Programme Name/s : **Mechanical Engineering**
Programme Code : **ME**
Semester : **Sixth**
Course Title : **COLD CHAIN MANAGEMENT**
Course Code : **316365**

I. RATIONALE

The design, optimization, and upkeep of machinery used to maintain necessary temperatures along with the supply chain from manufacturing to the customer are the core topics of Mechanical Engineering. Cold Chain management refers to the proper handling and transportation of temperature-sensitive items. The concepts, tools, and procedures required for effective cold chain management in a variety of sectors, including chemicals, food, and pharmaceuticals, are covered in this course. For businesses that need to store, ship, and distribute temperature-sensitive goods under controlled circumstances, cold chain management is crucial. The purpose of this course is to give students the information and abilities they need to efficiently manage Cold Chain logistics while maintaining product quality, safety, and legal compliance.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the students to attain the following industry identified outcomes through various teaching learning experiences: Perform activities related to Cold-Chain Management according to requirement such as products, quality, packaging and storage efficiently.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Interpret the significance and components of the Cold Chain Management in various industries.
- CO2 - Choose appropriate Cold Chain Packaging Techniques and Storage Systems for different applications.
- CO3 - Create cost effective sustainable Cold Chain system as per client requirement.
- CO4 - Apply appropriate Operations, Monitoring and Risk Management Strategies in Cold Chain.
- CO5 - Use the regulatory frameworks, policies and best practices that ensure efficient and environmentally sustainable Cold Chain Management

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/ s	Learning Scheme					Credits	Assessment Scheme											
				Actual Contact Hrs./Week			SLH	NLH		Paper Duration	Theory				Based on LL & TL				Based on SL		Total Marks
															Practical						
				CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
316365	COLD CHAIN MANAGEMENT	CCM	DSE	4	-	2	-	6	3	3	30	70	100	40	25	10	25#	10	-	-	150

Total IKS Hrs for Sem. : 2 Hrs

Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Explain the significance of the Cold Chain. TLO 1.2 Identify the key components of the Cold Chain. TLO 1.3 List the applications of Cold Chain Management in different sectors/industries. TLO 1.4 Identify key technological advancements in modern Cold Chain Management. TLO 1.5 Explain the global and national challenges affecting Cold Chain logistics.	**Unit - I Introduction to Cold Chain Management** 1.1 Definition and Importance, Key Components of Cold Chain, Applications in Food, Pharmaceuticals, and Chemicals, Global, National and Local Cold Chain Challenges 1.2 The Development of Cold Chain: Historical and Modern Development, Food Cold Chain, Medicinal Cold Chain, Vaccine Cold Chain 1.3 Fundamentals of Cold Chain & Logistic: Principles of Cold Chain Logistics Features & Structure of Cold Chain Logistics, Supply Chain Versus Cold Chain Management, Global Cold Chain Management, Role of Indian railways in cold chain. 1.4 Socio-economic and Environmental Impacts of Cold Chain: Social Impacts, Economic Impacts, Environmental Impacts.	Lecture Using Chalk-Board Collaborative learning Video Demonstrations Presentations

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
2	TLO 2.1 Explain the role of refrigeration and freezing in Cold Chain logistics. TLO 2.2 List different packaging materials used in Cold Chain logistics. TLO 2.3 Explain the importance of temperature and humidity control in the Cold Chain. TLO 2.4 List different types of refrigerated vehicles and their functions in the Cold Chain. TLO 2.5 Explain the role of Cold Storage and Refrigerated warehouses in preserving perishable goods. TLO 2.6 Select the appropriate refrigerated containers for various applications.	**Unit - II Cold Chain Packaging Techniques & Storage Systems** 2.1 Basic Elements for Cold Chain: Refrigeration and Freezing, Insight into Refrigeration and Freezing of Perishable Food products. 2.2 Cold Chain Packaging Techniques: Packaging Materials for Cold Chain Logistics, Insulated Packaging Systems, Sustainable Packaging Solutions. 2.3 Product Characteristics: Temperature/Humidity, Time, Chilling and Freezing Injury, Respiratory Metabolism. 2.4 Facilities and Equipment in Cold Chain: Refrigerated Vehicles, Cold Storage /Refrigerated Warehouse, Work in Refrigerated Warehouse in Cold Chain, Automation in Cold Chain Environment, Refrigerated Containers- Temperature-controlled vehicle with solar power, Multi-temperature trailer, Intelligent container Cold Chain Equipment, Maintenance of Refrigeration Equipment.	Lecture Using Chalk-Board Video Demonstrations Site/Industry Visit Collaborative learning
3	TLO 3.1 Differentiate between fixed costs (e.g., infrastructure, equipment, depreciation) and variable costs in Cold Chain. TLO 3.2 List common financial and operational challenges in maintaining an efficient Cold Chain. TLO 3.3 Explain the importance of energy optimization in Cold Chain operations and its impact on cost and sustainability. TLO 3.4 Classify energy-efficient transportation methods and technologies used in Cold Chain logistics. TLO 3.5 List essential KPIs for monitoring financial performance Cold Chain. TLO 3.6 Explain financial modelling techniques to assess the ROI for Cold Storage Infrastructure. TLO 3.7 List future trends & innovations in Cold Chain compliance.	**Unit - III Optimization Techniques in Cold Chain Management** 3.1 Introduction to Cold Chain and Cost Dynamics: Cost Components in Cold Chain (Fixed and Variable Costs), Challenges in Cold Chain Cost Management. 3.2 Optimizing Energy Use in Cold Chain Operations: Energy, Maintenance, Transportation Techniques for Cost Reduction in Cold Chain Operations, Life Cycle Cost Analysis of Cold Chain Equipment, Energy Efficiency and Cost Reduction in Refrigeration Technologies and Energy Consumption, Renewable Energy in Cold Chain Logistics, Reducing Carbon Footprint and Operational Costs. 3.3 Financial Modelling and Cost-Benefit Analysis: Building a Cost Model for Cold Chain Operations, Cost drivers and Key Performance Indicators (KPIs), Return on Investment (ROI) analysis of cold storage investments, Break-even Analysis for Cold Chain Operations, Evaluating profitability thresholds, Scenario analysis and sensitivity testing. 3.4 Future Trends and Innovations in Cold Chain Compliance - Use of Internet of Things (IoT), Block Chain and Artificial Intelligence (AI).	Lecture Using Chalk-Board Presentations Case Study Collaborative learning
4	TLO 4.1 Explain the 4 "Rs" of Cold Chain management and their significance. TLO 4.2 Classify various Cold Chain monitoring tools and their role in ensuring product safety. TLO 4.3 List the common risks in Cold Chain logistics. TLO 4.4 Explain the different quality assessment methodologies and apply them to maintain product integrity. TLO 4.5 Explain risk management strategies in Cold Chain.	**Unit - IV Cold Chain Operations, Monitoring & Control Systems** 4.1 4 "Rs" in Cold Chain Management. 4.2 Cold Chain Monitoring Tools: Chart Recorder, Timeâ€“Temperature Indicator, Data Loggers, Radio Frequency Identification(RFID), and Sensors, Wireless Sensor Networks and Internet of Things in Cold Chain, Integration of Tools and Technologies for Cold Chain. 4.3 Risk Management in Cold Chain: Risks in Cold Chain Logistics, Handling Disruptions in the Cold Chain, Contingency Planning and Emergency Response, Quality Control and Safety Standards.	Video Demonstrations Presentations Site/Industry Visit Collaborative learning

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
5	TLO 5.1 Explain the role of government bodies and international organizations in setting and enforcing Cold Chain standards. TLO 5.2 List Indian Cold Chain Regulation governed by different bodies. TLO 5.3 State the functions of FSSAI, BIS, and APEDA in regulating food and export Cold Chains. TLO 5.4 State the role of different organizations in refrigeration standards. TLO 5.5 Identify key drivers of sustainability in the Cold Chain industry. TLO 5.6 Explain the Challenges in Retrofitting Older Cold Chain Infrastructure with Sustainable Technologies.	**Unit - V Standards, Regulations & Sustainable Innovations in Cold Chain Management** 5.1 Introduction to Cold Chain Regulations and Standards - Importance of regulations, Role of Indian Government in cold chain. Indian Cold Chain Regulations â€“ Governed by Food Safety and Standards Authority of India (FSSAI), Bureau of Indian Standards (BIS), Agricultural and Processed Food Products Export Development Authority (APEDA).for food safety and exports. 5.2 Cold Storage and Refrigeration Standards - Best practices for refrigerated transport and storage as per International Institute of Refrigeration (IIR), Standards for refrigeration system efficiency as per American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE). 5.3 Indian Government Schemes and Initiatives Boosting Cold Chain Infrastructure for Agricultural Growth in India: Pradhan Mantri Kisan SAMPADA Yojana (PMKSY), Small Farmer Agri-Business Consortium (SFAC) Assistance. 5.4 Sustainable Innovation in Cold Chain: Importance, Social-Economic-Environmental Benefits, Challenges of Retrofitting Older Cold Chain Infrastructure with Sustainable Technologies.	Presentations Case Study Video Demonstrations Collaborative learning

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Identify Real-World Cold Chain Applications. LLO 1.2 Analyze Cold Chain Data as per Applications.	1	*ICT enabled tools to prepare technical feasibility report based on Local factors.	2	CO1
LLO 2.1 Identify Cold Chain Logistics Challenges. LLO 2.2 Interpret the data based on key National & global factors affecting Cold Chain logistics.	2	ICT enabled tools to prepare technical feasibility report base don National & Global challenges affecting cold chain logistics.	2	CO1
LLO 3.1 Identify the various insulation materials. LLO 3.2 Select suitable insulation materials for Cold Room Design.	3	Insulation materials for Cold Room design.	2	CO2
LLO 4.1 Use thermometers, data loggers, and hygrometers. LLO 4.2 Measure temperature and relative humidity inside cold storage.	4	Measurement of different product characteristics of Cold Storage.	2	CO2
LLO 5.1 Use thermometers, data loggers, and hygrometers. LLO 5.2 Measure temperature distribution and fluctuations within the storage environment.	5	*Measurement of different product characteristics in Iceplant/ Water cooler/ Chiller/ Refrigerator.	2	CO2
LLO 6.1 Label different componentâ€™s used in Refrigerated vehicle. LLO 6.2 Draw layout of refrigerant path flow diagram using CAD.	6	Different components used in Refrigerated vehicle.	2	CO2
LLO 7.1 Interpret simulation results and propose improvements in block chain-based cold chain systems. LLO 7.2 Prepare a brief report using data obtained under proposed block chain-based improvements.	7	*Preparation of report on Data Logger & Simulation used in Block chain, Cold Chain.	2	CO3
LLO 8.1 Select relevant strategy for cost effectiveness of cold chain system using online data. LLO 8.2 Use suitable strategy for cost effectiveness.	8	Strategies to optimize based on cost effectiveness using identified Cold Chain system.	2	CO3
LLO 9.1 Prepare check list for inspection of cold chain vehicle. LLO 9.2 Use check list for inspection of cold chain vehicle.	9	Inspection of a cold chain vehicle.	2	CO4

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 10.1 Inspect the changes in texture, color and odor over time due to storage conditions. LLO 10.2 Compare the spoilage process of perishable food in different storage conditions.	10	Comparison of rotting of perishible food with and without refrigerator.	2	CO4
LLO 11.1 Identify Cold Chain Monitoring Tools. LLO 11.2 Use Cold Chain Monitoring Tools.	11	*Make use of Cold Chain Monitoring Tools.	2	CO4
LLO 12.1 Prepare report on relevant data from government reports, official websites, and research papers. LLO 12.2 Analyze statistical data related to PMKSY funding, beneficiaries, and impact assessment.	12	*Pradhan Mantri Kisan SAMPADA Yojana (PMKSY).	2	CO5
LLO 13.1 Use data loggers and sensors to monitor energy consumption and temperature stability before and after retrofitting in given situation. LLO 13.2 Apply Sustainable Retrofitting Techniques in given situation.	13	Retrofitting Older Cold Chain Infrastructure with Sustainable Technologies.	2	CO1 CO2 CO3 CO4 CO5
LLO 14.1 Prepare brief report about the risks of maintaining an intact cold chain in emergency situations. LLO 14.2 List the measures to minimize the risk in cold chain system during emergency situations.	14	*Cold Chain Technology in Medical Emergency-(Case Study of Covid 19 for Vaccine)	2	CO1 CO2 CO3 CO4 CO5
LLO 15.1 Design prototype to preserve Agriculture Products in given situation. LLO 15.2 Test the prototype with operational parameters like temperature & humidity.	15	*Model of “Subjee Cooler” –Case Study by IIT Bombay.	2	CO1 CO2 CO3 CO4 CO5
LLO 16.1 Identify the techniques of preservation of Agricultural Products used in ancient India. LLO 16.2 Prepare a report on components of preservation of Agricultural Products used in ancient India.	16	*Preservation of Agricultural Products in Ancient India-(IKS)	2	CO1 CO2 CO3 CO4 CO5

Note : Out of above suggestive LLOs -

- '*' Marked Practicals (LLOs) Are mandatory.
- Minimum 80% of above list of lab experiment are to be performed.
- Judicial mix of LLOs are to be performed to achieve desired outcomes.

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING) : NOT APPLICABLE

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Applications of Cold Chain logistics. Focus on its importance in preserving perishable goods, including food, pharmaceuticals, and vaccines, and explore case studies, challenges, and future trends in this vital supply chain area etc.	1
2	Contingency Planning and Emergency Response in Cold chain Include Risk Assessment & Identification, Preventive measures & backup plans, Emergency response plan, Disaster recovery plan, Post-incident analysis & continuous improvement etc.	10
3	Report on Cold chain monitoring tools used in Refrigerated vehicle. Include key parameters monitored in Refrigerated vehicles such as GPS location tracking, Door open/close status, Power supply status etc. Include Data Loggers, Smart Refrigeration Systems, Real-time GPS & IoT Sensors, Real-life examples of cold chain monitoring in logistics etc.	11
4	Pradhan Mantri Kisan SAMPADA Yojana (PMKSY) Include objectives of PMKSY, Components of PMKSY, Benefits & Impact implementation mechanism, Case studies & success stories etc.	12
5	Retrofitting older Cold chain infrastructure with sustainable technologies. Include key technologies and expected benefits, Compliance & Certifications, Financial & Policy support for Retrofitting, importance of sustainability in retrofitting, Case studies & Real-world implementations etc.	13
6	Cold chain technology in medical emergency Include importance of Cold Chain in Vaccine distribution , Cold chain challenges during COVID-19, Vaccine Cold Chain implementation etc.	14
7	Preparation of model of â€œSubjee Coolerâ€  Structural components-wood, metal, or plastic to provide support Cooling mechanism-Sand, clay bricks, or charcoal Insulation Materials-Natural fiber insulation Assembly & Construction Tools-Saw, Hammer, Nails, Screws, Measuring Tape, Glue etc. Monitoring tools-Thermometer, Hygrometer etc.	15
8	Overview of ancient Indian agricultural preservation techniques Include traditional methods used for grains, fruits, vegetables, dairy, and meat preservation Role of Ayurveda, Herbal & Natural preservation techniques, Sustainability & relevance in modern times.	16
9	Report on global and local challenges affecting cold chain logistics Include infrastructure and energy constraints, Regulatory compliance and standardization, Technological and operational challenges etc.	2
10	Collection of information on different Packaging materials used in Cold Chain Logistics. Types of Packaging Materials Used, Phase Change Materials (PCMs), Rigid & Flexible Packaging, Key Considerations for Packaging Selection etc.	3
11	Equipment required for measuring product characteristics in Cold storage Temperature measurement: Infrared (IR) Thermometer Specification:Non-contact measurement, Temperature range: -40Â°C to 600Â°C Response Time: <1 second, Accuracy: Â±1Â°C etc. Humidity measurement: Digital Hygrometer, Humidity range: 0% to 100% RH, Accuracy: Â±2% RH Anemometer (Air flow meter): Measures airflow velocity (m/s) and air volume (CFM), Temperature Range: -10Â°C to 50Â°C Light intensity measurement: Lux meter, measures brightness inside storage areas. Range: 0â€“200,000 Lux etc.	4
12	Equipment required for measuring product characteristics during Visit to Dairy/ Frozen food processing plants Temperature measurement: Infrared (IR) Thermometer Specification: Non-contact measurement, Temperature range: -40Â°C to 600Â°C Response Time: <1 second, Accuracy: Â±1Â°C etc. Humidity measurement: Digital Hygrometer, Humidity range: 0% to 100% RH, Accuracy: Â±2% RH etc.	5
13	Different components are used in Refrigerated vehicle such as: Include Large Refrigerated Trucks, Refrigeration Unit (Cooling System), Insulated Cargo box, Evaporator unit (inside cargo area, Airflow & ventilation system, Temperature Monitoring & control System, Sealing mechanism (Doors & Insulation seals) etc.	6
14	Report on Data logger & Simulation used in Block chain, Cold chain. Include types of data loggers Used in Cold chain, Role and benefits of Block chain, importance of simulation, Types of simulations, Challenges and future developments etc.	7
15	Cost Components in Cold Chain Cost Management. Include Infrastructure cost, Energy and Utility costs, Transportation costs, Packaging and Handling costs, Monitoring and Compliance costs, Labor and Workforce costs etc.	8

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
16	Building of Cost Model for Cold Chain Operations. Include fixed costs, Variable costs, Build a cost model framework, ROI & Profitability analysis	9

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Introduction to Cold Chain Management	CO1	10	2	4	6	12
2	II	Cold Chain Packaging Techniques & Storage Systems	CO2	12	2	4	8	14
3	III	Optimization Techniques in Cold Chain Management	CO3	14	2	6	8	16
4	IV	Cold Chain Operations, Monitoring & Control Systems	CO4	10	2	4	6	12
5	V	Standards, Regulations & Sustainable Innovations in Cold Chain Management	CO5	14	2	8	6	16
Grand Total				**60**	**10**	**26**	**34**	**70**

X. ASSESSMENT METHODOLOGIES/TOOLS

Formative assessment (Assessment for Learning)

- Two-unit tests of 30 marks and average of two-unit tests.
- For laboratory learning 25 Marks

Summative Assessment (Assessment of Learning)

- End semester assessment of 25 marks for laboratory learning.
- End semester assessment of 70 marks.

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO- 1	PSO- 2	PSO- 3
CO1	3	2	-	-	2	3	2			
CO2	3	3	-	2	-	3	3			
CO3	3	2	-	2	3	3	3			
CO4	3	3	-	2	3	3	3			
CO5	3	2	-	-	3	3	3			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Aung Myo Min, Yoon Seok Chang	Cold Chain Management	Springer International Publishing AG Genre: Business & Economics, 1st Edition. 2023 ISBN: 9783031103766,
2	Ajay Kumar Gupta	The Complete Book on Cold Storage, Cold Chain & Warehouse (with Controlled Atmosphere Storage & Rural Godowns)	Niir Project Consultancy Services, 5th Edition, 2022 ISBN: 9788195577521.
3	Vijay Yadav Tokala, Majeed Mohammed	Cold Chain Management for the Fresh Produce Industry in the Developing World	CRC Press; 1st edition (30 November 2021), ISBN-13:978-0367498191
4	World Health Organization	Manual on the management, maintenance and use of blood cold chain equipment	World Health Organization (10 March 2006), ISBN-13: 978-9241546737

XIII . LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://youtu.be/EeNuQ5N2rNM?si=HWlU6gGY6BEmVr23	Cold Chain Management Introduction
2	https://youtu.be/HQA3Tk09mWs?si=7YdC23HQXkmpypd1	What Is a Cold Chain?
3	https://youtu.be/CyIwn7qEoy0?si=78nVOr_0D-G0yLQ2	What is the Cold Chain Process?
4	https://youtu.be/QxfnfGDbDyk?si=jjJ4zBaQjiNIumtH	Cold chain Vaccine storage and transportation
5	https://youtu.be/W44EKTz41aU?si=tBdP1_2NKasNgizx	Advanced Insulated Packaging Material for Cold-Chain Shipping
6	https://youtu.be/bqvR0zJMgqw?si=zrM_y2xOedGJWCdR	Large-scale cold-chain logistics automation
7	https://youtu.be/6N3qjr2MIYk?si=715ao7ZlB7Q5bF55	Best Practices: Managing the cold chain
8	https://youtu.be/jus-4svrUSY?si=pli83DOp3L5o0pUL	What is Cold Chain Equipment
9	https://youtu.be/16lw7AKtHHo?si=oIac0luK5NvHHUU8	Refrigerated trucks
10	https://youtu.be/Q17R6GyxUzs?si=js4veflAzLqf2qRX	Refrigerated Container Features

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students