#			
Record (20 Marks)	Presentation (20 Marks)	Viva Voce (20 Marks)	Model / Analysis Report (40 Marks)
External: 10 Internal: 5 Supervisor: 5	External: 10 Internal: 5 Supervisor: 5	External: 10 Internal: 5 Supervisor: 5	External: 20 Internal: 10 Supervisor: 10

 # The marks scored will be converted to 60 Marks.

94630	INDUSTRIAL TRAINING - II	L	T	P	C
INTERNSHIP		-	-	-	12

Course Objectives:

Following are the objectives of this course:

- This Apprenticeship course is intended to practice whatever is taught in the institute in theory classes during the Vth Semester, Preparation of appropriate e - documents for Export and Import processing, Prepare necessary documentation in E-commerce operations. Apply the principles, acts and rules of insurance and its regulation. Also application of the concepts of quality assurance.

Course outcomes:

After competing this course, student will become skilled and able to:

- Understanding the requirements of Logistics Informatics and application of various technology .
- Preparation of appropriate e - documents for Export and Import processing,
- Prepare necessary documentation in E-commerce operations.
- Apply the principles, acts and rules of insurance and its regulation. Also application of the concepts of

quality assurance.

1. Logistics Informatics

1.1. Understanding the requirements of Logistics Informatics and application of various technology solutions in logistics and various logistics technology solutions in road transport, in rail and in maritime.

2. Documentation

2.1. Preparation of appropriate e - documents for Export and Import processing including EDI filing, EXIM documentation checklist. Evaluate KYC, Goods and Service Tax (GST) details of the importer/exporter including copies of invoice, purchase order, Statutory Declaration Form (SDF), packing list, shipping bill/ Airway bill, Bill of lading, as delivery order, certificate of origin, industrial license, insurance document, etc. Process documentation using ICEGATE" web portal, portals of customs, shipping lines,

Directorate General of Foreign Trade (DGFT), Participative Government Agencies (PGAs) etc. Verify GST invoices and Land Transportation Documentation.

3. Ecommerce

3.1. Prepare necessary documentation in E-commerce operations. Use electronic payment system in transactions. Use EDI in business development. Perform various activities like allocating resources and streamlining of operations in Ecommerce, Processing forecasting demand in Ecommerce, Reviewing and approving of order processing, Reverse logistics and monitoring inbound and outbound operations.

4. Basics of quality assurance

4.1. Application of the concept of total quality management, the appropriate ISO 9000 series of standards and perform the necessary steps to implement TQM as per industry need.

5. Basics of Insurance

5.1. Apply the principles, acts and rules of insurance. List the various insurance terminologies. Apply the concepts of marine insurance, air insurance, road insurance, liability insurance. Prepare various documents in insurance. Interpret the insurance policy. Perform claims settlement process. Perform various steps involved in the risk management process. Use insurance as a risk transfer techniques Apply the principles of marine insurance. Perform marine claims handling and settlement

Reference Books

1. Online Resources: From LSC Web Site

94331	LOGISTICS IN MANUFACTURING, SUPPLY CHAIN AND DISTRIBUTION	L	T	P	C
THEORY		3	0	0	3

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

Assessment Methodology:

	Continuous Assessment (40 marks)				**End Semester Examination (60 marks)**
	CA1	**CA2**	**CA3**	**CA4**	
Mode	Written test	Written test	Quiz MCQ	Model Examination	Written Examination
Portion	Two units	Another Two units	Online / Offline	All units	All units
Duration	2 Periods	2 Periods	1 Hour	3 Hours	3 Hours
Exam Marks	50	50	60	100	100
Converted to	15	15	5	20	60
Marks	15		5	20	60
Tentative Schedule	6th Week	12th Week	13-14th Week	16th Week	

Note:

- **CA1 and CA2: W**ritten test should be conducted for 50 Marks for two units. The marks scored will be converted to 15 Marks. Best of one will be considered for the internal assessment of 15 Marks.

- **CA1 and CA2 Question Pattern:**

  FOUR questions should be asked from each unit. Students shall write any **FIVE** questions out of **EIGHT** questions. Each question carries 10 marks each. (5 X 10 Marks = 50 Marks)

  Each question may have subdivisions. Maximum two subdivisions shall be permitted.
- **CA3:** 60 MCQ can be asked by covering the entire portion. It may be conducted by Online / Offline. The marks scored should be converted to 5 marks for the internal assessment.
- **CA4:** Model examination should be conducted as per the end semester question pattern. The marks should be converted to 20 marks for the internal assessment.

Question Pattern: Model Examination and End Semester Examination

Answer ten questions by selecting two questions from each unit. Each question carries 10 marks each. (5 X 20 Marks = 100 Marks)

Four questions will be asked from every unit. Students should write any two questions from each unit. The question may have two subdivisions only.

CONTENT:

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

94332	STORAGE CONTAINERS; TYPES, USAGE, MAINTENANCE AND REPAIR	L	T	P	C
THEORY		3	0	0	3

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

Assessment Methodology:

	Continuous Assessment (40 marks)				**End Semester Examination (60 marks)**
	CA1	**CA2**	**CA3**	**CA4**	
Mode	Written test	Written test	Quiz MCQ	Model Examination	Written Examination
Portion	Two units	Another Two units	Online / Offline	All units	All units
Duration	2 Periods	2 Periods	1 Hour	3 Hours	3 Hours
Exam Marks	50	50	60	100	100
Converted to	15	15	5	20	60
Marks	15		5	20	60
Tentative Schedule	6th Week	12th Week	13-14th Week	16th Week	

Note:

- **CA1 and CA2: W**ritten test should be conducted for 50 Marks for two units. The marks scored will be converted to 15 Marks. Best of one will be considered for the internal assessment of 15 Marks.

- **CA1 and CA2 Question Pattern:**

  FOUR questions should be asked from each unit. Students shall write any **FIVE** questions out of **EIGHT** questions. Each question carries 10 marks each. (5 X 10 Marks = 50 Marks)

  Each question may have subdivisions. Maximum two subdivisions shall be permitted.
- **CA3:** 60 MCQ can be asked by covering the entire portion. It may be conducted by Online / Offline. The marks scored should be converted to 5 marks for the internal assessment.
- **CA4:** Model examination should be conducted as per the end semester question pattern. The marks should be converted to 20 marks for the internal assessment.

Question Pattern: Model Examination and End Semester Examination

Answer ten questions by selecting two questions from each unit. Each question carries 10 marks each. (5 X 20 Marks = 100 Marks)

Four questions will be asked from every unit. Students should write any two questions from each unit. The question may have two subdivisions only.

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 pipe lines 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

Course Code 94361	Port terminal equipment and conveyor maintenance	L	T	P	C
Practicum / Practical		1	0	4	3

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 onhandling Conveyor and Equipment Maintenance and caring out their routine maintenance.

Assessment Methodology:

	Continuous Assessment (40 marks)			**End Semester Examination (60 marks)**
	CA1	**CA2**	**CA3**	
Mode	Practical & Written Test	Practical & Written Test	Practical Test	Practical Examination
Portion	PART A/Cycle 1 Exercises & Two units	PART B/Cycle 2 Exercises & another two units	All Exercises	All Exercises
Duration	3 Periods	3 Periods	3 Hours	3 hours
Exam Marks	60	60	100	100
Converted to	15	15	10	60
Marks	30		10	60
Tentative Schedule	7th Week	14th Week	16th Week	

Note:

- **CA1 and CA2:**.The practical and written test should be conducted as per the portion above and the scheme of evaluation can be decided by the departments. Assessment written & Practical test should be conducted for 60 Marks. The marks awarded will be converted to 15 Marks for each assessment test. Addition of CA1 and CA2 will be considered for the internal assessment of 30 Marks.

- **CA 3:** All the exercises/experiments should be completed and kept for the practical test. The students shall be permitted to select any one by lot for the test. The practical test should be conducted and the scheme of evaluation can be decided by the departments. The marks awarded should be converted to 10 Marks for the internal assessment.

Course content

1. Material Handling Equipment

1.1. MHE at sea side, Ship to shore, STS Gantry crane (Single Trolley), Mobile Harbour Crane (MHC)

And Wide Span Crane (WSC)

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

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

1.4. Maintenance of MHE

1.4.1. Maintenance schedule for material handling equipment.

1.4.2. Preventive and breakdown maintenance

1.4.3. Procedure for handling Preventive and Break down maintenance

2. Container Yard

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

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

2.3. Terminal Chassis, Road Chassis and Overhead Bridge Crane

2.4. Repair facilities of container in the

yard, Safety load for container, Certification of containers safety

3. Conveyors

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

3.2. Goods transported on Conveyors and Advantages of Conveyor system

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

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

S.No	List of Practical
1.	Preparationof 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. AP Mollor Guide book on Terminal
4. Dubai Port Authorities Manual
5. Online Resources: From LSC Web Site

Course Code 94362	MARINE LOGISTICS INCLUDING LIQUID CARGO AND BULK CARGO DOCUMENTATION	L	T	P	C
Practicum / Practical		1	0	4	3

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.

Assessment Methodology:

	Continuous Assessment (40 marks)			**End Semester Examination (60 marks)**
	CA1	**CA2**	**CA3**	
Mode	Practical & Written Test	Practical & Written Test	Practical Test	Practical Examination
Portion	PART A/Cycle 1 Exercises & Two units	PART B/Cycle 2 Exercises & another two units	All Exercises	All Exercises
Duration	3 Periods	3 Periods	3 Hours	3 hours
Exam Marks	60	60	100	100
Converted to	15	15	10	60
Marks	30		10	60
Tentative Schedule	7th Week	14th Week	16th Week	

Note:

- **CA1 and CA2:**.The practical and written test should be conducted as per the portion above and the scheme of evaluation can be decided by the departments. Assessment written & Practical test should be conducted for 60 Marks. The marks awarded will be converted to 15 Marks for each assessment test. Addition of CA1 and CA2 will be considered for the internal assessment of 30 Marks.

- **CA 3:** All the exercises/experiments should be completed and kept for the practical test. The students shall be permitted to select any one by lot for the test. The practical test should be conducted and the scheme of evaluation can be decided by the departments. The marks awarded should be converted to 10 Marks for the internal assessment.

Course content:

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 varies 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.

S. No	List of Practical
1.	Prepare proforma invoice to transport liquid cargo
2.	Prepare an invoice for a passenger cum cargo ships
3.	Prepare a cargo way bill for dry bulk cargo ship
4.	Prepare a procedure chart for loading unloading in tanker ships
5.	Prepare a chart of cargo safety measures
6.	Prepare an allotment of booking a container for radioactive material in sea transport process
7.	Prepare a proforma for transport of goods in air craft carrier ships.
8.	Prepare a chart of rules and regulations of classification society and safe packaging of cargo transporting
9.	Prepare a OGL for importing a spare parts
10.	Prepare a Export documents for exporting of spare parts

Reference Books

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

Course Code 94431	DANGEROUS GOODS MANAGEMENTS	L	T	P	C
THEORY		3	0	0	3

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.

Assessment Methodology:

	Continuous Assessment (40 marks)				**End Semester Examination (60 marks)**
	CA1	**CA2**	**CA3**	**CA4**	
Mode	Written test	Written test	Quiz MCQ	Model Examination	Written Examination
Portion	Two units	Another Two units	Online / Offline	All units	All units
Duration	2 Periods	2 Periods	1 Hour	3 Hours	3 Hours
Exam Marks	50	50	60	100	100
Converted to	15	15	5	20	60
Marks	15		5	20	60
Tentative Schedule	6th Week	12th Week	13-14th Week	16th Week	

Note:

- **CA1 and CA2: W**ritten test should be conducted for 50 Marks for two units. The marks scored will be converted to 15 Marks. Best of one will be considered for the internal assessment of 15 Marks.
- **CA1 and CA2 Question Pattern:**

  FOUR questions should be asked from each unit. Students shall write any **FIVE** questions out of **EIGHT** questions. Each question carries 10 marks each. (5 X 10 Marks = 50 Marks)

  Each question may have subdivisions. Maximum two subdivisions shall be permitted.
- **CA3:** 60 MCQ can be asked by covering the entire portion. It may be conducted by Online / Offline. The marks scored should be converted to 5 marks for the internal assessment.
- **CA4:** Model examination should be conducted as per the end semester question pattern. The marks should be converted to 20 marks for the internal assessment.

Question Pattern: Model Examination and End Semester Examination

Answer ten questions by selecting two questions from each unit. Each question carries 10 marks each. (5 X 20 Marks = 100 Marks)

Four questions will be asked from every unit. Students should write any two questions from each unit. The question may have two subdivisions only.

COURSE CONTENT:

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. Dlammable solids and emitting flammable gases, oxidizing substance and organic peroxides, toxic or infectious substance, radioactive material and corrosives.

1.2. Miscellaneous transportation ways - Road, rail, sea and air - 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, 6 criteria, 6 complexities (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 -Gases transport provisions 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 - Special attention, need for Packaging, Intermediate bulk container (IBC) and Large Packaging -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 -. Compressed gas transport, gas cylinders, gas tanker ships and gas tanker trucks

5.2. Packaging of special goods-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.

Course Code 94432	QUALITY ASSURANCE IN LOGISTICS	L	T	P	C
THEORY		3	0	0	3

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.

Assessment Methodology:

	Continuous Assessment (40 marks)				**End Semester Examination (60 marks)**
	CA1	**CA2**	**CA3**	**CA4**	
Mode	Written test	Written test	Quiz MCQ	Model Examination	Written Examination
Portion	Two units	Another Two units	Online / Offline	All units	All units
Duration	2 Periods	2 Periods	1 Hour	3 Hours	3 Hours
Exam Marks	50	50	60	100	100
Converted to	15	15	5	20	60
Marks	15		5	20	60
Tentative Schedule	6th Week	12th Week	13-14th Week	16th Week	

Note:

- **CA1 and CA2: W**ritten test should be conducted for 50 Marks for two units. The marks scored will be converted to 15 Marks. Best of one will be considered for the internal assessment of 15 Marks.
- **CA1 and CA2 Question Pattern:**

  FOUR questions should be asked from each unit. Students shall write any **FIVE** questions out of **EIGHT** questions. Each question carries 10 marks each. (5 X 10 Marks = 50 Marks)

  Each question may have subdivisions. Maximum two subdivisions shall be permitted.
- **CA3:** 60 MCQ can be asked by covering the entire portion. It may be conducted by Online / Offline. The marks scored should be converted to 5 marks for the internal assessment.
- **CA4:** Model examination should be conducted as per the end semester question pattern. The marks should be converted to 20 marks for the internal assessment.

Question Pattern: Model Examination and End Semester Examination

Answer ten questions by selecting two questions from each unit. Each question carries 10 marks each. (5 X 20 Marks = 100 Marks)

Four questions will be asked from every unit. Students should write any two questions from each unit. The question may have two subdivisions only.

COURSE CONTENT:

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. PDSA cycle, benefits and 5W2H method analyzing pertaining to logistics.

4. Quality system:

4.1. Quality System, need for ISO 9000, introduction, definitions, ISO and BIS

4.2. ISO 9000 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

Course Code 94441	COMPLIANCE-INSURANCE, REGULATIONS AND LOSS PREVENTIONS.	L	T	P	C
THEORY		3	0	0	3

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.

Assessment Methodology:

	Continuous Assessment (40 marks)				**End Semester Examination (60 marks)**
	CA1	**CA2**	**CA3**	**CA4**	
Mode	Written test	Written test	Quiz MCQ	Model Examination	Written Examination
Portion	Two units	Another Two units	Online / Offline	All units	All units
Duration	2 Periods	2 Periods	1 Hour	3 Hours	3 Hours
Exam Marks	50	50	60	100	100
Converted to	15	15	5	20	60
Marks	15		5	20	60
Tentative Schedule	6th Week	12th Week	13-14th Week	16th Week	

Note:

- **CA1 and CA2: W**ritten test should be conducted for 50 Marks for two units. The marks scored will be converted to 15 Marks. Best of one will be considered for the internal assessment of 15 Marks.
- **CA1 and CA2 Question Pattern:**

  FOUR questions should be asked from each unit. Students shall write any **FIVE** questions out of **EIGHT** questions. Each question carries 10 marks each. (5 X 10 Marks = 50 Marks)

  Each question may have subdivisions. Maximum two subdivisions shall be permitted.
- **CA3:** 60 MCQ can be asked by covering the entire portion. It may be conducted by Online / Offline. The marks scored should be converted to 5 marks for the internal assessment.
- **CA4:** Model examination should be conducted as per the end semester question pattern. The marks should be converted to 20 marks for the internal assessment.

Question Pattern: Model Examination and End Semester Examination

Answer ten questions by selecting two questions from each unit. Each question carries 10 marks each. (5 X 20 Marks = 100 Marks)

Four questions will be asked from every unit. Students should write any two questions from each unit. The question may have two subdivisions only.

COURSE CONTENT:

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.

Course Code 94442	LIQUID TERMINALS, STORAGE AND TRANSPORTATION .	L	T	P	C
THEORY		3	0	0	3

Course Objectives:

Following are the objectives of this course:

- To make students to understand logistics Terminals and Liquid Terminals
- To make students to understand Liquid Terminals, storage and transportation

Course outcomes:

After completing this course, student will be able to:

- Understand Functions and operation of logistics Terminals and Liquid Terminals
- Understand Liquid Terminals, storage and storage information system
- Understand liquid logistics and apply for transportation of liquids logistics

Assessment Methodology:

	Continuous Assessment (40 marks)				**End Semester Examination (60 marks)**
	CA1	**CA2**	**CA3**	**CA4**	
Mode	Written test	Written test	Quiz MCQ	Model Examination	Written Examination
Portion	Two units	Another Two units	Online / Offline	All units	All units
Duration	2 Periods	2 Periods	1 Hour	3 Hours	3 Hours
Exam Marks	50	50	60	100	100
Converted to	15	15	5	20	60
Marks	15		5	20	60
Tentative Schedule	6th Week	12th Week	13-14th Week	16th Week	

Note:

- **CA1 and CA2: W**ritten test should be conducted for 50 Marks for two units. The marks scored will be converted to 15 Marks. Best of one will be considered for the internal assessment of 15 Marks.
- **CA1 and CA2 Question Pattern:**

  FOUR questions should be asked from each unit. Students shall write any **FIVE** questions out of **EIGHT** questions. Each question carries 10 marks each. (5 X 10 Marks = 50 Marks)

  Each question may have subdivisions. Maximum two subdivisions shall be permitted.
- **CA3:** 60 MCQ can be asked by covering the entire portion. It may be conducted by Online / Offline. The marks scored should be converted to 5 marks for the internal assessment.
- **CA4:** Model examination should be conducted as per the end semester question pattern. The marks should be converted to 20 marks for the internal assessment.

Question Pattern: Model Examination and End Semester Examination

Answer ten questions by selecting two questions from each unit. Each question carries 10 marks each. (5 X 20 Marks = 100 Marks)

Four questions will be asked from every unit. Students should write any two questions from each unit. The question may have two subdivisions only.

COURSE CONTENT:

1. logistics Terminal:

1.1. Functions and operation, quay side process, land side process, primary function, loading and unloading from to vessel
1.2. Storage for container, other goods, Terminal elements, quay wall, apron and storage area
1.3. Land side traffic system, building, free area for vehicle transport system and Area for material handling system

2. Terminal Information:

2.1. Terminal operation forecast, unit and factor, (TEU), throughput of the terminal and throughput

waterside

2.2. Throughput of the stack storage capacity, surface area of the stack, throughput landside and technical handling capacity

2.3. Design process for pipe line discharge, layout calculations, yard layout sheet and Lighting arrangements

3. Liquid Terminals

3.1. Bulk Liquid storage points, Port side, Sea side, Land area, Rail wagon side and Airport area
3.2. Loading and Unloading from ships, Rail, Lorry, Pumps, Pipe lines, Storage tanks and Types
3.3. Safety procedures, Minimum requirement for prevention of fire and Prevention of leakages.

4. Transportation

4.1. Types of Liquids, Compressed gas, Crude oil, Clean oil, Edibile oil and Water
4.2. Dairy products, Tanker ships, Shuttle tanker, Chemical tanker, LPG, LNG, VLCC, ULCC and Land transport tankers
4.3. Rail wagon Liquid transport, Temperature control system and emergency towing arrangement (ETA)
4.4. International tanker and Safety guide for oil tankers and terminals (ISGOTT)

5. Liquid terminal /Storage Information system:

5.1. Calculation of Liquid discharge / Loading, integrated Automation system, Spill prevention and Techniques
5.2. Requirement supply DATA collection, Arrangement for transportation globally, Inter model terminal arrangement and Trouble shooting
5.3. Rectifying information, Delivery of Liquids information, Survey and research of the operation and feed back, Customer relationship and Study of cost reduction

Reference Books:

1. Institute Chemical Distribution Bulk Liquid Chemical Handling Guide for Plants, Terminals, Storage and Distribution Depots 2012,
2. April Weber, Storage and Transportation of Crude Oil, Natural Gases, Liquid Petroleum Products and Other Chemicals
3. Saara Hanninen & Jorma Rytkonen, Transportation of liquid bulk chemicals by tankers
4. Online Resources: From LSC Web Site

Course Code 94443	PACKAGING	L	T	P	C
THEORY		3	0	0	3

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.

Assessment Methodology:

	Continuous Assessment (40 marks)				**End Semester Examination (60 marks)**
	CA1	**CA2**	**CA3**	**CA4**	
Mode	Written test	Written test	Quiz MCQ	Model Examination	Written Examination
Portion	Two units	Another Two units	Online / Offline	All units	All units
Duration	2 Periods	2 Periods	1 Hour	3 Hours	3 Hours
Exam Marks	50	50	60	100	100
Converted to	15	15	5	20	60
Marks	15		5	20	60
Tentative Schedule	6th Week	12th Week	13-14th Week	16th Week	

Note:

- **CA1 and CA2: W**ritten test should be conducted for 50 Marks for two units. The marks scored will be converted to 15 Marks. Best of one will be considered for the internal assessment of 15 Marks.
- **CA1 and CA2 Question Pattern:**

  FOUR questions should be asked from each unit. Students shall write any **FIVE** questions out of **EIGHT** questions. Each question carries 10 marks each. (5 X 10 Marks = 50 Marks)

  Each question may have subdivisions. Maximum two subdivisions shall be permitted.
- **CA3:** 60 MCQ can be asked by covering the entire portion. It may be conducted by Online / Offline. The marks scored should be converted to 5 marks for the internal assessment.
- **CA4:** Model examination should be conducted as per the end semester question pattern. The marks should be converted to 20 marks for the internal assessment.

Question Pattern: Model Examination and End Semester Examination

Answer ten questions by selecting two questions from each unit. Each question carries 10 marks each. (5 X 20 Marks = 100 Marks)

Four questions will be asked from every unit. Students should write any two questions from each unit. The question may have two subdivisions only.

COURSE CONTENT:

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 amper 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. Keppler 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

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