CURRICULUM

MASTER IN MARITIME SCIENCE

DEPARTMENT OF NAUTICAL SCIENCE

FACULTY OF SHIPPING ADMINISTRATION

BANGABANDHU SHEIKH MUJIBUR RAHMAN MARITIME UNIVERSITY, BANGLADESH

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14.4.4 MMS 511 : Marine Engineering Knowledge
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14.6 **Dissertation/ Thesis**

14.6.1 MMS 500: Dissertation/ Thesis

1. Introduction to the University

1.1 General: The victory over maritime boundary delimitation with neighboring countries opened a new window in the maritime arena of Bangladesh. Vast sea area along with scarcity in land based resources has made it imperative to boost up our economy through effective exploration of sea resources. Keeping this in perspectives honorable Prime Minister Sheikh Hasina outlined the concept of blue economy and underscored the importance of effective manpower in the maritime sector.

In order to create effective human resources, the first ever specialized university Bangabandhu Sheikh Mujibur Rahman Maritime University, Bangladesh (BSMRMU) was established in 2013 after the name of the Father of the nation Sheikh Mujibur Rahman. Our motto is "We strive for Maritime Excellence". The University aims at bringing all maritime professional to a common platform to share knowledge and carryout research for the advancement of maritime sector and developing effective human resources in this sector.

1.2 Mission: Bangabandhu Sheikh Mujibur Rahman Maritime University, Bangladesh is committed to provide quality education based on state of the art technological support responsive to the emerging challenges at home and abroad.

The university is dedicated to nurture and develop world class professionals, who would serve the mankind with strong sense of ethical values and competence and ready to face the competitive world of maritime business, service and employment.

1.3 Vision: Our vision is to promote and create a learning environment for higher maritime education with excellence, through state- of- the- art facilities and gadgets, competent faculty and staff, expanded frontier of research based knowledge and international standards supportive of the new horizons in diverse fields by 2021.

1.4 Goals:

Achieve sustainable development and progress of the university through mutual cooperation with other related universities/ institutions.

Continue to upgrade educational services and facilities responsive to the demands and requirements of the nation.

Bring all types of marine professionals on a common platform to share knowledge and perform research and development works for the advancement of country's maritime sector.

Enhance research consciousness in the maritime sector in discovering new dimensions with the upcoming challenges.

Accelerate the participation of alumni students and professionals with educational programs and development of projects designed to expand and improve academic standards.

Teach students on marine science and technology and guide them towards research to enhance contribution to the maritime profession.

Conduct various educational programmes and research works for sustainable development of the maritime service and industrial sector of the country.

Educate students on different subjects of maritime management, law and security and strategy and conduct research on allied fields.

Create conducive environment for students to prepare themselves to serve the nation as future planners/ policy makers/ leaders in maritime sectors in coordination with national and international organizations including International Maritime Organization (IMO).

1.5 Faculties and Institutes: The University aspires to have seven teaching faculties and four research institutes. The faculties are:

1. Faculty of Maritime Governance and Policy (FMGP)
2. Faculty of Shipping Administration (FSA)
3. Faculty of Earth and Ocean Science (FEOS)

4. Faculty of Engineering and Technology (FET)

5. Faculty of General Studies (FGS)

6. Faculty of Computer Science &Informatics (FCSI)

7. Faculty of Maritime Business Studies (FMBS)

Research institutes are: Institute of Professional Language, Institute of Bay of Bengal & Bangladesh Studies, Institute of Renewable Energy & Marine Resource and Institute of Disaster Management.

2. Introduction to the Faculty of Shipping Administration:

Faculty of Shipping Administration is one of the oldest faculties of the university. The faculty has special learning environment, innovative course curriculum, methods of teaching, and quality programs. The faculty has three departments namely Port & Shipping Management, Nautical Science and Transportation & Logistics Management.

3. Introduction to the Department of Nautical Science:

The Department of Nautical Science started its journey from the very inception of this University under the Faculty of Shipping Administration. The Department is committed to provide an excellent teaching and learning environment. Global standard curriculums are followed to impart quality education by the qualified and competent teachers. Graduates of this department will get a unique opportunity to develop their career in the different areas of job market like domestic and foreign port, terminals and ICDS, University Teaching, shipping management companies, commercial organizations, freight forwarding companies, ship broking agency etc.

4. Introduction to the Program:

4.1 General: Master in Maritime Science (MMS) is a 24 months industry attractive post-graduate program under the Department of Nautical Science. The program is designed with 15 theoretical courses and a dissertation/Thesis. Besides, the student has to perform a field trip/study tour and student concluding seminar in first two semesters. Total credit for the program is 60.

4.2 Division of Semester: The duration of each semester is 26 weeks. Distribution is as follows:

a.	Classes	15 weeks
b.	Mid Term Examinations	02 week
c.	Preparatory Leave	02 weeks
d.	Term Final Examination	03 weeks
e.	Recess	04 weeks

4.3 Admission Criteria: Every applicant must fulfil the admission requirements as prescribed by BSMRMU. The minimum requirements for admission into the program are:

a. A Bachelor degree or its equivalent in any discipline of Science including Bachelor in Maritime Science.

b. Applicant with general education must have at least second division/Class or CGPA 3.00 in S.S.C and H.S.C/Equivalent and 2.25 in Bachelor/Equivalent in all public examination.

c. Applicants with GCE must have passed at least five subjects in O level (including mathematics) and at least two subjects in A level. However, applicant having more than two ‘D’ grades in O level and/or more than one ‘D’ grades in A level shall not be eligible for admission.

d. Applicants having at least two years job experience shall be given preference.

e. Foreign applicants shall apply through their respective embassy.

4.4 Admission Test: All eligible applicants shall be required to appear the admission test as per BSMRMU Admission Policy/regulations for Master in Maritime Science. Admission test shall normally be comprised of written test and viva voce. Only written test qualified applicant shall be called for viva voce.

4.5 Final Selection and Registration: The final selection for admission shall be based on Admission Test result. Selected candidates shall be registered with the programme in accordance with the procedures as laid down by BSMRMU.

4.6 Degree Requirement: Degree requirements are as follows:

a. Passing of all courses with minimum Cumulative Grade Point Average (CGPA) of 2.50 (C+) in 4.00 point grading scale at the end of the program.

b. Completion of Dissertation with a minimum grade of 2.50 (C+).

4.7 Credit Earned: The Courses in which a student has obtained 'D' or a higher Grade will be counted as credits earned by him/her. Any course in which a student has obtained 'F' grade will not be counted towards his/her earned credits.

4.8 Grading System: Letter grades and corresponding grade points will be awarded in accordance with the provisions (unified UGC grading system) shown below:

Grade	Grade points	Numerical Markings
A+	4.0	80% and above
A	3.75	75% to below 80%
A-	3.50	70% to below 75%
B+	3.25	65% to below 70%
B	3.00	60% to below 65%
B-	2.75	55% to below 60%
C+	2.50	50% to below 55%
C	2.25	45% to below 50%

Grade	Grade points	Numerical Markings
D	2.00	40% to below 45%
F	0.00	below 40%
I	Incomplete	-
W	Withdrawn	-
X	Projects/Thesis continuation	-
E	Expelled	Due to exam offence

4.9 Eligibility for Appearing Semester/Term Final Examination: An examinee shall be eligible for appearing at the semester/term final examination upon fulfilment of the following conditions:

a. The examinee submitted an application for appearing at the semester/term final exam in the prescribed form (hard copy/Online) to the Controller of Examinations through his/her department/institutes.

b. The examinee has paid the prescribed examination fees and all outstanding dues (including dues of hall/mess for resident students) of the university.

c. The examinee has attended minimum 75% of classes held in an individual course.

d. The examinee, who has attended from 60% to below 75% of classes, may be eligible to sit for the examination subject to the payment of non-collegiate fees fixed by BSMRMU.

4.10 Course Waiver: A student with relevant degrees from reputed universities may get maximum 16 credits waiver provided they fulfil the following conditions:

a. Obtained at least a 'B' grade or 1st class in a similar course in the earlier program
b. Minimum least 70% of the course contents are similar

All applications for course waiver will be reviewed by equivalence committee on a case-by-case basis and finally shall be approved by the Academic Council of BSMRMU.
For mariners, preparatory courses for combined class 2/1 Certificate of Competency duly endorsed by Department of shipping may also be considered.

4.11 Retaking a Course: It is expected that students will obtain degree by clearing the entire offered courses of specified credit hours as per the syllabus within academic period of three years. In case of failure to do so by any student the following guiding policies shall be adopted:

a. A student obtaining F grade in a course may be allowed to repeat the course with the prior approval of Head of the Department on the recommendation of the course coordinator. Such approval shall be reported to the BPGSR and academic council.

b. A student shall not be allowed to continue the programme if he/she obtains a total of three or more F grades in any term/semester.

c. If at the end of the second or any subsequent semester, the cumulative GPA falls below 2.0 he/she shall not be allowed to continue in the programme.

d. Two courses may be repeated for improvement with the prior approval of the Head of the Department on the recommendation of the course coordinator in accordance with examination regulation. Such approval shall be reported to the BPGSR and academic council.

5. Vision of the Program:

Developing world-class postgraduate to penetrate the maritime industry and Organization

6. Mission of the Program:

Supporting and structuring industry attractive curriculum and state of the art teaching.

7. Program Outcome:

In general, the programme will enable its graduates to master the art of technology, business and management of maritime industries and organization. On completion of the programme, Graduates will be able to:

- Apply knowledge of logistics and management in Maritime field
- Formulate Maritime problems and develop practical solutions
- An ability to work effectively in teams and provide leadership
- An ability to effectively communicate orally, graphically and in writing
- An understanding of managerial, professional and ethical responsibility

8. Learning Outcomes of the Programme:

After the successful completion of the master program, the students will be able to

- Plan, organize and control the port, terminal, depot etc.
- Manage shipping and shipping ancillary business
- Execute strategic maritime decision
- Design transportation routes and logistics

9. Generic Skills:

The generic skills for the program is primary maritime knowledge, information technology, introduction to business, mathematics, routes and history of trade and communicative English

10. Curriculum Structure

Master in Maritime Science Program consists of the following categories of courses:

Category	No. of Courses	Credit	Percentage
Fundamental Courses	4	12	20%
Core Courses	7	21	35%
Allied Courses	2	6	10%
Elective Courses	2	6	10%
Skill Development Courses	2	6	10%

Dissertation/ Thesis	1	9	15 %
Total	**18**	**60**	**100 %**

11. Course Schedule:

The course schedule of the program is as follows:

Semester 1				
Ser.	Sub. Code	Course Title	Credit	Contact Hours
1.	MPSM 511	Port and Shipping Operations	3	42
2.	MPSM 514	Maritime Economics	3	42
3.	MPSM 521	Maritime Human Resource Management	3	42
4.	MPSM 524	Maritime Law and Conventions	3	42
5.	MMS 501	Ocean Science	3	42
6.	DEV501	Study Tour/ Field Trip-1	1.5	3-4 days
7.	DEV502	Student Concluding Seminar-1	1.5	2-3 Days
		Sub Total	18	
Semester 2				
1.	MMS 502	Maritime Environment and Pollution	3	42
2.	MMS 503	Marine Spatial Planning	3	42
3.	MMS 504	Maritime Energy Management	3	42
4.	MMS 505	Maritime Transportation and Logistics	3	42
5.	MPSM 526	Research Methodology	3	42
6.	DEV503	Study Tour/ Field Trip-2	1.5	3-4 days
7.	DEV504	Student Concluding Seminar-2	1.5	2-3 days
		Sub Total	18	
Semester 3				
1.	MPSM 525	Maritime Safety and Security	3	42
2.		Allied 1	3	42
3.		Allied 2	3	42
4.		Elective 1	3	42

5.		Elective 2	3	42
		Sub Total	15	
Semester 4				
1.	MMS 500	Dissertation/ Thesis	9	
		Total Credits	**60**	

12. Teaching Strategy:

The teaching strategy of the program is mainly lecture based. Other teaching strategies includes; case analysis, group discussion, workshop, seminar, and fieldwork learning etc.

13. Assessment Strategy:

13.1 Theoretical Courses: The performance of the theoretical courses shall be evaluated through continuous assessment and semester final examination. Forty percent (40%) of marks of a course shall be allotted for continuous assessment and remaining sixty percent (60%) shall be allotted to the Semester Final Examination. The continuous assessment shall include class attendance and participation, quizzes/class test, term paper/assignments/case study and midterm examinations. Distribution of marks is as follows:

a. Class Attendance: 05%
b. Observation/ Class Participation: 05%
c. Term Paper/Assignment/Case Study: 05%
d. Quizzes/Class Test: 05%
e. Mid Term Examination: 20%
f. Term/semester Final Examination: 60%

Content	Marks

13.2 **Dissertation/ Thesis:** The distribution for dissertation is as marks follows:

Thesis	60%
Presentation	30%
Oral Exam	10%

13.3 Skill Development Courses: Developing Course is comprised of two items. One is field trip/ study tour and the other one is student concluding seminar. The performance of the field trip/ study tour of each student will be evaluated as follows:

Content	Marks
Attendance	20%
Participation	20%
Visit Report	30%
Presentation	30%

The performance of the Student Concluding Seminar of each student will be evaluated as follows:

Content	Marks
Attendance	10%
Submission of Paper	30%
Presentation	40%
Handling Questionnaire	20 %

14. Course Profile:

The course profile is describing as follows:

DISSERTATION/ THESIS

Course Code : MMS 500
Credit : 09

Aim:

To demonstrate skill in research, analysing findings and writing report.

Learning Outcome:

The students will gain hands-on research experience through completing a research project, starting with hypothesis development, literature searching, experimental design, data collection, analysis, and interpretation. Students will also gain experience in written and oral communication by submitting several written components including research proposal, progress report, and final thesis as well as presenting the results of their research in an oral presentation.

Method of Conduct:

The student will submit the three dissertation/ thesis topics and name of supervisors at the beginning of the third semester. The BPGSR will analyse the topic and supervisor and recommend the list to Academic Council for Approval. The overall guideline of the dissertation/ thesis will be circulated to the students throughout the semester by Dean Office.

PORT AND SHIPPING OPERATIONS

Course Code : MPSM 511
Credits : 3.0
Contact Hours : 42

Aim:

To orient the students with the basics of port, shipping and ancillary businesses of port and shipping. To understand about how port, terminals, shipping companies and other related organizations perform its functions.

Learning Outcomes:

By the end of this course, the students will be able to:

- Describe the functions of port, shipping and maritime organizations.
- Analyse ancillary activities of shipping and ports
- Identify the shipping company structure and its market.
- Describe the flagging policy and decisions

Syllabus Contents:

1. Ports & Terminals**:** Economic impact of ports on the regional economy – Location Characteristics – Organization structure in Ports – Interface of Rail & Road infrastructure – Factors affecting the future ports & terminals.

2. Shipping Company Structure**:** Organization of a shipping company – Roles of Commercial, Technical & Crewing departments – In house vs outsourcing of Ship Management functions – Ship Registries, National vs Open Registries – Ship Classification societies

3. Port Operations: Managing Port Operations – Introduction to Vessel Traffic Systems (VTS) & Harbour Authority – Services rendered by Ports and performance indicators – Terminal operations – Factors affecting Terminal Productivity – Cargo handling equipment – intermodal connections.

4. The roles and functions of United Nations and other International Organizations (IMO, ILO, UNCTAD, WHO) in the maritime context. International conventions and national regulations: responsibilities of ship-owners and crews; reports, declaration and certification requirements.

5. Flagging policy and decisions; flag state and ship registration practices, Shipping management practices and the uses of BIMCO SHIPMAN and CREWMAN. Design and development of safety management systems in maritime organizations using ISM Code.

6. International Maritime Organization: History of IMO, Membership in IMO, Legal instruments – SOLAS, COLREG, PSC, Governing bodies in IMO, Technical Committee, Marine safety Committee, standards and Recommendations for safety Investigation in Marine casualty. Safety of navigation, radio communications, search and rescue, standards of training and watch keeping, ship design and equipment, fire protection, stability, load lines and fishing vessel safety, flag state implementation, dangerous goods, solid cargoes and containers, bulk liquids and gases.

7. Introduction to ship broking and Chartering – Principles of Chartering- Chartering Terminology –Role of Broker –Types and Functions -forms and activities –charter parties. Types of Charter -voyage Ships –Vessel Descriptions -Vessel requirements - tramp chartering services - Passenger Ship Chartering –Cargoes -Freight Markets -Liner Operations –Tanker Charter – tanker trades -International Tanker Chartering Market

Recommended Text(s):

1. H. Ligteringen , H. Velsink, Ports and Terminals (Book)

2. Downard, J. (1987), Managing Ships, London: Fairplay Publications Ltd.

3. Shipping Law Handbook – Bundock, 1997 Ed. (LLP)

MARITIME ECONOMICS

Course Code : MPSM 514

Credits : 3.0

Contact Hours : 42

Aim:

The aim of the course is to provide an understanding of how the shipping market economic works. Students would be able to answer some basic questions about how the shipping market is

organized, how it works, how the freight rate is determined, how the cycle works, how are ships financed and what influence the design as well as the economic principle behind these.

Learning Outcomes:

Students will be able to identify/discuss/describe/explain/analyse:

- Shipping and Shipping Market Economics
- Shipping Company Economics
- Seaborne Trade and Transport Systems
- The Merchant Fleet and Transport Supply
- Forecasting and Planning

Syllabus Contents:

1. The economic organization of the shipping market: Economic role of the shipping industry, demand for sea transport, world merchant fleet, supply of sea transport, role of ports in the transport system, Shipping cycles and shipping risk, Characteristics of shipping market cycles, The frequency of shipping cycles, Freight market cycles, 1869–1914, The return on investment in shipping, The prediction of shipping cycles.

2. Supply, demand and freight rates :The shipping market model , The demand for sea transport, The supply of sea transport , The freight rate mechanism .Costs, revenue and financial performance: Cash flow and the art of survival , The cost of running ships, The capital cost and financial performance , The revenue calculation , Computing the cash flow.

3. Financing ships and shipping companies: Ship finance and shipping economics, How ships have been financed in the past , The world financial system and types of finance, Financing ships with equity , Financing ships with debt , Finance for new buildings , Leasing ships.

4. The economic principles of maritime trade: study seaborne trade, The countries that trade by sea, An explanation of trade theory ,Theories about the pattern of trade, Economic growth and sea trade, Trade forecasting and the commodity trade model.

5. The global pattern of maritime trade: Introduction, The Westline theory, Geographical distribution of seaborne trade, Maritime trade of the Atlantic and East Pacific, Maritime trade of the Pacific and Indian Oceans, Eastern Europe and the former Soviet Union

6. Bulk cargo and the economics of bulk shipping :The commercial origins of bulk shipping , The bulk trades, The 'transport system' concept , Handling bulk cargoes , Liquid bulk cargoes , The five major dry bulks , The minor bulk trades , Refrigerated cargo, The vehicle trade

7. The general cargo and the economics of liner shipping: Introduction, The origins of the liner service, Economic principles of liner operation , Liner conferences and their regulation, The components of liner service costs , The liner service cash flow model, Liner prices , The demand for liner services , The liner shipping routes ,The liner fleet, The economics of ships and ship designs

8. The regulatory framework of maritime economics: How maritime regulation affects maritime economics, The institutions that regulate shipping , Self-regulation and the classification societies , The law of the sea , The regulatory role of the flag state

9. The economics of shipbuilding and scrapping: Role of the merchant shipbuilding and scrapping industries, Regional structure of world shipbuilding , Shipbuilding market cycles, The economic principles , The shipbuilding production process , shipbuilding costs and competitiveness, The ship breaking industry.

10. Marketing environment – customer oriented organization – marketing interface with other functional areas marketing in a globalised environment–The concept of global marketing – Importance, Growth and Benefits-Scope and challenge of international marketing.

Recommended Text(s):

1. Martin Stopford, Maritime Economics
2. E. Karakitkos, L. Varnabides, Maritime Economics: A Macroeconomic Approach

3. Kotler, Keller, Koshy, Jha, Principles of Marketing Management, Prentice Hall.
P.K.Vasudeva, International Marketing, Excel books, 2004

MARITIME HUMAN RESOURCE MANAGEMENT

Course Code : MPSM 521
Credits : 3.0
Contact Hours : 42

Aim:

The course aims at developing a basic understanding in the students of the issues relating to procurement, development, appraisal, compensation, integration etc. of human resource for its optimum utilization and productivity in the organization in the context of dynamic maritime business environment.

Learning Outcomes:

Upon completion of the course, students should be able to:

- Understand the meaning of human resource management as well as maritime human resources, the concept of crew and manning a vessel, and the structure of the world maritime labour market.
- Understand and analyse the fundamental processes of managing human resources in general and more particularly in maritime environment.
- Compare and evaluate strategies for managing maritime human resources, both onboard and ashore.

Syllabus Contents:

1. Strategic Role of Human Resource Management: History- nature- objectives importance and scope of HRM- HRM and competitive advantage- Traditional HRM and Strategic Human Resource Management (SHRM)-Growth of SHRM in the new Millennium- Human Resource Development Practices in Bangladesh.

2. Planning for human resources in dynamic environment: Constituents of dynamic environment and their effect on HR practices i.e. technological changes- quality orientations- flexible manufacturing systems-economic challenges and workforce diversity- Job analysis- uses, process and methods of collecting data- Job description and Job Specification. Effective Human Resource Planning - objectives- importance- process and responsibility.

3. Acquisition and Maintenance of Human Resources: Recruitment- definitions- constraints and challenges- sources- methods- various types of affecting environments, Selection- purpose and process- Placements- Induction/ orientation- Internal mobility- Transfers and Separations- Performance Evaluation-format- techniques and problems. Compensation Administration - objectives-components- principles- regulation and factors governing. Incentives and Employee Benefits- Methods- Guidelines- Bases and Typologies.

4. Training and Development: Training- need- areas- applicability- methods and evaluation of training programmes-learning principle and philosophy of training. Executive Development concept-importance- methodology/ techniques and selection of suitable methods- evaluation of training and development- Career and succession planning- problems and issues in career planning and development- succession planning, career stages and career management in Indian scenario.

5. Maritime HRM: Introduction to human resource management (HRM) , Introduction to crew management and Maritime HRM , Describing the world maritime labour market , Maritime Human Resource Planning , Recruitment of ship's and shore-based personnel , Selection and placement of ship's and shore-based personnel , Training and development of ship's crew and shore-based personnel , Performance evaluation onboard and ashore, Compensation and rewards in the shipping industry, Outsourcing of maritime HRM practices , The competitive advantage from maritime HRM system

Recommended Text(s):

1. Rao VSP (2009); Human Resource Management: Text and Cases; Excel Books; New Delhi.

2. Dressler (2009); Human Resource Management, 11th Ed. Pearson Education

3. Ivancevich (2009); Human Resource Management; Tata McGraw Hill, New Delhi.

4. Aswathappa K (2009); Human Resource Management: Text and Cases; Tata McGraw Hill.

SUPPLY CHAIN MANAGEMENT AND MARKETING

Course Code : MPSM 522

Credits : 3.0

Contact Hours : 42

Aim:

The aim of the course is to introduce the students with what is supply chain management and logistics and the principles belong to this area of study.

Learning Outcomes:

Student will know about logistics and supply chain management, the role of supply chain management in business as well as the role of port and shipping in the supply chain management.

Syllabus Contents:

1. Logistics Management: Origin and Definition – Types of Logistics –Logistics Management – Ware House Management – Automation and Outsourcing- Customer Service and Logistics Management – A Perspective- Concepts in Logistics and Physical Distribution - Distribution and Inventory

2. Types of Inventory Control - Demand Forecasting - Warehousing and Stores Management – Routing - Transportation Management - Some Commercial Aspects in Distribution Management – Codification - Distribution Channel Management -Distribution Resource Planning (DRP) - Logistics in 21st Century

3. Supply Chain Management: Introduction and Development- Nature and Concept -Importance of Supply Chain - Value Chain - Components of Supply Chain - The Need for Supply Chain - Understanding the Supply Chain Management - Participants in Supply Chain – Global

Applications

4. Role of a Manager in Supply Chain - Supply Chain Performance Drivers - Key Enablers in Supply Chain Improvement - Inter-relation between Enablers and Levels of Supply Chain Improvement-Systems and Values of Supply Chain

5. Aligning the Supply Chain with Business Strategy - SCOR Model – Outsourcing and 3PLs – Fourth Party Logistics – Bull Whip Effect and Supply Chain – Supply Chain Relationships – Conflict Resolution Strategies - Certifications

6. Concepts of Logistics- Evolution – Nature and Importance – Components of Logistics Management- Competitive Advantages of Logistics- functions of Logistics management-principles-Logistics Network- Integrated Logistics system. Supply chain management- Nature and Concepts- Value chain- Functions – Supply chain effectiveness- Outsourcing - 3PLs and 4PLs – Supply chain relationships- Customer services.

7. Elements of Logistics and Supply chain management – Inventory carrying – Ware housing – Material handling – Order Processing - Transportation - Demand Forecasting - Impact of Forecasts on Logistics and Supply chain management – Performance measurements.

8. Transportation- Position of Transportation in Logistics and Supply chain management-Road, Rail, Ocean, Air, Transport Multi model transport-Containerization – CFS- ICDS – Selection of transportation mode – Transportation Network and Decision- Insurance Aspects of logistics.

9. Logistical Information system (LIS) - Operations – Integrated IT solution for Logistics and Supply chain management – Emerging technologies in Logistics and Supply Chain management. Components of a logistic system – transportation – inventory carrying – warehousing – order processing – Ocean transport – ships – types - measurement of capacity of ships – shipping information.

10. Plant location: Facility location and layout planning - Types of layouts - Material handling equipment's - Productivity: Factors Affecting Productivity - Job Design – Process Flow charts – Material Management - Costs associated with inventory - Economic Order Quantity - ABC Analysis - Just in-time Production - Total Quality Management.

Recommended Text(s):

1. Krishnaveni Muthiah, Logistics Management and Seaborne Trade' Himalaya Publishing House.
2. D.K.Agarwal. Textbook of Logistics and Supply Chain Management, Mc Millan India Ltd.
3. Martin Christoper, Logistics and Supply Chain Management, Pearson Education, 2003.
4. Ronald H. Ballou, Business Logistics and Supply Chain Management, Pearson Education.
5. G Raghuram & N Rangaraj, Logistics and Supply Chain Management - Cases and Concepts. Mac Millan.
6. Martin Christopher, Logistics & Supply Chain Management: Creating Value-Adding Networks, FT Press.

MARITIME LAW AND CONVENTIONS

Course Code : MPSM 524
Credits : 3.0
Contact Hours : 42

Aim:

The course is designed with a view to enabling the students to develop their knowledge and understanding of legislative drafting and law making procedure in Bangladesh in general and in particular transforming international maritime legislations into municipal law of Bangladesh to have a better implementation of international standard. It also aims to familiar the students with different modes of interpretation of maritime legislations and understanding the jurisdiction of the Admiralty court and its procedures under the legal framework of Bangladesh. The aim of this course is also to orient students with different international conventions on the Maritime Affairs.

The maritime commercial laws and the basics of marine insurance and claims so that they can apply this knowledge in day to day shipping operation

Learning Outcomes:

By the end of this course students should be able to:

- understand law making procedure of Bangladesh;
- acquire basic legislative drafting skills;
- learn the procedure of incorporating international maritime legislations into municipal law of Bangladesh
- Understand admiralty jurisdiction and procedure of admiralty matters in Bangladesh.
- The different areas of maritime commercial laws
- The contingent nature of marine insurance and its subject matter to determine insurable interest under insurance contract.
- The calculation of total loss apart from the freight loss and partial loss.
- Understand the limitations and insurer's liability in marine insurance.

Syllabus Contents:

1. Third United Nations Conference on the Law of the Sea (UNCLOS III): baselines internal waters and territorial sea, straits used for international navigation, archipelagic states, contiguous zone, continental shelf, exclusive economic zone, fisheries , land-locked and geographically disadvantaged states

2. The High Seas**:** Legal Status of the High Seas, High Seas Freedoms, nationality of Ships, Status of Ships on the High Seas International seabed area,

3. Settlement of disputes, The International Tribunal for the Law of the Sea (ITLOS), The International Court of Justice (ICJ), Arbitration and Other Forms of Alternative Dispute Resolutions (ADR)

4. Nationality, registration and ownership of ships: Nationality of Ships. Ship Registration, Registration and Ownership of Ships The Concept of 'Genuine Link', Types of Ship Registries.

5. International Convention for the Safety of Life at Sea, 1974 (SOLAS) and the 1978 and 1988 Protocols thereto as amended, International Safety Management Code (ISM Code) International Convention for the Prevention of Pollution from Ships, 1973; the 1978 and 1997 Protocols thereto (MARPOL), as amended, International Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 and the 1996 Protocol thereto.

6. The law of contract and other relevant legal principles, carriage of goods by sea and the relevant conventions including INCOTERMS and the recent developments.

7. Historical Development of Maritime Liens and Privileges, Sources of Maritime Liens and Privileges, Nature and Characteristics of Maritime Liens and Privileges

8. Introduction – Evolution – Principles– Risks - Hazards -Insurable risks - Insurable interest - utmost good faith - indemnity - need, nature and scope of cargo insurance policy - marine cargo insurance - marine insurance contract .

9. Types of insurance cover– Insurance Products - Transport insurance – Legal liability Insurance – Third party legal liability insurance – Property insurance - hull and machinery insurance.

10. Kinds of losses - perils and causa proxima - Actual Total Loss (ATL)-Constructive Total Loss (CTL) - Collisions and Salvage - Average Clause - general average - coverage and institute clauses - transit clauses - Disbursements - premiums - liability - mutual protection & indemnity clubs (P&I clubs

11. Claims Handling-Insurance Claims – Risks – Reinsurance – Demurrage – Claim procedures and Documentation – Right of Subrogation

12. Law of the sea- Historical background, general introduction and elements of the law of the sea, principles of the law of the sea, baselines, internal waters, Belts of coastal water, fisheries,

land-locked and geographically disadvantaged states, the high seas, prohibition of transport of slaves, piracy, Illicit Traffic in Narcotic Drugs or Psychotropic Substances, Unauthorized Broadcasting, Right of Visit, Right of Hot Pursuit, Submarine Cables and Pipelines, regime of islands, enclosed and semi-enclosed seas, legal regime of the arctic, international seabed area, the International Seabed Authority, the System of Exploitation of Deep Seabed Resources, marine scientific research, development and transfer of marine technology

Recommended text(s):

1. The Law of the Sea by R R Churcill,
2. The International Law of the Sea by R Rothwell
3. Shipping and Environment Law (2nd Edition) by Charles
4. Marine insurance by Solomon Stephen Huebner (Nabu Press)
5. Marine Insurance: Its Principles And Practice by Templeman (Qureshi Press)
6. The Modern Law of Marine Insurance by D. Rhidian Thomas (Lloyd's List)
7. Simon Baughen " Shipping Law" – Cavendish Publishing
8. Fransis Rose " Marine Insurance" Informa Uk Ltd
9. Law of the Sea: UNCLOS as a Living Treaty. By Jill Barrett and Richard Barnes
10. Jurisdiction Over Ships: Post-UNCLOS Developments in the Law of the Sea (Publications on Ocean Development) XII Edition by Henrik Ringbom (Editor)

MARITIME SAFETY AND SECURITY

Course Code : MPSM 525
Credits : 3.0
Contact Hours : 42

Aim:

The course highlights on related international legislations on various aspects of safety and security in sea. Moreover, the course covers the legal arena for liability in marine collision; salvages and wrecks; towage; pilotage; piracy, hijacking and armed robbery at sea.

Learning Outcomes:

On completion of this course, students are expected to be able to: Use the basic provisions of International conventions to establish national, regional and global individual and collective responsibility for maritime safety and security. Moreover, students would be able to act as attorney on behalf of client filing suit for the violation of the safety measures by the concerned authority and claiming compensation for suffering.

Syllabus Contents:

1. ISM Code. Key issues, Legal status of code. Practical aspects of the code. Company verification, review and evaluation. Case studies. Regulatory framework for maritime security: International ship and port facility security (ISPS) code.

2. Definitions of key terms and concepts (e.g. safety, risk, hazard etc.). Influencing factors on administrative decisions regarding risk and safety (social amplification of risk etc.) Risk assessment: Introduction of qualitative (failure mode and effect analysis, hazard and operability studies etc.) and quantitative (fault trees, event trees etc.) methods of risk assessment.

3. Risk management: Introduction of risk control options (RCOs) with effects on likelihoods of unwanted events to occur and severity of consequences, Discussion of risk acceptance criteria, the as low as reasonably practicable (ALARP) principle. Formal Safety Assessment (FSA) as a tool in the IMO decision making process.

4. The need to investigate maritime casualties (Legal background): Overview about relevant regulations in different international and maritime legal instruments regarding casualty investigations, Reporting requirements to IMO about maritime casualties, Selected national approaches related to maritime casualty investigations

5. Accident investigation process: Initiation of maritime casualty investigations, Appointment of investigators, collecting of evidence, developing time lines, conducting interviews with witnesses

6. The General System Concept: Understanding the SAR system; legal basis of services, the global concept, national and regional systems, system component

Recommended Text(s)

1. Maritime Safety, Security and Piracy by Wayne Kenneth Talley
2. Maritime Safety: The Human Factors by Sean M Trafford

RESEARCH METHODOLOGY

Course Code : MPSM 526
Credits : 3.0
Contact Hours : 42

Aim:

The primary aim of this course is to introduce students to the majority of the quantitative as well as qualitative research methods used most frequently by management scholars, particularly within the domains of innovation and entrepreneurship studies.

Learning Outcomes:

The students might know how to design, implement and complete the research activities. It would include writing a proposal and academic writing.

Syllabus Contents:

1. Introduction to Research - Research in Business – Research Process-Research Need, formulating the problem, designing, sampling, pilot testing - Thinking Like a Researcher and Proposals - Ethics in Business Research.
2. Research Design- Exploratory, Descriptive, Casual, Formulation of hypothesis - types. Measurement- characteristics of sound measurement tool, Scaling methods and sampling techniques- Nature, simple probability and complex probability – Non-probability samples.

3. Sources and Collection of Data- : Primary and secondary sources, survey observation, experimentation- details and evaluation. - Questionnaires – schedules and Instruments – Coding, data entry, tabulation & cross tabulation-and Graphic presentation – Examining Data.

4. Analysis and Preparation: Hypothesis testing – statistical significance, statistical testing procedure. Tests of significance- Types and selection of tests- Multivariate Analysis Techniques -Simple Correlation -Regression Analysis -Multivariate Techniques – Variable in Multivariate Analysis -Important Methods of Factor Analysis

5. Presenting results and writing the report: - Written and Oral Reports, The written research report, preparatory items, introduction, methodology, findings and conclusions- writing the draft to presentation – Oral presentation – preparation, delivery and audio visuals.

Recommended text(s):

1. William C Emory, Business Research Methods, Richard D Irwin.
2. Donald R Cooper, Business Research Methods 7th Ed, McGraw Hill, 2001.
3. Krishnaswami, Ranganatham, Methodology of Research for Social Science, Himalaya, Mumbai, 2001.
4. Anderson J. et.al, Thesis and Assignment writing, Wiley Eastern.
5. Research Methodology by C.R. Kothari

PORT OPERATION AND PLANNING

Course Code : MPSM 533
Credits : 3.0
Contact Hours : 42

Aim:

The overall aim of the course is to understand the port's operational, constructional and planning process through supply chain aspects as well as logistics management in port

Learning Outcomes:

After the completion of the course, students will be able to analyze/ express/ differentiate/ investigate:

- Port development and planning
- Port investment, financing and pricing
- Port productivity, marketing and competition
- Logistics management and related aspects of ports

Syllabus Contents:

1. Introduction of Port-What is a port, the port system, Approaches to port operations and management

2. Port development and organization-History of port development. Port roles andfunction. Port users and stakeholders. Port administration and organizational structure. Traditional vs. emerging port management model. Recent trend in port development

3. Port planning-Infrastructure and capacity. Evaluation and management of port projects. Long term (master) port planning. Modelling port demand and supply. Port traffic forecasting. Strategic port planning. Operational port planning: Terminal planning module

4. Port investment and financing-Port costs and costing systems. Economic evaluation vs. financial appraisal of port projects. Financing mechanism of port projects. Contractual and legal arrangements. Private sector participation and emergence of global port operator. Public-private partnership(PPP) models in ports issues with public financing of port infrastructure

5. Port pricing-Port charges vs. port dues, Tariff structures and surcharges. Marginal cost pricing. Strategic port pricing. Through transport pricing. Other pricing models. Regulatory mechanism for port pricing

6. Port operations-Port operations and services. Nautical versus cargo handling services. Value added and logistics port services. Queuing system and congestion in port. Port layout and configuration. Port equipment and maintenance. Terminal and site operation. Terminal procedures. Functional modelling of port operations. Port automation

7. Port Performance and Productivity-Multi-disciplinary approaches to port performance, Economic impact and port performance, Trade logistics and port productivity, Index methods for measuring port efficiency, Frontier methods for port benchmarking, Optimization tools in port operations,

8. ICT and Port Management-Information management systems in port, Port community system, Terminal operation system, Port technology, ITS in ports

9. Port Marketing and Competition-Analysis of Port Markets, Port Marketing tools, Techniques of port promotion, Market intelligence and research in ports, Economic analysis of port competition, Forms of port competition, Port selection and choice modelling ,Port co-operation, Competition policy and regulation

10. Port Logistics-The network structure of port operations, Freight logistics systems and ports, Intermodality and landside port logistics, Port centric logistics, Value added logistics services in ports, Port and trade logistics, and integrating port in global supply chains.

11. Port Safety-Safety regulations and procedure, Formal safety assessments in ports, HAZMAT and the handling of dangerous goods, Accident reporting and investigation, Occupational safety and health

12. Port Security-Regulatory framework for port security, Security risk assessment and management, Economic and operational impact of security, Supply chain security and ports, Quality system of port security

13. Environmental Management and ports- Coastal zone management and the port city interface, Environmental port regulation, EIA in ports, Port operations and the climate change agenda, Contingency plans and environmental response

14. Port labour and HRM- History and development of port labour. Labour reform and social

issues, Labour performance and Terminal operations, Port training and education, Port careers and HRD

15. Port Policy-Components and instruments of port policy, regulating port services. Subsidizing port services, Port governance and reform, Deregulation and institutional restructuring.

Recommended text(s):

1. Port Management and Operations – Patrick Alderton (2nd Edn, Informa Maritime & Transport Jun 2008)

2. Port security Handbook 2004 – Lloyds Register

3. Port Infrastructure & Economic Development – Pradeepta Kumar Samanta & Ashok Kumar Mohanty (Gyan Publications 2005)

4. Port State Control – Dr.Z.Ozcayir (2nd Edn, Informa Professional Jun 2004)

5. Port Development : A Handbook for Planners in developing countries – UNCTAD

6. Excellence in Warehouse Management : How to Minimize Costs & Maximize Value - Stewart Emmet (John Wiley & Sons Ltd Jul 2005)

OCEAN SCIENCE

Course Code : MMS 501
Credits : 3.0
Contact Hours : 42

Aims:

The aim of the course is to enlighten the students with knowledge and expertise of complex marine environments, the pressures placed upon them, their importance for society and the need to manage them sustainably.

Learning Outcomes:

On successful completion of the course students will be able to:

- Understand the knowledge in ocean science and a critical awareness of current problems or areas of investigation which are at the forefront of the discipline.
- Demonstrate a comprehensive understanding of methodologies and techniques applicable to their own research.
- Deal with complex issues both systematically and creatively

Syllabus Contents:

Introduction to ocean science , concept of physical and chemical oceanography, ocean bio-diversity, exploration and exploitation of marine resources, seafloor mapping, fundamental of acoustical oceanography, marine renewable energy, marine observation system, Coastal morphology.

Recommended text(s):

1. A textbook of oceanography by Jenkins, James Travis
2. Mapping the Deep: The Extraordinary Story of Ocean Science Revised ed. Edition By Robert Kunzig
3. Introduction to Physical Oceanography by Robert Stewart

MARITIME ENVIRONMENT AND POLLUTION

Course Code : MMS 502
Credits : 3.0
Contact Hours : 42

Aims:

The objective of this course is to provide updated information and the knowledge of various aspects of marine pollution and the ways and methods of its prevention.

Learning Outcomes:

On successful completion of this unit, students will be able to:

- Identify the basic sources of marine pollution caused by human activities
- Demonstrate fluency to read, analyze and synthesize marine pollution literature
- Know the basic techniques and practices for the monitoring of pollution in the coastal marine environment
- Apply methodologies and techniques to assess/evaluate marine and coastal pollution

Syllabus Contents:

General concepts of marine pollution; Types of marine pollution - oil pollution, heavy metal pollution, synthetic organic chemical pollution and eutrophication; Biological consequences of marine pollutants – substances harmful to living organisms. Sources of marine pollution - natural, transportation, accidents and routine discharge; Monitoring of pollution and environmental impact assessment; Life cycle assessment of marine transport; Past, current and proposed approaches for the improvement of marine pollution problems related to marine transports. Pollution Control - Oil; Air; Garbage; Sewage; Ballast water; Oily water separator; Sewage plant; Incinerator.

Recommended text(s):

1. Long-Term Environmental Effects of Offshore Oil and Gas Development By Donald F. Boesch; Nancy N. Rabalais
2. Harm to the Environment: The Right to Compensation and the Assessment of Damages by Peter Wetterstein

MARINE SPATIAL PLANNING

Course Code : MMS 503
Credits : 3.0
Contact Hours : 42

Aim:

The overall aim of the course is to educate the students to understand the functions of marine

spatial planning.

Learning Outcomes:

Students will be able to identify/discuss/describe/explain/analyze:

- Marine spatial planning
- Comprehensive policy for MSP
- Organization, condition for MSP management

Syllabus Contents:

1.Concepts of Marine Spatial Planning- What is marine spatial planning, Why do we need marine spatial planning, Why is space and time important, How can marine spatial planning affect ecosystem goods and services, benefits of marine spatial planning, outputs of marine spatial planning, Relation of MSP to other planning approaches.

2. Authority of MSP -Identifying why need marine spatial planning, Establishing appropriate authority for marine spatial planning.

3. Financial Support- Estimating cost for MSP activities, Alternative financial sources, Feasibility of alternative financial funding.

4. Organising, Planning and Participation of Stakeholders

5. Alternative and comprehensive management plan.

6. Implementation and Enforcment of MSP

7. Coastal and Ocean Environmental Policies

Recommended text(s):

1. Marine Spatial Planning- A step by step process: An Ecosystem based Management.
2. Identifying Marine Spatial Planning Gaps, Opportunities, and Partners: An Assessment

MARITIME ENERGY MANAGEMENT

Course Code : MMS 504

Credits : 3.0

Contact Hours : 42

Aim:

The aim of the course is to familiarize the students with the basic concepts and understanding of the overall maritime energy management in context of regulatory aspects in both on shore and offshore.

Learning Outcomes:

On successful completion of this unit, students should be able to do:

- Energy Management in Maritime Onshore Facilities
- Alternative Fuels and Marine Renewable Energy
- Maritime Energy Management and Operational Research
- Energy and Maritime Industry – Principles and Regulatory Framework
- Examine solar and wind power applications onboard ships as well as in maritime onshore facilities

Syllabus Contents:

1. Concepts related to energy and an appraisal of available energies; the predominance of fossil fuels; the problems associated with air emissions; local pollution and global climate impacts; the international regulatory and institutional framework for air emissions; energy management in the shipping context.

2. MARPOL Annex VI including EEDI, SEEMP, MRV and technology transfer; technological innovation related to energy management in the maritime industry; the basic process of onboard power generation and describe principal energy consumers; energy saving measures in both ship design and operation; ship operation and energy efficiency through operational measures both at ship and fleet levels along with the integration of port/ship duo.

3. An overview of the ISO 50001 energy management system certification process and ISO 14001 environmental management systems; energy auditing through real applications from ports/shipyards; South Asia and regional port emissions regulations.

4. Emission abatement technologies and alternative fuels including LNG, biofuels and methanol; solar and wind power applications onboard ships as well as in maritime onshore facilities; the social aspects of modern technology applications in maritime energy and the related role of IMO

and ILO instruments; energy management systems including the cost, financing and economic evaluation; the evaluation of sustainable investment in ports and shipyards.

Recommended text(s):

1. Trends and Challenges in Maritime Energy Management Editors: Olcer**,** A.I., Kitada**,** M., Dalaklis**,** D., Ballini**,** F. (Eds.)
2. Energy Economics and Policy, 2nd Edition, Authors: James M. Griffin Henry B. Steele

MARITIME TRANSPORTATION AND LOGISTICS

Course Code : MMS 505
Credits : 3.0
Contact Hours : 42

Aim:

The overall aim of the course is to educate the students to understand the role of maritime transportation and logistics system. The economics of transportation and elements of logistics.

Learning Outcomes:

Students will be able to identify/discuss/describe/explain/analyze:

- Maritime transportation and logistics
- Trade and logistics and freight management
- Hinterland logistics and global supply chains

Syllabus Contents:

1. Introduction to Maritime Transportation and Logistics: Definition and terminology, scope and link or network.

2. Maritime Transport and Logistics as a Trade Facilitator: Ports and shipping as facilitators of trade, the practice of international shipping, International trade research and non-tariff barriers.

3. International Maritime Trade and Logistics: Logistics and supply chain management, Logistics and transport, Global trade and the maritime industry, Discussion and conclusion

4. Hinterland Logistics and Global Supply Chains: Conceptual framework, Hinterland transport system design, Hinterland logistics: Strategy, Hinterland logistics: Management, Hinterland logistics and its influence on global supply chains

5. Intermodal Freight Transport and Logistics: Characteristics of intermodal transport, Containerization and intermodal transport, Development of intermodal transport, Combined transport operators and their services, towards the innovative intermodal transport

6. Trade Routes: Importance of main trade routes including the main container shipping routes, railway routes and land bridges, Relationship between commodities, value and transit time and transport mode, the economic, Political and environmental factors arising in respect of road/rail/barge competition and the role of short sea shipping, The role of airfreight and its advantages and limitation

7. Transport Pricing: The nature of price competition between transport modes, namely sea versus road/rail versus air, Understand price measurements: tonne-kilometre, and cost-transit time benefit, the relationship between price and demand, The importance of revenue and cash flow, different pricing strategies, contribution or volume (market share) led, the calculation of through transport pricing, the component price/cost components and the concept of price transparency

Recommended text(s):

1. Maritime Logistics: A Guide to Contemporary Shipping and Port Management (2nd edition)

2. Locking D.P.: The Economics of Transportation.

3. International Journal of Supply Chain Management

ELECTRO TECHNOLOGY

Course Code : MMS 506

Credits : 3.0

Contact Hours : 42

Aim:

The aim of this course is to provide the detailed knowledge related to Electrical, Electronic and Control Engineering with particular emphasis on high voltage installation.

Learning Outcomes:

By the end of the course, students will have the knowledge of:

- Managing the operation of electrical and electronic control equipment
- Function and managing trouble shooting and restoration of electrical and electronic control equipment.
- Automatic control engineering and auxiliary systems

Syllabus Contents:

1. Electro-Technology- Introduction to electro technology, Direct Current Circuits, Electrostatics and Capacitance, Alternating Current Theory, Single Phase Transformers, Three Phase Supply, Materials of conductors – single wire and multi-stranded, Effect of temperature, oxidation, fire, oil, acids and solvents on, insulation materials, Electrical Interference, Common sources of interference, Method of suppression of interference.
2. Power Electronics-Semiconductor Devices, Integrated Circuits, Electronic Fault Diagnosis
3. Automatic Control Engineering and safety devices- Open and closed control loops, Process control, Essential components in process control loops, Sensors and transmitters, Controllers and Basic Control Theory, Final Control Elements, Control Loop Analysis.
4. Generator and distribution system- Instrumentation and Safety in Generator and Distribution system, Auxiliary Diesel Generator Alarm and Shut Down, Automatic Starting of Propulsion Auxiliaries
5. Steam boiler- Alarms, display and automatic shutdown
6. Effect of varying frequency and voltage of A.C Motors- Temperature, Torque, Power output
7. Motor control and protection- DC Motors, AC Motors
8. Emergency Power- Automatic starting arrangements for the emergency generator

9. Design features of high-voltage installations- Generation and distribution of high voltage on ships, Electric propulsion system, Synchro-convertors and cycle-convertors, Functional, operational and safety requirements for a marine high voltage system.
10. Electrical Safety-Safety procedures to be adopted when working on electrical installations; the effects of electric current on human body.
11. Interpretation of Circuit Symbols- Circuit components, functional description, Construction of simple electrical circuits using relays, timers, contactors and other components.
12. Prime Mover Electrical Controls- Description, Identification and operation of control components of the prime mover for the alternator.
13. Electrical Survey Requirements- Conducting tests to the requirements of survey
14. Control system fault finding-Fault finding methods; governor faults; evaluation and rectification of common control systems; testing alarm and monitoring systems; electric power supply for control systems.
15. Microcontrollers-Basics of microcontroller; Analog to digital convertor; Digital interfaces; Serial peripheral interface; Communication with PC; Code integration

Recommended text(s):

1. Alexander & Sadiku :Fundamental of Electric Circuits
2. Kerchner& Corcoran : Alternating Current Circuits, 4th Edition
3. R.L.Boylestad : Introductory Circuit Theory, Prentice-Hall India Pvt. Ltd.
4. Arthur Morly and Edward Hughes, Principles of Electricity, 3rd edition, Publisher: Longman ,London and Newrork
5. Robert L. Boylestad & Louis Nashelsky, Electronics devices and circuit theory
6. V.K.Mehta & A.K.Mehta, 2005, Principles of Electronics, Publisher: S. Chand and Company Ltd.
7. B.L.Thereja & A.K.Thereja, Basic Electronics solid state

APPLIED MECHANICS

Course Code : MMS 507

Credits : 3.0

Contact Hours : 42

Aim:

The objective of this course is to provide an understanding of the basic concepts, principles and processes of basic engineering science.

Learning Outcomes:

On successful completion of this course, students should be able to

- Background knowledge to support an understanding of the physical principles underlying the behavior of the ship and its environment.
- Understand functioning of equipment upon which to build professional studies.
- Understanding in technical specifications and instructions regarding equipment normally used on board ship

Syllabus Contents:

1. Statics- Bow's notation, Force analysis by method of sections, framed structures
2. Dynamics- Equations of motion, Velocity and acceleration diagrams, Laws of conservation of energy and momentum, Collision of rigid and elastic bodies, Projectiles, Engine mechanisms, Flywheels, Hoists, Cams, Governors, Simple and epicyclical gear systems, Vehicle dynamics
3. Friction- Sliding friction on horizontal and inclined planes, Cotters, Screw threads, Belt drives, Friction brakes, Plate and cone clutches
4. Balancing- Primary and secondary forces, Primary and secondary couples, Complete balancing of reciprocating machinery
5. Simple Harmonic Motion- Equation of simple harmonic motion, Amplitude, frequency and periodic time, Vibrating spring mass systems, springs, Resonance, Transmissibility, Vibrations of flywheels and gearwheels.
6. Stress & Strain- Stress and strain relationships in thin cylindrical and spherical shells, Stress in thin, rotating rims, Thermal stress, Stress in compound bars, Elastic strain energy, Stresses due to gradually applied and shock loads

7. Bending of Beam- Shear force and bending moment diagrams, Fundamental bending equation, Bending stresses, Deflection of beams. Macaulay's method
8. Torsion- Stress, strain and strain energy due to torsion, Fundamental torsion equation, Reciprocating engine crank effort, Rudder stock turning moment from steering gear, Deflection of helical springs
9. Struts- Euler's formula, Slenderness ratio
10. Combined Stress- Stresses on an oblique plane, Material subjected to two perpendicular stresses, Axial and bending stress, Mohr's stress circle, Principal stresses and strains, Combined bending and twisting
11. Stresses In Thick Shells- Lame's equations, The Lame Line, Shrinkage allowance
12. Fluid Mechanics- Volume and mass flow, Venturi meter, Bernouilli's equation, Jets. Orifice coefficients, Dynamic and kinematic viscosity, Reynolds' number, Flow losses in pipes and fittings, Darcy's formula, Centrifugal pumps.

Recommended text(s):

1. William Embleton & J.T Gunn, Reeds applied Mechanics for Engineers, 4th Edition.
2. Hannah－Hillier, J. Applied Mechanics. Harlow, Longman 1995.

SHIP DYNAMICS

Course Code : MMS 508
Credits : 3.0
Contact Hours : 42

Aim:

This course will enrich the knowledge of students related to seakeeping and estimation of vessel’s motions due to ocean waves. Students will also learn vessel’s manoeuvring and directional stability.

Learning Outcomes:

By the end of the course, students will be able to:

- Predict the wave and motion induced forces acting on a ship hull and an offshore structure.
- Calculate natural heave, pitch and roll frequencies as well as heave motions of a ship and an offshore floating structure in regular and irregular waves.
- Assess manoeuvring characteristics of ships.
- Predict turning ability and course-keeping qualities of a given ship design

Syllabus Contents:

Introduction, Sea-keeping theories, Added resistance due to ship motion in regular and irregular waves, added resistance due to wave reflection, Methods of predicting added resistance in wave, Added resistance due to wind, Methods of predicting added resistance due to wind, Resistance increase due to steering on a straight course, Sea spectra, Response spectra, Involuntary speed loss and power increase at constant power and constant speed approach, Voluntary speed reduction in seaways, Weather routing of ships.

Recommended text(s):

1. Ship Stability for Master and Mates by Bryan Barrass and D.R. Derrett
2. Developing Seakeeping Performance Criteria for a helicopter pilot training vessel by P. Crassland, M.C. Johnson
3. Seakeeping: Ship Behaviour in Rough Weather Paperback – by Adrian R.J.M. Lloyd

PORT DESIGN AND CONSTRUCTION

Course Code : MMS 509
Credits : 3.0
Contact Hours : 42

Aim:

The aim of this course is to teach the students various aspect of planning, design and construction of marine terminals, port and harbors.

Learning Outcomes:

By the end of the course, students will be able to:

- Explain the functions of ports and waterways in the total transport chain, and discuss port planning methodologies
- Apply the knowledge of hydraulic interaction between ship and waterways and ship navigation to design approach channels and inland waterways
- Develop port and terminal layout (quay length, number of cranes, apron area, storage yard)
- Demonstrate an understanding of dredging and related environmental issues in ports and harbours

Syllabus Contents:

Introduction to port and harbor structures; Harbor classifications; Port facilities - berthing and mooring structures and rendering system; Operational and environmental loads; Wave oscillations in harbor and its control; Maneuvering of ships within harbor; Cargo handling in ports; Offshore mooring - design of breakwaters, jetties, wharfs, quays, diaphragm walls, slipways and docks; Sediment transport and maintenance dredging in harbors. Control and marine pollution in ports.

Recommended text(s):

1. Port designer's handbook: Recommendations and guidelines by carl A Thoresen
2. Design and Construction of Ports and Marine Structures Hardcover – January 1, 1972 by Alonzon De F. Quinn
3. Port designer's handbook: Recommendations and guidelines Authors: Carl A Thoresen. 2003

SHIP CONSTRUCTION

Course Code : MMS 510

Credits : 3.0

Contact Hours : 42

Aim:

The aim of this course is to prepare the students with the basic knowledge and exposure on construction, repair and conversion process of ship & offshore structures.

Learning Outcomes:

By the end of the course, students will be able to:

- Draw the production/construction flow Chart for ship and offshore structure and explain individual process involved
- Determine the factors for selecting location and layout of shipyard
- List down facilities of a modern Ship and offshore construction yard
- Work in group effectively during class discussion and in solving some of the class assignment given
- State down clearly the important aspects of ship and offshore construction, repair and conversion process

Syllabus Contents:

The ideal layout of shipyard: Material handling facilities; Production Process; Advanced fabrication processes (N/C flame cutting, double curvature bending by Universal Press and Line Heating etc.) Component assembly; Sub-assembly, assembly and grand assembly; Block assembly; advanced outfitting; Zone outfitting: Block erection. Machinery installation, Launching; Pier outfitting, trial and delivery. Production planning, Scheduling and line charts; production piling charts; Man-hour control, Subcontracting: Quality control; Application of the critical path analysis.

Recommended text(s):

1. Ship Production by Richard Lee Stoech Colin P. Hammon, Howard McRaven B

2. Ship construction – 7th Edition by George Bruce David Eyres

MARINE ENGINEERING KNOWLEDGE

Course Code : MMS 511
Credits : 3.0
Contact Hours : 42

Aim:

The aim of the course is to familiarize the students with the basic concepts and understanding of the overall construction, operating principles, and characteristics of a marine engineering system and its associated auxiliary systems.

Learning outcome:

On successful completion of this unit, students should be able to know:

- Refrigeration and air conditioning system
- Technology related with materials
- Bilge and ballast operation
- System configuration of automatic control equipment and safety devices
- Main engine system

Syllabus Content:

1. Refrigeration and Air Conditioning system- assess common refrigerants used on board, using factors such as their, properties, economics of use, handling, health hazards, and environmental, impact, Explain the environmental concerns of traditional refrigerants and the methods, used to address these concerns, explain correct procedures for the recovery of refrigerants from refrigeration Systems, analyze functions and operation of all components including fittings and safety, devices of refrigeration and air conditioning plants, Interpret symptoms, effects, and remedial actions for common faults in refrigeration and air conditioning systems, precautions during cargo operations – re-

circulation system of AHU, explain the purposes and procedures for pumping down, leak test, refrigerant charging and oil changing, record keeping of refrigerant consumption.

2. Contaminants including microbiological infection- Outline procedures for dealing with contamination of oils by water, fuel in lubricating oil, solid debris or other contaminants, including recognition of unacceptable levels and possible consequences.
3. Properties and application of material used in machinery on board ships- Explain the properties of materials and how these can be determined by simple tests; compare common non-metallic materials used at sea and explain their properties, applications and restrictions on usage; examine common metallic materials used at sea, their applications, failure mechanisms, and methods to limit or reduce failures.
4. Engineering processes used in construction and repair- Evaluate common fabrication techniques, including welding, forging, and casting, assess common repair techniques.
5. Materials and Welding- Types of steel used, designation of material types, welding processes, electrodes, forged, rolled, cast sections, edge preparation prior to welding, consideration of strength of welded sections, joining of different materials, construction and repairs, testing of weldments.
6. Bilge and Ballast Operations- Describe procedures for evaluating pumps, ejectors, and pumping systems including ship side valves, explain methods of identifying problems which affect performance, and identify common faults and evaluate methods of assessment. Illustrate the operation of self-priming systems as used on ballast or cargo pumping arrangements, explain the main causes of corrosion in sea water systems and the regions most affected, compare corrosion and marine growth prevention systems used for pumps and pumping systems, including impressed current, sacrificial anodes, chemical injection, special coatings, chlorination, and special materials.
7. Fire Main- Describes the number and source of supply to the fire main for the given ship, explains how and when fire pumps should be tested, describes the uses to which a fire main can be put, explains the purpose of the fittings on a fire main,
8. Sewage and sludge- Describes a sewage retention system, explains why vacuum transportation systems are used, describes the process where a comminutor and treatment with chlorine are used, describes the processes in a biological treatment plant, explains how the sludge from a biological treatment plant is disposed of, explains why biological

treatment should be kept working continuously, names the contaminants which would impair the treatment process, describes the operation of chemical treatment plants, lists the waste materials that can be incinerated, explains how liquid and solid waste are prepared for combustion in an incinerator

9. Main Engine- Basic control system design, control system stability, manual and automatic tuning of electronic controllers, boiler water level control, advanced boiler combustion control, diesel engine cooling control, alarm and monitoring systems, general requirements of automatic control equipment and safety devices, power supply, Concept of Unattended Machinery Spaces (UMS), requirements of UMS, bridge control, testing regime for UMS, instrumentation and Safety in generator and distribution system, auxiliary diesel generator alarm and shut down, automatic starting of propulsion Auxiliaries.

Recommended text(s):

1. Jackson, L and Morton, T.D. General Engineering Knowledge for Marine Engineers. 5th ed. London, Thomas Reed Publications Ltd 1990.
2. Taylor, D.A. Introduction to Marine Engineering. 2nd ed. London, Butterworth. 1990
3. General Engineering Knowledge, 3rd Edition, Butterworth Heinemann

MARINE METEOROLOGY

Course Code : MMS 512
Credits : 3.0
Contact Hours : 42

Aim:

The aim of the course is to prepare the students with the basic knowledge in environmental physical science, with emphasis on the physics of the Earth's atmosphere, planetary system, marine forecast system and oceans.

Learning Outcomes:

By the end of the course, students will be able to:

- Demonstrate general knowledge and understanding of some of the basic facts, concepts, scientific principles and language relating to meteorology and weather forecasting for marine environment
- Identify and inter-relate the various physical principles which determine the conduct of maritime transportation.
- Assess all possible limitations which may be imposed by the internal and external environments within which ships and ports operate
- Evaluate navigational/meteorological information for directing the safe navigation of a ship
- Recommend solutions to minimizing potential risks that arise from the dynamic maritime environment surrounding a ship
- Appraise the need for adopting weather routing services and using it to determine the optimum route for a voyage
- Master the basic techniques of applying conventional position fixing principles and assess the impact of associated modern technologies on safety of maritime transportation.

Syllabus Contents:

The planetary system of wind and pressure, weather associated with the principle air mass types, Synoptic and prognostic charts and forecasts from any source, the range of information available through fax transmission, the main types of floating ice their origins and movements, the guiding principles relating to the safety of navigation in the vicinity of ice, conditions leading to ice accretion on ship's superstructures, dangers and remedies available, the formation, structure and weather associated with the principle frontal systems, the formation of, and weather associated with, frontal and non- frontal depressions, formation and weather characteristics of non-frontal weather systems, Tropical Revolving Storms (TRS), surface water circulation of the ocean, formation of sea waves and swell waves.

Recommended text(s):

1. The Weather Book- A Manual of Practical Meteorology by Robert Fitzroy
2. Weather: An Illustrated History: From Cloud Atlases to Climate Change by Andrew Revkin Lisa Mechaley

3. Marine Meteorology- nutshell series book-2 by Capt. H. Subramaniam

OFFSHORE OPERATIONS

Course Code : MMS 513
Credits : 3.0
Contact Hours : 42

Aim:

The aim of this course is to provide updated information and the knowledge of various operations of offshore structure and vessels.

Learning Outcomes:

On successful completion of this course, students should be able to:

- Describe various types of underwater surveys
- List down facilities of offshore construction yard
- Know the various pipelines and control system
- Explain in basic terms of regulatory and classification control of offshore floating units
- Demonstrate a knowledge of the safety of offshore platforms
- Know the operations of offshore vessels

Syllabus Contents:

1. Offshore Surveying - How oil is formed; Types of surveys (Geophysical surveys, geotechnical surveys and the seismic source); Underwater surveys including pipe line surveys
2. Offshore Oil and Gas Drilling Industry - History of the drilling industry; Introduction to the scale and growth of the industry; Explanation of various types of drilling rigs and fixed platforms; Various types of production platforms; Subsea pipeline and flow lines and control systems
3. Production & Drilling (semi-submersible, drillship, FPSO and jack up etc.) Safety;

Operations, Roles and Responsibilities; Introduction to the offshore role; Offshore safety and safe working practices; Responsibility of unit stability - Helicopter equipment (fire prevention and re-fueling) and Heli-deck operations; Hazardous operational areas for Offshore Units & the Safety Requirements; Cargo control operational overview; Offshore crane types and operational overview

4. Anchor Handling and Supply Vessel Operations - Introduction to anchor handling and supply vessels; Equipment on an anchor handling vessel; Safe practice on an anchor handler; Communication during anchor handling; Anchor handling techniques; Supply boat cargo systems (bulk and mud systems)
5. Miscellaneous Offshore Vessels and Equipment - Heavy lift vessels and submersible heavy lift vessels (float-over type), The Shuttle Tanker, Remote operated vehicles (ROVs) and their applications, Floating Storage and Re-gasification Unit (FSRUs), Diving support ships (DSVs), Accommodation vessels and their applications

Recommended Text(s):

1. Offshore Operation Facilities: Equipment and Procedures by Book by Hua Can Fang and Menglan Duan
2. Handbook of Offshore Oil and Gas Operations Book by James Speight
3. A primer of offshore operations by Ron Baker 3rd edition

STUDY TOUR/ FIELD TRIP

Course Code : DEV 501/503

Credits : 3.0

Aim:

To orient students with the practical function of different maritime organizations.

Outcome:

After the completion of the trip/visit, the students will be able to:

- Explain the practical functions of maritime organisation

- Analyse the duties and responsibilities of different maritime professionals

Method of Conduct:

For first two semester, there will be one study tour/ field trip. The study tour/ field trip will normally be conducted within the country. However, study tour/ field trip in third semester may be conducted in overseas countries subject to availability of sponsorship. All of the visit will be conducted in maritime organizations, Like: Ports, dockyards, different shipping companies, ICDs, Terminals, Bangladesh Navy, Maritime institutes, Freight forwarder agencies etc.

STUDENT CONCLUDING SEMINAR

Course Code : DEV 502/504

Credits : 3.0

Aim:

To train the students to conduct the seminar.

Outcome:

After the completion of student concluding seminar, the students will be able to:

- Organize any seminar
- Deliver speech in a big platform.

Method of Operation:

In first two semester there will be one Student Concluding Seminar. Student will organise the whole seminar on their own.