

# **Bangladesh Maritime University, Bangladesh**



## **Curriculum of Bachelor of Maritime Science (Nautical)**

**For  
Bangladesh Marine Academy  
(An affiliated institution of BMU)**



## **TABLE OF CONTENT**

1. Introduction to the Bangladesh Marine Academy
  - 1.1 Background
  - 1.2 Vision
  - 1.3 Mission
  - 1.4 Goals
  - 1.5 Department
2. Faculties and Training console
3. Introduction to Department
4. Introduction to Programme
5. Programme Outcome
6. Admission Information
  - 6.1 Admission Criteria
  - 6.2 Admission Procedure
  - 6.3 Other Additional Qualifications.
  - 6.4 Registration in the Programme
7. Teaching Strategy
  - 7.1 Assignment of Credits
  - 7.2 Conduct of Courses
  - 7.3 Evaluation
  - 7.4 Programme Monitoring Committee
8. Assessment Strategy
  - 8.1 Grading Systems
  - 8.2 GPA Requirements for obtaining Graduation
  - 8.3 Performance Evaluation
    - 8.3.1 Theory Courses
    - 8.3.2 Lab Courses
    - 8.3.3 Presentation Skill Development
    - 8.3.4 Study Tour
    - 8.3.5 On board Training
    - 8.3.6 Co-Curricular Course
  - 8.4 The requirements for promotion to the next semester
  - 8.5 The requirements for promotion to the next year
  - 8.6 The reexamination of failed subjects
  - 8.7 Credit Earned
  - 8.8 Degree Requirement
9. Course Designation System
10. Name of the Certificate.
11. Time Limits for completion of the Bachelor Degree
12. Curriculum Structure
13. Course Schedule
  - 13.1 Core Courses
  - 13.2 Foundation Courses
  - 13.3 Basis Science/Humanities/ Social Science Courses
  - 13.4 Laboratory Courses
  - 13.5 Development Courses
  - 13.6 On board Training
  - 13.7 Degree++ Courses

# **PREAMBLE**

## **1. Introduction to the Bangladesh Marine Academy:**

### **1.1 Background:**

Bangladesh shipping sector is very prehistoric and matured. For thousands of years the people of Bangladesh are spontaneously seafarers. Bangladesh has achieved the name of Maritime nation through its largest river networks, largest bay, largest delta, coastal mangrove forest, longest sea-beach, shipbuilding heritage, unsinkable sampan (country boat) building technology and rise of ship owning, ship management, shipbuilding, ship breaking and skilled maritime manpower development.

To fulfill the requirement of merchant marine officers and engineers in national merchant fleet and private shipping companies, including the international shipping market, Bangladesh Marine Academy was established in 1962. BMA is having an excellent prestigious past, has achieved the requisite professional status by being a branch of World Maritime University in 1990 and through the inclusion of Bangladesh in the white list of the international maritime organization (IMO) in 2000. Therefore, the coveted international status of this academy with the STCW international convention for all levels of maritime education and training is achieved. Undoubtedly, Bangladesh Marine Academy is a unique institution in south Asia and known for its maritime excellence. In addition to the pre-sea Sea Nautical Science / Pre-Sea Marine Engineering course, BMA offers 4 years Honors degree under affiliation of Bangladesh Maritime University (BSMRMU). The 4 years honors degree study schedule is 2 years at Academy for theoretical study, which is also known as Pre-sea training, one year at sea, which is a mandatory provision by STCW convention, known as on board training and finally another year at Academy. The 4<sup>th</sup> year academic study is also covering the preparatory course syllabus as required by Department of Shipping (DoS) requirement to prepare the cadets for their Certificate of Competency (CoC, Clas III) examination.

The Bachelor of Science (Honors) in Maritime Science and Technology (B.Sc. in MST) is a under graduation degree program that deals with the study on diverse field of maritime sector to ensure blue economy from sea resources of Bangladesh and to maintain safe, secure, environmentally sound, efficient and sustainable shipping in international waters. The course provides Maritime education in a well-planned and organized manner to produce skilled

human resources for global shipping market of 55000 ocean going ships. The course is designed to enhance the knowledge, understanding and competency level of nautical cadets to become officer in charge of a navigational watch and maintenance of the ship as well as care for persons on-board at the operational level. The curriculum also consist of various management, business administration and technological courses, which will be helpful to build the nautical cadets to work in any shipping company or shore, based shipping industry.

### **1.2 Vision:**

Developing World-Class Maritime Leaders.

### **1.3 Mission:**

Emerging as a leading maritime education, training and research facilities provider in the shipping world through continuous innovation and endeavors.

### **1.4 Quality Policy:**

Bangladesh Marine Academy is keen to keep up the standard of its education and training programme according to the requirements of STCW'78 as amended, as well as to the requirements of the national curriculum and to enhance the customer satisfaction. Therefore, the academy is committed to constitute, promote and propagate throughout the institution, a culture of quality and continual improvement in all of its programmes of learning for all levels of Maritime Education and Training (MET).

## **2. Faculties and Training console**

Bangladesh Marine Academy assigned with two faculties namely Nautical and Marine Engineering. There are other supporting wings to facilitate the education and training, such as education, development, administration, store and accounts department. The Training facilities required and available to conduct the Bachelor of Maritime Science course:

- i. Electronic Navigation and Simulation centre
- ii. Seamanship block
- iii. Radar Navigation centre
- iv. Firefighting centre
- v. Survival training lake
- vi. Swimming pool
- vii. Library
- viii. Chart work room

- ix. Ocean sustainability lab
- x. Physics Lab
- xi. Computer lab
- xii. Language lab

### **3. Introduction to Department**

The Department of Nautical started its journey from the very inception of this Academy. 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, teaching, shipping companies, commercial organizations beside the main stream of sea carrier to become Master/Captain on board ship.

The professional teachers are qualified as per STCW requirement, those are experience Master Mariner in merchant ships. There are electronic instructor, radar and signaling instructor and seamanship instructor to conduct various theoretical and practical classes.

### **4. Introduction to Programme**

**4.1 Program Educational Objectives:** Bachelor of Maritime Science is a fully integrated professional course of study for the persons willing to prepare themselves for variety of careers in the Shipping sector, Merchant marine, and other maritime related organization. Cadets will get sufficient practical training at sea and in various shore based industrial establishment during their 4 (Four) years courses. The aim of Bachelor of Maritime Science Program is to provide:

- a. Knowledge, understanding, proficiencies, skills, competences, morally upright, attitudes and values to qualify and prepare them for assessment and certification as Officer of the Watch (OW) at Bridge on seagoing Vessels in both usual and extreme situation.
- b. Sufficient practical orientated training at sea and simulator so that they are well conversant about their profession and become confident in practical field.
- c. Produce graduates who are qualified to pursue a professional career or advanced studies in a related maritime field of specialization.

- 4.2 The Aim of Bachelor of Maritime Science Program** Provide and equip Cadets with knowledge, understanding, proficiencies, skills, competences, attitudes and values to

qualify and prepare them for Merchant Shipping and other maritime organization. The graduates of the Bachelor of Maritime Science program shall have acquired the knowledge and competences necessary to perform the following:

- a) Demonstrate the ability to perform the competence, at the operational level under Section A-II/1 of the STCW (International Convention on Standards of Training, Certification and Watch keeping for Seafarers) Code.
- b) Apply knowledge in mathematics, science and technology in solving problems related to the profession and the workplace.
- c) Work in a multi-cultural and/or multi-disciplinary team.
- d) Understand professional and ethical responsibilities.
- e) Communicate effectively in oral and written English.
- f) Understand the impact and implications of various contemporary issues in the global and social context of the profession.
- g) Engage in lifelong learning and keep abreast with developments in the field of specialization and/or profession.
- h) Use appropriate techniques, skills and modern equipment in the practice of the profession in order to remain globally competitive.
- i) Conduct research using appropriate research methodologies.

## 5. Programme Outcome

A graduate of the Bachelor of Maritime Science program is prepared for careers in, among others:

- Merchant Marine profession
- Maritime Industry
- Ship building and repair (Nautical and administration Side)
- Ship operations and management
- Port operations and management
- Pilot Duties at port (Chittagong, Mongla and Payra etc.)
- Ship surveying and inspection
- Offshore industry
- Maritime Education and Training
- Industrial and Commercial Establishment
- Government
- Bangladesh Navy
- Bangladesh Coast Guard

## 6. Admission Information

### 6.1 Admission Criteria

Eligibility for admission in Bachelor of Maritime Science programme are as follows:

- a. SSC (Science)/ 'O' level or equivalent (with Mathematics & Physics): Minimum CGPA 3.50
- b. HSC (Science)/ 'A' level or equivalent (with Mathematics & Physics): Minimum CGPA 3.50
- c. HSC (Science)/ 'A' level or equivalent: Minimum GPA in Physics is 3.50, Mathematics is 3.50 and English is 2.00 or IELTS average score 5.50

### 6.2 Other Additional Qualifications.

- a. **Age:** 16 to 21 Years.
- b. **Condition of Health:** Good.
- c. **Eye Sight:**  
**Nautical Science:** 6/6
- d. **Color Vision:** Normal.
- e. **Swimming:** Standard Swimming Test Pass (100 m. swimming and 10 min floating).
- f. **Height:**  
(1) **Male:** 162.5 cm.  
(2) **Female:** 155 cm.
- g. **Weight:** Standard as per body mass Index
- h. **Marital Status:** Unmarried.

### 6.3 Admission Procedure

The procedure for admission in Bachelor of Maritime Science (Nautical):

- a. **Admission Circular.** BMA will invite applications from interested candidates for admission in Bachelor of Maritime Science (Nautical) by publishing advertisements in the national dailies, BSMRMU website and BMA website.
- b. **Application process.** Applicants will apply through Teletalk for their registration.
- c. **Written Admission Test.** An eligible candidate will have to sit for a written admission test on English, general knowledge, Mathematics, Physics and Chemistry.
- d. **Marks Distribution of Written Admission Test.** Syllabus of the admission test shall that be of the current HSC Syllabus.
- e. **Medical Test.** Under supervision of civil surgeon.

- f. **Color Vision test.** Under supervision of Mercantile Marine Department.
  - g. **Swimming and physical test.** Standard Swimming Test Pass (60 m. swimming, climbing rope, running 400 meter and 10 push-up).
  - h. **Final Selection.** Candidates will be selected finally on the basis of their combined marks obtained on the written admission, viva-voce, HSC/equivalent examination result 30% and SSC equivalent examination result 20% as well as on the basis of health, eye, color vision and swimming test result. Final Merit list along with waiting list will be published on national dailies as well as on BMA website.
- 63.1 **Registration in the Programme:** After final selection, the selected candidates will be registered under the programme in accordance with the procedures as laid down by BSMRMU. The selected candidates have to collect Admission Form from the Admission Section, and complete admission and registration formalities within the given time frame by paying the required fees. The following rules will apply in this regard:
- a. If any candidate fails to complete admission formalities within the prescribed date and time, the candidate's selection will be cancelled automatically
  - b. If any Cadet does not attend the class within two weeks of commencement of classes, the Cadet's admission will be cancelled automatically.

## 7. Teaching Strategy

The teaching strategy of the programme is mainly lecture based for theoretical courses and demonstration for lab courses. Other teaching strategy includes case study, group discussion, workshop, seminar and fieldwork learning etc.

### 7.1 Assignment of Credits

- a. For theoretical courses, one lecture of 60 minutes per week per term is equivalent to one credit hour.
- b. For laboratory courses, 120 minutes per week per term is equivalent to one credit hour.

- c. Credit hours are also assigned to study tour co-curricular activities, presentation development skills and internship taken by the Cadets. The amount of time assigned to such work may vary depending on their requirements

## **7.2 Conduct of Courses**

The following guidelines will be followed for conducting the courses:

- a. At the beginning of the term, the course teacher will prepare a course outline incorporating the course syllabus, performance evaluation and grading system (as laid down in the policy), list of suggested text books/references, and a tentative schedule of classes, examinations and events.
- b. Internship/Sea Training work will be assigned individually on any issue pertaining to the organization/Ship in which the Cadets are engaged with.
- c. A number of individual and group assignments, presentations, etc. will be assigned to Cadets as per the course requirements.

## **7.3 Evaluation**

The performance of a Cadet will be evaluated in semester indices, viz. semester grade point average, and cumulative grade point average, which is the grade average for all the year. The semester grade point average is computed dividing the total grade points earned in a semester by the number of year hours taken in that year. The overall or cumulative grade point average (CGPA) is computed by dividing the total grade points accumulated up to date by the total Credit hours earned.

## **7.4 Programme Monitoring Committee**

To keep pace with new developments of the Maritime science and technology, the University will update the course curriculum at frequent intervals (at least every three years). Such updating will aim not only to include expanding frontiers of knowledge in the maritime field but also accommodate the changing social, industrial and professional needs. This will be done through modification of some of the courses and through the introduction of new ones. With this view, the university will constitute a programme

monitoring committee with representatives from Bangladesh Marine Academy, Department of Shipping and BSMRMU. The committee will monitor and evaluate the conduct of the courses. The committee may also propose from time to time to the University any changes and modifications needed for upgrading the curriculum and the course system keeping alignment of the IMO guideline.

## **8. Assessment Strategy**

### **8.1 Grading Systems**

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

<b>Letter</b>	<b>Grade points</b>	<b>Numerical Markings</b>
<b>Grade</b>		
A+	4	80% and above
A	3.75	75% to below 80%
A-	3.5	70% to below 75%
B+	3.25	65% to below 70%
B	3	60% to below 65%
B-	2.75	55% to below 60%
C+	2.5	50% to below 55%
C	2.25	45% to below 50%
D	2.00	40% to below 45%
F	0	below 40%
I	Incomplete -	-
W	Withdrawn -	-
X	Projects/Thesis continuation	-
E	Expelled	Due to exam offence

Grade Point Average (GPA) is the weighted average of the grade points obtained in all the courses passed/completed by a Cadet. For example, if a Cadet passes/completes five courses

in a Semester having Credits of C1, C2, C3, C4, and C5 and his grade points in these courses are G1, G2, G3, G4, and G5, respectively then:

$$GPA = \frac{\sum C_i G_i}{\sum C_i}$$

8.2 GPA Requirements for obtaining Graduation: The Minimum CGPA requirement for obtaining Bachelor's degree in Maritime Science and Technology is 2.5.

### 8.3 Performance Evaluation

Thirty percent (30%) marks of theoretical course will be allotted for continuous assessment, i.e. quizzes, class tests, assignments, class evaluation, class participation, mid-term exam etc. Term Final Examination will be conducted under regulation of BSMRMU. Term Final Examination will be normally of 3-hour duration and comprise of 100 marks. Distribution of marks for a given course is as follows:

Serial no.	Examination type	Weightage
1.	Class attendance and participation	10%
2.	Mid-term exam/Class test/Class quiz/Assignment	20%
3.	Final Examination (3 hours) (100 marks)	70%
4.	Total	100%

The number of quizzes/class tests of a theory course will be n+1, where n is the number of credit hours of the course. Evaluation of performance in quizzes/class tests will be on the basis of the best n quizzes. The scheme of continuous assessment that a particular teacher wishes to follow for a course will be announced as course outline on the first day of the term. The performance of a Cadet will be evaluated in terms of two indices, viz. Semester Grade Point Average (SGPA), and Cumulative Grade Point Average (CGPA).

### 8.4 On board Training

STCW-10 Basic safety training courses (Degree++) need to be completed by each cadet's prior commencement of onboard Training.

- a) Each cadet must serve in ocean going vessel for 12 months, which will be recorded in the Continuous Discharge Certificate (CDC) /Seaman Book and the training is documented in an approved Training Record Book (TRB).
- b) As an alternative of the On board training cadets may perform 12 months apprenticeship in a Ship operating company, Port Authority, Shipyard& Dockyard, Marine Workshop and any other similar maritime service approved by the maritime safety administration (Dept. of Shipping).
- c) The third year on board training must be supervised by one supervisor from institution and on board trainer. The trainee must submit Training Record Book (TRB) and minimum two assignments on ship's structure, cargo operation, emergency procedures, safety, security and firefighting appliances as suggested by supervisor. The mark allocation for the third year final examination will be as follows:

Serial no.	Examination type	Weightage	Marks
1.	Training Record book and two assignment	50 %	100
2.	Oral examination and presentation	50 %	100
3.	Total	100%	200

### **8.5 Thesis Paper**

The distribution of marks for the performance evaluation of thesis/ project/ review paper is given below:

Serial no.	Examination type	Weightage
1.	Thesis/Project/Review Paper	50 %
2.	Presentation	20 %
3.	Oral Examination	30%
4.	Total	100%

### **8.6 The requirements for promotion to the next semester**

The requirements for promotion to the next semester are as follows:

- a. A Cadet has to take the required courses for a particular semester as per the syllabus of the programme.
- b. A Cadet will be promoted to the second semester of each year, irrespective of his/her results in the first term of the year.

- c. A Cadet will not be promoted to the next semester, provided he/she got 'C' grades or above in more than three subjects including backlog subjects (if any).
- d. If a student obtains 'C' grade ( less than 50%) in more than three courses or earn GPA 2.5 or below in any term will not be allowed to promote in next term but to continue the full course of that term in subsequent year.

### **8.7 The re-examination of failed subjects or improvement**

Normally the re-examination of the failed subjects or improvement examination will be conducted with the term end examination of next semester. However, Cadets may also opt to register the failed subjects and appear the examination with next batch.

If a cadet earns B grade or lower, he/she is eligible to appear in improvement in next semester term end examination. The maximum grade is achievable in improvement examination is B+.

### **8.8 Degree Requirement**

Degree requirements are as follows:

- a. Completion of courses required for fulfilling the minimum credit hours of 161 in a maximum period of 8 (Eight) academic years.
- b. Appearing at the final examination in all the required courses as per curriculum of the programme.
- c. Successful completion of internship and thesis/ project/ review paper.
- d. Successful completion and obtaining pass mark in non-credit courses.
- e. Scoring a CGPA 2.5 or above.

## **9. Course Designation System**

Each course is designated by a maximum of four-letter code identifying the programme or department offering the course followed by a four-digit number having the following interpretation:

- a. The first digit corresponds to the year in which the course is normally taken by the Cadets.
- b. The second digit corresponds to the semester in which the course is normally taken by the Cadets.
- c. The last two digits denote a course, where an odd number is used for a theoretical course and an even number for Laboratory/Practical/sessional course.

## **10. Name of the Certificate.**

After successful completion of the 4 year Training and Educational programme of 161 Credits the Nautical Science Cadets shall be awarded of Bachelor of Maritime Science (Nautical)

## **12. Curriculum Structure**

Bachelor of Maritime Science (Nautical) consists of the following categories of courses:

<b>Category</b>	<b>No</b>	<b>Credit</b>	<b>Percentage</b>
Core Courses (STCW course)	25	75	47%
Basic Science/ Humanities/Social Science/ Maritime Management	16	48	30%
Laboratory Courses	12	18	11%
Development Course	5	-	Non Credit
Dissertation/ Thesis	1	8	5%
Sea Training	1	12	7 %
<b>Total</b>		<b>161</b>	<b>100%</b>

## **13. Course Schedule**

### **13.1 Core Courses (25 x 3 credit)**

- BMST 1107 Ship Construction and Stability - I
- BMST 1109 Meteorology and Ocean Science- I
- BMST 1111 Principles of Navigation - I
- BMST 1211 Maritime Conventions
- BMST 1209 Shipboard Operation and Cargo Work- I
- BMST 1213 Principles of Navigation-II
- BMST 2103 Marine Engineering and Control System
- BMST 2105 Celestial and Ocean Navigation- I
- BMST 2107 Ship Construction and Stability- II
- BMST 2109 Electronic Navigation System
- BMST 2111 Chart Work- I
- BMST 2113 Collision Prevention Regulation- I
- BMST 2201 Meteorology and Ocean Science II
- BMST 2203 Cargo and Shipboard Operation- II

BMST 2205 Celestial and Ocean Navigation- II

BMST 2207 Ship Construction and Stability- III

BMST 2209 Radar Navigation and Advance Navigation Technology

BMST 2211 Chart Work-II

BMST 2213 Collision Prevention Regulation- II

BMST 4103 Advance Navigation

BMST 4105 Cargo Operation & Stability

BMST 4107 Ocean & Offshore Navigation

BMST 4109 Coastal Navigation

BMST 4111 Meteorology for Navigators

BMST 4113 Advance Ship Knowledge

**13.2 Basis Science/Humanities/ Social Science/Maritime Management Courses (16 x 3 credit)**

BMST 1101 Physics

BMST 1103 Mathematics

BMST 1105 Bangladesh Studies

BMST 1201 Fundamentals of Electronics & Computer

BMST 1203 Mathematics for Navigators

BMST 1205 English and Communication Skills

BMST 1211 Leadership, Teamwork and Principles of Management

BMST 2101 Environmental Science and Prevention of Marine Pollution

BMST 4101 Research Methodology & Professional Ethics

BMST 4115 Bangla Language

BMST 4201 Maritime Law, Insurance and Risk Management

BMST 4203 Shipboard, Shipping and Port Management

BMST 4205 Basic Computer Programming

(Any Three subject can be taken)

BMST 4221 Advance Oil Tanker Cargo Operation

BMST 4223 Advance Chemical Tanker cargo Operation

BMST 4225 Maritime Economics

BMST 4227 Maritime Safety and Environment Administration

BMST 4229 Integrated Coastal and Ocean management

BMST 4231 Advance Marine Technology

BMST 4233 Marine Surveying and Casualty Investigation

BMST 4235 International Trade and Ship Chartering

BMST 4237 Shipping Accounting and Finance

### **13.3 Laboratory/ Sessional Courses ( 12 x 1.5 credit)**

BMST 1102 Basic Seamanship Practice Sessional

BMST 1104 Signaling & SMCP Sessional

BMST 1202 Electronics and Computer Sessional

BMST 1204 Shipboard Instruments Sessional

BMST 2102 Advance Seamanship Sessional

BMST 2104 Watch Keeping Sessional

BMST 2202 Shipboard Operation Sessional

BMST 2204 Bridge Watch Keeping Sessional

BMST 4102 Bridge Team and Bridge resource management Sessional

BMST 4104 Efficient Deck Hand Sessional

BMST 4202 Electronic Navigation System Sessional

BMST 4204 Computer Programming Sessional

### **13.4 Non Credit Development Courses**

BMST 0001 Contemporary Maritime Issues

BMST 0002 Organizational Discipline and Personal Management

BMST 0003 Basic Safety and Security

BMST 0004 Advance Safety and Security

BMST 0005 Basic oil and chemical tanker cargo operation

### **13.5 On board Training (12 Credit)**

The 3rd year period will be covered on board by completion of 12 months practical sea time under supervision of on-board management level officers of the respective ship or in any dockyard, ship-building yard, ship-owner or ship manager's office as approved by the BSMRMU.

### **13.6 Degree++ Courses**

Each Cadet shall have to register minimum 3 (Three) degree++ courses as a part of requirement of the degree. Such courses will be offered by the Academy time to time in coping with the requirement of contemporary maritime management and business world. A list of probable

degree++ courses are given below:

- a) Basic Ancillary Courses (06)
- b) French Languages
- c) Chinese Languages
- d) Arabic Languages
- e) Radar and ARPA Operation Level Course
- f) Global Maritime Distress & safety system
- g) Ship Handling Simulator course

### **13.7 Thesis work:**

BMST 4000 Thesis on Maritime Topics

### **1<sup>st</sup> Year 1<sup>st</sup> Term (1<sup>st</sup> Semester)**

<b>Code</b>	<b>Course Name</b>	<b>Cr</b>	<b>Hr</b>
BMST 1101	Applied Physics	3	42
BMST 1103	Applied Mathematics	3	42
BMST 1105	Bangladesh Studies	3	42
BMST 1107	Ship Construction and Stability-I	3	42
BMST 1109	Meteorology and Ocean Science- I	3	42
BMST 1111	Principles of Navigation - I	3	42
BMST 1102	Basic Seamanship Sessional	1.5	42
BMST 1104	Signaling & SMCP Sessional	1.5	42
	<b>TOTAL</b>	<b>21</b>	<b>336</b>

### **1<sup>st</sup> Year 2<sup>nd</sup> Term (2<sup>nd</sup> Semester)**

<b>Code</b>	<b>Course Name</b>	<b>Cr</b>	<b>Hr</b>
BMST 1201	Fundamentals of Electronics & Computer Science	3	42
BMST 1203	Mathematics for Navigators	3	42
BMST 1205	English and Communication Skills	3	42
BMST 1207	Leadership, Teamwork and Principles of Management	3	42
BMST 1209	Shipboard Operation and Cargo Work Paper I	3	42
BMST 1211	Maritime Conventions	3	42
BMST 1213	Principles of Navigation-II	3	42
BMST 1202	Electronics and Computer Science Sessional	1.5	42
BMST 1204	Shipboard Instruments Sessional	1.5	42
	<b>TOTAL</b>	<b>24</b>	<b>378</b>

## **2<sup>nd</sup> Year 1<sup>st</sup> term (3<sup>rd</sup> Semester)**

<b>Code</b>	<b>Course Name</b>	<b>Cr</b>	<b>Hr</b>
BMST 2101	Environmental Science and Prevention of Marine Pollution	3	42
BMST 2103	Marine Engineering and Control System	3	42
BMST 2105	Celestial and Ocean Navigation- I	3	42
BMST 2107	Ship Construction and Stability-II	3	42
BMST 2109	Electronic Navigation System	3	42
BMST 2111	Chart Work- I	3	42
BMST 2113	Collision Prevention Regulation- I	3	42
BMST 2102	Advance Seamanship Sessional	1.5	42
BMST 2104	Bridge Watch Keeping Sessional-I	1.5	42
	<b>Total</b>	<b>24</b>	<b>378</b>

## **2<sup>nd</sup> Year 2<sup>nd</sup> term (4<sup>th</sup> Semester)**

<b>Code</b>	<b>Course Name</b>	<b>Cr</b>	<b>Hr</b>
BMST 2201	Meteorology and Ocean Science II	3	42
BMST 2203	Cargo and Shipboard Operation- II	3	42
BMST 2205	Celestial and Ocean Navigation-II	3	42
BMST 2207	Ship Construction and Stability- III	3	42
BMST 2209	Radar Navigation and Advance Navigation Technology	3	42
BMST 2211	Chart Work-II	3	42
BMST 2213	Collision Prevention Regulation- II	3	42
BMST 2202	Shipboard Operation Sessional	1.5	42
BMST 2204	Bridge Watch Keeping Sessional-II	1.5	42
	<b>Total</b>	<b>24</b>	<b>378</b>

### **3<sup>rd</sup> Year (5<sup>th</sup> and 6<sup>th</sup> Semester)**

<b>Code</b>	<b>Course Name</b>	<b>Cr</b>
BMST 3102	<b>On board Training</b>  An approved seagoing service of not less than 12 months as part of an approved training program, which includes onboard training that meets the requirements of section A-II/1 of the STCW Code and is documented in an approved training record book. The training will be conducted under the supervision of professional instructor and finally assessed by assignment and presentation	12
BMST 3104	<b>Alternative</b>  Students may perform 12 months apprenticeship in a ship management, owners, or agency company, port authority, Ship yard, dry-dock, marine workshop or any other similar organization approved by the Bangabandhu Sheikh Mujibur Rahman Maritime University. The training will be conducted under the supervision of professional instructor and finally assessed by assignment and presentation	12
	<b>Total</b>	<b>12</b>

### **4<sup>th</sup> Year 1<sup>st</sup> Term (7<sup>th</sup> Semester)**

<b>Code</b>	<b>Course Name</b>	<b>Cr</b>	<b>Hr</b>
BMST 4000	Thesis on Maritime Topics	4	
BMST 4101	Research Methodology & Professional Ethics	3	42
BMST 4103	Advance Navigation	3	42
BMST 4105	Cargo Operation & Stability	3	42
BMST 4107	Ocean & Offshore Navigation	3	42
BMST 4109	Coastal Navigation	3	42
BMST 4111	Meteorology for Navigators	3	42
BMST 4113	Advance Ship Knowledge	3	42
BMST 4102	Bridge team and bridge resource management sessional	1.5	42
BMST 4104	Efficient Deck Hand Sessional	1.5	42
	<b>Total</b>	<b>28</b>	<b>378</b>

## **4<sup>th</sup> Year 2<sup>nd</sup> Term (8<sup>th</sup> Semester)**

<b>Code</b>	<b>Course Name</b>	<b>Cr</b>	<b>Hr</b>
BMST 4000	Thesis on Maritime Topics	4	
BMST 4201	Maritime Law, Insurance and Risk Management	3	42
BMST 4203	Shipboard, Shipping and Port Management	3	42
BMST 4205	Basic Computer Programming	3	42
BMST 4207	Bangla Language	3	42
BMST 4202	Bridge Navigation and GMDSS Sessional	1.5	42
BMST 4204	Computer Programming Sessional	1.5	42
	<b>(Any Three from the following subject can be taken)</b>	$3 \times 3 = 9$	126
	<b>Total</b>	<b>28</b>	<b>378</b>
BMST 4221	Advance Oil Tanker Cargo Operation	3	42
BMST 4223	Advance Chemical Tanker cargo Operation	3	42
BMST 4225	Maritime Economics	3	42
BMST 4227	Maritime Safety and Environment Administration	3	42
BMST 4229	Integrated Coastal and Ocean management	3	42
BMST 4231	Advance Marine Technology	3	42
BMST 4233	Marine Surveying and Casualty Investigation	3	42
BMST 4235	International Trade and Ship Chartering	3	42
BMST 4237	Shipping Accounting and Finance	3	42

## **NON-CREDIT SUBJECT**

<b>Code</b>	<b>Course Name</b>
BMST 0001	Contemporary Maritime Issues
BMST 0002	Organizational Discipline and Personal Management
BMST 0003	Basic Safety and Security
BMST 0005	Advance Safety and Security
BMST 0007	Basic Oil and Chemical tanker cargo operation

## **Total Credit Distribution**

<b>Sl No</b>	<b>Semester</b>	<b>Credit</b>
01	First Semester	21
02	Second Semester	24
03	Third Semester	24
04	Fourth Semester	24
05	3 <sup>rd</sup> Year On board Training	12
06	Seventh Semester	28
07	Eight Semester	28
	<b>Total</b>	<b>161</b>

## **1<sup>st</sup> Year 1<sup>st</sup> Term (1<sup>st</sup> Semester)**

**Course Code:** BMST 1101

**Course Name:** Physics

**Credit:** 3

**Contact Hour:** 42

**Learning Objectives:** This function provides the background knowledge to support an understanding of the physical principles underlying the behavior of the ship and its environment and the functioning of equipment upon which to build in their professional studies. Students will also be better able to understand technical specifications, operating and maintenance instructions regarding equipment with which they are not familiar.

### **Syllabus Contents:**

#### **Physical Sceince**

Mass, weight and force

Distance, velocity and acceleration

Circular motion and rotation statics

Work, energy and power

Machines

Density

Fluids

Principle of Archimedes and flotation

#### **Heat**

Temperature

Expansion of solids and liquids 1 2

Gases

Transmission of heat

Change of state

Vapours

Refrigeration

#### **Waves, sound and light**

Waves

Electromagnetic radiation

Light

sound

**Course Code:** BMST 1103

**Course Name:** Mathematics

**Credit:** 3

**Contact Hour:** 42

**Learning Objectives:** This competence provides the background knowledge to support mathematical skills to perform calculations in navigation, cargo work, ship stability and other areas of their professional work

### **Syllabus Contents:**

#### **Algebra**

This section covers the standard algebraic manipulations leading to the transposition of equations and their solution

#### **Graphs**

Trainees should be able to produce a graph of given or observed data and extract information from the graph. They should also be able to draw graphs of simple functions for a given range of the independent variable. sketching the graphs of functions is not required.

#### **Proportion, variation and interpolation**

Ship's officers use many tables requiring linear interpolation. It is essential that trainees learn to interpolate quickly and accurately, and can also perform inverse interpolation. The arrangement and correct use of critical tables should also be covered.

#### **Geometry**

The emphasis is on the properties of figures, parallel lines and constructions to provide a basis for chart work, radar plotting and the use of figures in other subjects.

#### **Trigonometry**

Trainees should be proficient in the use of trigonometrical functions of angles in any quadrant, since these will occur in navigational problems. The range of values of the inverse functions should be known.

#### **Mensuration**

Figures and solids reducible should be included in the problems.

#### **Vectors**

The graphical solution of sums and differences of vector quantities and the resolution of vector in given directions should be thoroughly covered.

#### **Circle, ellipse and hyperbola**

The object of this section is to provide an elementary introduction to the properties of the circle ellipse and hyperbola which will aid the understanding of topics in navigation and navigational aids.

#### **Statistics**

Trainees should be able to collect, organize, analyze and interpret various data with this acquired knowledge of statistics

**Course Code:** BMST 1105

**Course Name:** Bangladesh Studies

**Credit:** 3

**Contact Hour:** 42

**Learning Objectives:** After successful completion of this course, the students will have clear understanding on History, culture, climate, geography, heritage and cultural influences environment and development agenda of the government of Bangladesh. A general overview on the maritime affairs in Bangladesh and will be able to appreciate the huge potential of Bangladesh in maritime sector.

**Syllabus Contents:**

- 1. History of the Emergence of Independent Bangladesh:** Proposal for undivided sovereign Bengal and the partition of the Sub-Continent, 1947; Pakistan: Structure of the state and disparity; Language movement and quest for Bengali identity; Military rule: the regimes of Ayub Khan and Yahia Khan (1958-1971); Rise of nationalism and the movement for self-determination; Election of 1970 and the declaration of independence; The war of liberation 1971, and Independent Bangladesh
- 2. Description of the country and its people:** Topography of Bangladesh; Demography of Bangladesh; Climate of Bangladesh and Natural Resources of Bangladesh.
- 3. Society and Culture:** Social structure; Social problem- Poverty; Unemployment Drug addiction and Corruption
- 4. Some provisions of the Constitution of Bangladesh:** Basic knowledge on the Constitution of Bangladesh; Parliament; Judicial system of Bangladesh and Administrative system of Bangladesh
- 5. Economic Sector Highlights:** Agriculture; Industry; Energy, Trade and Commerce and Financial Administration of GOB
- 6. Emergence of Maritime Sector in Bangladesh:** Historical background; Bangladesh in International Maritime Forum
- 7. Maritime Cluster in Bangladesh:** Maritime Administration; Maritime Human; Resource Development; Sea-Ports and Port infrastructure; Ship management and logistic services in Bangladesh; Inland Shipping in Bangladesh and Shipbuilding industry in Bangladesh
- 8. Bangladesh Maritime Sector Highlights:** Ship recycling in Bangladesh; Management of Marine Fisheries Resources in Bangladesh and Hydrocarbon exploration in the deep offshore area in Bangladesh.
- 9. Prospects and Challenges of Blue economy of Bangladesh:** Definition of Blue economy, the various sectors of blue economy in Bangladesh.

**Course Code:** BMST 1107

**Course Name:** Ship Construction and Stability- I

**Credit:** 3

**Contact Hour:** 42

**Learning Objectives:** The trainees should have knowledge of the principal structural members of a ship and the proper names of the various parts. Their knowledge should be such that they are capable of intelligent observation during the ordinary course of their work and could make adequate reports describing the location and nature of faults or minor damage discovered.

### **Syllabus Contents:**

#### **SHIP CONSTRUCTION:**

##### **Ship dimensions and form (12 hours)**

Illustrates the general arrangement of various types of ship, such as general cargo, oil, chemical and gas tankers, bulk carriers, combination carriers, container, ro-ro, passenger

Sketches an elevation and plan views of various ship types.

Illustrate a general knowledge of the primary structural members and indicate the proper names for the various parts to include holds, engine-room, peak tanks, double-bottom tanks, hatchway, tween deck and position of bulkheads, cofferdams, etc

Illustrate various structural terminology, such as camber, rise of floor, tumblehome, flare, etc

Illustrate various features and dimensions of Ship, such as LOA, LBP, Breadth molded etc

##### **Hull structure (9 hours)**

Identifies structural components on ships' plans and drawings, eg frames, floors, transverse frames, deck beams, knees, brackets, shell plating, decks, tank top, stringers, bulkheads and stiffeners, pillars, hatch girders and beams, coamings, bulwarks etc

Describes the types of materials that are used in the construction of a ship

Describes and illustrates standard steel section eg flat plate, offset bulb plate, equal angle etc

Describes with aids of sketches the longitudinal, transverse and combined systems of framing on transverse sections of various types of ships including double bottom, bulk head etc.

##### **Stability (21 hr)**

Displacement

Buoyancy

Fresh water allowance

Statical stability

Initial stability

Angle of loll

Curves of statical stability

Movement of centre of gravity

**Course Code:** BMST 1109

**Course Name:** Meteorology and Ocean Science- I

**Credit:** 3

**Contact Hour:** 42

**Learning Objectives:** To understand the earth and ocean structure, ocean current circulation, wind and weather system, and atmospheric pressure so that the students can carry out the navigation watch keeping duties on board

### **Syllabus Contents:**

#### **Meteorology:**

##### **The atmosphere, its composition and physical properties (4 hours)**

Define dry air, water vapour, 'troposphere', 'tropopause', 'stratosphere', 'stratopause', 'Mesosphere', 'mesopause' and 'thermosphere'etc. Sun as the principal energy source, solar radiation (scattering, reflection and absorption) Explains the effect on insolation of a variation in latitude, sun's declination, length of daylight Defines 'evaporation', 'condensation', 'latent heat of vaporization', defines 'saturated air' Defines 'dewpoint', 'absolute humidity', 'relative humidity', 'vapour pressure'

##### **Atmospheric pressure (4 hours)**

##### **Wind (8 hours)**

Beaufort scale of wind force, pressure gradient force, Coriolis (geostrophic) force, Surface wind circulation, relative wind speeds, Buys-Ballot's Law, Differences between apparent and true wind Determines the true wind velocity by using a vector diagram, given the apparent wind and the ship's course and speed.

##### **Ocean science:**

Introduction to Earth science and Oceanography, Marine Ecology, Marine Resources, Coastal and Marine habitats, Marine Eco-system goods & services and human impact, Blue economy in Bangladesh prospective, Formation of the earth and its structure, evolution of continents and ocean basins, continental drift hypothesis, Plate tectonics, Materials of the earth's crust: Maritime Atlas, Physical Properties of Sea Water, Salinity, The energy budget of the Oceans, Oceanic Circulation System.

**Course Code:** BMST 1111

**Course Name:** Principles of Navigation-I

**Credit:** 3

**Contact Hour:** 42

**Learning Objectives:** This subject gives learners the underpinning and theoretical knowledge for ocean navigation using terrestrial and celestial methods, and also the theory and properties of the free gyro.

### **Syllabus Contents:**

#### **Earth**

Defines 'latitude' and 'parallels of latitude', 'prime meridian' and 'longitude', 'great circle', 'small circle', 'spherical angle', 'spherical triangle', 'poles', 'equator' and 'meridians', Describes the earth as an ellipsoid, 'compression', and states its value, 'nautical mile', explains the rotation of the earth about its axis, describes the directions on the earth's surface. Describes the approximate polar and equatorial circumferences of the earth.

### **Solar system**

Describes the composition and dimensions of the solar system, the earth's elliptical orbit, perihelion and aphelion distances, eccentricity of the earth's orbit, inclination of the earth's axis and its effect on the seasons, solstices and equinoxes, explains the concept of the earth's axial rotation giving day and night, explains the varying length of daylight through the year, describes the significance of the tropics of Cancer and Capricorn and of the, Arctic and Antarctic Circles.

### **Charts**

Demonstrates basic knowledge of chart projections, 'natural scale' of a chart, Identifies the Mercator chart as a mathematical projection and understands the principles of its construction, demonstrates how to measure the distance between two positions on a Mercator chart based on the latitude of the two positions

### **Sailings**

'Departure' difference of longitude 'true course' 'rhumb line', Plane sailing formulae, parallel of latitude, Calculates a DR position or an estimated position by using the plane sailing formula, given compass course and compass error, distance by log, estimated speed, tidal and current information and leeway. Describes the layout of a traverse table. Derives the information required in a parallel or plane sailing problem, using a traverse table or calculator. Solves problems of plane sailing. Solves problems of DR and fixing positions, using plotting charts. States the Mercator sailing formula, uses the Mercator formula to calculate course and distance between two positions.

**Course Code: BMST 1102**

**Couse Name:** Basic Seamanship Sessional

**Credit:** 1.5

**Contact Hour** 42

**Learning Objective:** To be acquainted with the tools and seamanship practices on board.

### **Syllabus Contents:**

Name and Use of various tools on board, Store inventory and management, Compass Card and helm order, Hand lead line, Anchor, cables and Mooring Winches, Ropes and Wires, Various types of ladders, Knots, hitches and bends in common use.

Demonstrates how to make Reef knot, Rolling hitch, Timber hitch, Figure of eight, Clove hitch, Wall and crown, Bowline and bowline on the bight, Sheet bend (double and single), Sheepshank Round turn and two half hitches a marlinspike hitch, Demonstrates how to whip a rope's end using plain or palm and needle whipping, Demonstrates how to put a seizing on a rope and wire Splicing, Demonstrates splicing of fiber rope (eye splice, short splice and back splice),

Demonstrates splicing of wire rope (eye splice, short splice and back splice), States the tools needed for splicing.

**Course Code:** BMST 1104

**Course Name:** Signaling & SMCP Sessional

**Credit:** 1.5

**Contact Hour:** 42

**Learning Objectives:** To enable the Morse code signaling communication and VHF communication with other ships.

**Syllabus Contents:**

**Signaling by Morse code:** Sends and receives Morse signals by flashing light, States the recommendations on sound signaling, Lists the single-letter signals which may be sounded only in compliance with the requirements of the International Regulations for Preventing Collisions at sea International Code of Signals, recognizes all International Code flags and pendants, explains the purpose of the International Code of Signals, correctly uses substitute flags, demonstrates how to call, using flags, states that cross-referencing of signals in the right-hand column is used to facilitate coding, states the meanings of single-letter signals, states that there are single-letter signals for use between an ice-breaker and assisted vessels, explains how time of origin may be included, codes and decodes messages, using the General Sections, codes and decodes messages, using the Medical Sections and complements, states the International Code Signal of distress, Standard . Marine Communication Phrases uses the IMO Standard Marine Communication Phrases, VHF communication practice.

## **1<sup>st</sup> Year 2<sup>nd</sup> Term (2<sup>nd</sup> Semester)**

**Course Code:** BMST 1201

**Course Name:** Fundamentals of Electronics & Computer Science

**Credit:** 3

**Contact Hour:** 42

**Learning Objectives:** Enable the students to be familiar with computer operations and various applications including the hardware and software.

### **Syllabus Contents:**

**Electronics:** Passive components, Semiconductor devices, Amplifiers, Feedback, Integrated circuits, Power supplies, Oscillators, Radio transmission and reception, Photoelectric devices, Digital circuits

**Computer Science:** Historical development of computers- An evolution, Classification of Computers on different norms such as generations, technology, etc. Different functional parts of a computer and their functions. Computer peripherals: Monitor, Printer, Key Board, Floppy diskdrive, Floppy, Hard disk, Mouse. Computer arithmetic: Binary, Octal, Decimal & Hexadecimal number systems and mutual conversion: addition, 1's & 2's complementation in binary only. Units of memory measurement: Bits, Bytes, KB, MB, GB, and TB. Units of run-time measurement: sec, ms,  $\mu$ s, ns, ps, fs, as.

**Different computer environments:** Batch processing, Time-sharing, Interactive & network, their functional details and differences. Computer connectively: LAN, MAN, WAN, Internet. Internet activity in India and various facilities available on Internet, Satellite based Communication. Microsoft Office. (MS Word, Excel, Power point)

**C Language:** Computer languages, their classification and compilation. C- Character set. Data Types. Constants and variables. Operators: Arithmetic, Increment & Decrement, Modulo division, Relational, Logical, conditional and Comma. Expressions and Assignment statements. Control statements: if, nested if, switch, while loop, for loop, do while loop. Arrays: single and two-dimensional only. Functions: User defined, standard library functions of various types. Pointers: &, \* operators. Pointer expression: pointer assignment, pointer arithmetic, pointer comparison, and structure. File handling in C: Opening a file, write into a file, reading from a file, Closing a file.

**Course Code:** BMST 1203

**Course Name:** Mathematics for Navigators

**Credit:** 3

**Contact Hour:** 42

**Learning Objectives:** To understand the mathematical calculation used in entire degree programme.

## **Syllabus Contents:**

**Spherical triangles:** Defines a spherical triangle as a figure on the surface of a sphere bounded by arcs of three great circles, explains right-angled spherical triangles and their properties, explains Napier's rule for right-angled spherical triangles and quadrantile spherical triangles, solve problem, explains polar triangles and their application in the solution of spherical triangles, given two parts of a right-angled spherical triangle, Use Napier's rules to solve for any other part, states what is meant by a quadrantile triangle, given two parts of a quadrantile triangle, uses Napier's rules to solve for any other part, solves problems involving oblique spherical triangles by use of the cosine and sine formulae, uses the haversine formula to solve right-angled spherical triangle and explains its advantage, over the sine and cosine formulae, solves problems on spherical triangles by dropping a perpendicular and solving the resulting right-angled triangles

**Differential Calculus:** Differential Co-efficient, Successive differentiation, partial differentiation, Curve Tracing, Maxima and Minima, Tangent and Normal.

**Integral Calculus:** Indefinite Integrals, Definite Integrals.

**Differential Equations:** Ordinary differential equations of first order and first degree: Variables separable, Homogenous equations, Equation reducible to homogeneous form, exact differential equations, the linear equations, Linear differential equations with constant co-efficient, and Inverse Operator.

**Co-ordinate Geometry:** Pair of Straight Lines; General equations of second degree; the tangents and normal on the curves. Co-ordinates of three dimensions; Direction cosines and ratios, plane.

**Course Code:** BMST 1205

**Course Name:** English and Communication Skills

**Credit:** 3

**Contact Hour:** 42

**Learning outcomes:** Enable the students to communicate verbally and in writing with the multi-national crew on board. Enable to report writing for on board and ashore management. Enable the students to understand the publications available on board also to understand the manufacturer's manual.

## **Syllabus Content:**

Grammar - Structure of sentences - Active / Passive Voice - Direct / Indirect Narration, Essay - Descriptive - Comparative - Argumentative - Thesis statement- Structure of opening / concluding paragraphs - Body of the essay, Reading Comprehension - Global- Contextual- Inferential- Select passages from recommended text, Business Correspondence - Letter Writing - Formal. Drafting. Bio-data- Resume/Curriculum Vitae, Report Writing - Structure, Types of report - Practice Writing, Communication / Public Speaking skills, Features of effective speech, verbal-nonverbal, Group discussion - principle – practice, the places and manners of articulation of the English sounds, Vocabulary, Comprehension, Composition on current affairs, Précis writing, Short stories

written by some well known classic writers.

**Skills of oral communication:** Speech training: Elocution, debating & extempore speech, Group discussions & interviews, Delivery of welcome address, Sea Speak.

**Course Code:** BMST 1207

**Course Name:** Leadership, Teamwork and Principles of Management

**Credit:** 3

**Contact Hour:** 42

**Learning Objectives:** On completion of this course the participants should be able to demonstrate sufficient understanding and knowledge of leadership and management skills to competently carry out the duties of officer in charge of a navigational or engineering watch

**Syllabus Contents:**

1. Introduction to Management Principles & Practice: Need for sound Management principles and Practice & growth of modern management through, various Managerial Functions, Planning, Organizing, staffing, Directing, controlling & Co-ordination; Principles of locating a Plant & Developing Organization Structure. Various types of organizational structures; Authority & Responsibility. Boundaries of Authority.
2. Working knowledge of shipboard personnel management and training: Organization of crew, authority structure, responsibilities, cultural awareness, inherent traits, attitudes, behaviour, cross-cultural communication; shipboard situation, informal social structures on board; human error, situation awareness, automation awareness, complacency, boredom; leadership and team working; training, structured shipboard training programs; knowledge of personal abilities and behavioural characteristics.
3. Ability to apply task and workload management: Planning and coordination; personnel assignment; human limitations; personal abilities; time and resource constraints; prioritization; workloads, rest and fatigue; management (leadership) styles; challenges and responses.
4. Knowledge and ability to apply effective resource management
5. Effective communication on board and ashore; allocation, assignment and prioritization of resources; decision making reflecting team experience; assertiveness and leadership, including motivation; obtaining and maintaining situational awareness; appraisal of work performance; short and long term strategies.
6. Knowledge and ability to apply decision-making techniques: situation and risk assessment; identify and consider generated options; selecting course of action; evaluation of outcome effectiveness; decision making and problem solving techniques; authority and assertiveness; judgement; emergencies and crowd management.
7. Personnel Management: The personnel function Requirement & role of psychological tests in recruitments; Training, performance appraisal and reward system, Legal requirements and regulation of working Condition, Employer's liabilities for health and safety, Leadership and Discipline, Motivation and incentives, Problems of Accident, Fatigue, etc., Relationship with Trade union and workers participation in management.

**Course code:** BMST 1209

**Course Name:** Shipboard Operation and Cargo Work Paper I

**Credit:** 3

**Contact Hour:** 42

**Learning Objectives:** The objective of this course understanding advance operation of all type cargo securing, oil, liquid, bulk, container and general cargo.

**Syllabus Contents:**

Common Nautical Terms: The Names and Functions of Various Parts of the Ship, Knowledge of the Compass Cards and Helm Orders, Ropes and wires, Care, maintenance, construction, size, use of various types of wires and ropes, means of Access on Board, accommodation ladder, pilot ladder, Jacobs ladder, Gangway ladder,

Cargo care: Inspection and preparation of holds, clean holds dunnage, spar ceiling, bilges or drain wells, bilge suctions, sounding pipes, Segregation and separation of cargoes, explains the need for the segregation of different cargoes with reference to, dangerous goods, dry cargo, wet cargo, clean cargo, Ventilation and control: Ship's sweat and cargo sweat, natural ventilation, forced ventilation, humidity control, cargoes requiring special ventilation, states that ventilation is also required for the removal of heat, gases and odours, Refrigerated cargo, Cargo handling equipment: Care and maintenance of: standing rigging, topping lifts, cargo runners, guys and preventers – cargo blocks and topping lift blocks, derrick heel fittings, Describes the rigging of derricks for loading and discharging cargo, Discuss gun tackles, derricks lowering and heaving, boom, securing derricks, Use of slings, snotters, canvas slings, trays, pallets, nets, chain slings, cant hooks, bale hooks and vehicle slings, advantages and disadvantages of ship's cranes and derricks for handling cargo – types of derricks, Cargo handling safety: cargo gear should be visually inspected, test certifications and registration Safe Working Load (SWL)

**Course Code:** BMST 1211

**Course Name:** Maritime Conventions

**Credit:** 3

**Contact Hour:** 42

**Learning Objectives:** The student will be able to understand:

1. The basic principles of maritime law within the wider context of law and legal systems
2. The basics of public international law, including law of the sea and the law of treaties
3. Various IMO conventions
4. Bangladesh local law on maritime administration

**Syllabus Contents:**

1. Introduction to Maritime Law: Law and legal systems; Principles of public international law, International Maritime Organization; Maritime administration.

2. Law of the Sea: Conventions on the Law of the Sea, Territorial Sea and the Contiguous Zone, International Straits, Exclusive Economic Zone and Continental Shelf, High Seas, Protection and Preservation of the Marine Environment
3. IMO structure and functions of various organs, Mission and objectives of IMO
4. List of IMO Conventions, preparation of IMO convention
5. Historical background, structure, contents, amendments of SOLAS,
6. Historical background, structure, contents, amendments of STCW,
7. Historical background, structure, contents, amendments of Load Line
8. Historical background, structure, contents, amendments of STP and FAL convention
9. Maritime labour convention and National law on seafarer issue.

**Course Code:** BMST 1213

**Course Name:** Principles of Navigation-II

**Credit:** 3

**Contact Hour:** 42

**Learning Objectives:** This subject gives learners the underpinning and theoretical knowledge for ocean navigation using terrestrial and celestial methods, and also the theory and properties of the free gyro.

### **Syllabus Contents:**

#### **CELESTIAL SPHERE:**

Celestial sphere and equinoctial system of coordinates: celestial sphere, explains the apparent annual motion of the sun and the concept of the ecliptic, ‘celestial poles’, ‘celestial meridians’, ‘equinoctial’ and the ‘obliquity of the ecliptic’, Hour angle: earth’s axial rotation causing change in the hour angle of bodies, ‘Greenwich Hour Angle (GHA)’, ‘Local Hour Angle (LHA)’ and longitude, and explains their relationship, identifies the tabulation of sHA, GHA, and declination (and ‘d’ and ‘v’ corrections) in the Nautical Almanac for all celestial bodies, geographical position of a body for any given GMT, Daily motion and horizontal system of coordinates: ‘Rational horizon’, ‘zenith’ and ‘nadir’, ‘vertical circle’ and ‘prime vertical circle’ ‘elevated pole’ and ‘depressed pole’ ‘true altitude’, ‘azimuth’ and ‘true zenith distance’ recognizes rising and setting points and defines amplitude, circumpolar body, crossing the prime vertical, PZX triangle, illustrate navigational problems and principles, Sextant and altitude corrections: Amplitude, Time and equation of time, Nautical Almanac, Latitude by meridian altitude.

#### **Solar system**

Describes the composition and dimensions of the solar system, the earth’s elliptical orbit, perihelion and aphelion distances, eccentricity of the earth’s orbit, inclination of the earth’s axis and its effect on the seasons, solstices and equinoxes, explains the concept of the earth’s axial rotation giving day and night, explains the varying length of daylight through the year, describes the significance of the tropics of Cancer and Capricorn and of the, Arctic and Antarctic Circles.

#### **Charts**

Demonstrates basic knowledge of chart projections, ‘natural scale’ of a chart, Identifies the Mercator chart as a mathematical projection and understands the principles of its construction, demonstrates how to measure the distance between two positions on a Mercator chart based on the latitude of the two positions

#### **Sailings**

Great Circle Sailing, calculation of simple and composite great circle sailings.

**Course Code:** BMST 1202

**Course Name:** Electronics and Computer Sceince Sessional

**Credit:** 1.5

**Contact Hour:** 42

**Syllabus Contents:**

1. CE Amplifier – voltage gain, frequency response, plotting A.C. & D.C. load lines
2. Emitter Follower – voltage gain & output resistance.
3. Op-Amp – inverting & non-inverting amplifier, voltage follower, summer & difference amplifiers
4. Op-Amp – square wave generator, slew rate.
5. 555 timer – a stable & monostable multivibrators
6. Wien Bridge Oscillator – transistor & op-amp versions
7. Study of Basic logic gates – NOT, AND, OR, NAND, NOR
8. DeMorgan's Laws & use of NAND & NOR as basic building blocks.
9. J-K Flip Flop – turth table, Ripple & Decade counters.
10. Microprocessors: a) Learning (get to know) the Hardware of a microprocessor b) Operating procedure, precautions & use of key- board of a microprocessor c) Use of commands & keys of a microprocessor to solve simple problems d) Writing & running simple programs e) Simple Input & Output programs
11. Finding n!
12. Finding GCD of two numbers
13. Solution of a quadric equation
14. Simple and Compound interest
15. Mean and standard deviation
16. Sorting of numbers
17. Finding real distinct roots of an algebraic equation: Newton – Raphson method
18. Creating a database of students using file operations
19. Problems based on nautical sciences

**Course Code:** BMST 1204

**Course Name:** Shipboard Instruments Sessional

**Credit:** 1.5

**Contact Hour:** 42

**Syllabus Contents:**

Shipborne meteorological instruments: describes the basic principle of an aneroid barometer, reads the atmospheric pressure from an ordinary aneroid barometer and precision aneroid barometer if available, reads the temperature from a thermometer, describes the function of a

hygrometer, describes the basic principles of wind sensors and demonstrates ordinary readings of wind speed, Gyro Compass, Magnetic Compass, Bridge Equipment's, Safety Equipment, Fire detection equipment

## **2nd Year 1st term (3rd Semester)**

**Course Code:** BMST 2101

**Course Name:** Environmental Science and Prevention of Marine Pollution

**Credit:** 3

**Contact Hour:** 42

**Learning Outcomes:** The students will enable to understand the pollution prevention regulation by ships at sea. Also the students will learn the civil and criminal liability of environmental pollution including the impact of sea environment by marine pollution

### **Syllabus Contents:**

Environmental Pollution; Basic causes; Common pollutants, International convention on prevention of pollution by Marine Environment 1973/78 (MARPOL); Pollution by oil, chemicals, hazardous substances, garbage and sewage. Pollution by microorganisms in ballast water; measures for prevention, atmospheric pollution by marine transportation, amendments against marine pollution, liability against marine pollution, anti-fouling Convention, Ballast Water Management Convention, convention of the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Dumping Convention), International Convention relating to intervention on the high seas in cases of oil pollution casualties, 1969, Description of the living species and plants under sea, Short and long term effect of marine lives due to pollution. Clearing process and materials used to recover the pollution damage. Shore reception facility. Emergency oil pollution preparedness and response.

**Course Code:** BMST 2103

**Course Name:** Marine Engineering and Control System

**Credit:** 3

**Contact Hours:** 42

**Learning Outcomes:** The course will enable the student to understand the principles and operation of diesel engine and various machineries of the engine room and on deck including the electrical installation on board the ship.

### **Syllabus Content:**

SOLAS Chapter II/1 Machinery and Electrical Installation, Diesel Engines, Steam Turbine Systems, Propeller and Propeller Shaft, Bridge Control, Boilers, Distillation and Fresh-water systems, Pumps and Pumping Systems, Steering Gear, Generators, Alternators and Electrical Distribution, Refrigeration, Air-conditioning and ventilation, Oily-water Separators and Oil Filtering Equipment, Sewage Treatment Plants, Incinerators, Stabilizers, Deck Machinery, Hydraulic Systems, Oil, Marine Engineering Terms and Fuel Consumption.

**Course Code:** BMST 2105

**Course Name:** Celestial and Ocean Navigation- I

**Credit:** 3

**Contact Hour:** 42

**Learning Outcomes:** The course will enable the student to understand the celestial sphere and finding ship's position by celestial object.

**Syllabus Content:**

Position fixing- combines the equinoctial and horizon system of coordinates to determine the centre and radius of a position circle and its direction in the vicinity of a selected position, applies the principles of a method of enabling the navigator to draw a small, part of the position circle in his vicinity to a practical problem, explains the assumptions made when plotting celestial position lines and the circumstances in which they may become significant, determines the direction of a position line through an observer and a position through which it passes, defines and evaluates the co-latitude, polar distance and zenith distance and uses them as the sides of the PZX triangle, solves the PZX triangle to find the calculated zenith distance of the body when it is out of the meridian, applies this calculated zenith distance to the true zenith distance of the body to find the intercept and the intercept terminal point. Celestial sphere and equinoctial system of coordinates: celestial sphere, explains the apparent annual motion of the sun and the concept of the ecliptic, 'celestial poles', 'celestial meridians', 'equinoctial' and the 'obliquity of the ecliptic', Hour angle: earth's axial rotation causing change in the hour angle of bodies, 'Greenwich Hour Angle (GHA)', 'Local Hour Angle (LHA)' and longitude, and explains their relationship, identifies the tabulation of sHA, GHA, and declination (and 'd' and 'v' corrections) in the Nautical Almanac for all celestial bodies, geographical position of a body for any given GMT, Daily motion and horizontal system of coordinates: 'Rational horizon', 'zenith' and 'nadir', 'vertical circle' and 'prime vertical circle', 'elevated pole' and 'depressed pole', 'true altitude', 'azimuth' and 'true zenith distance' recognizes rising and setting points and defines amplitude, circumpolar body, crossing the prime vertical, PZX triangle, illustrate navigational problems and principles, Sextant and altitude corrections: Amplitude, Time and equation of time, Nautical Almanac, Latitude by meridian altitude.

**Course Code:** BMST 2107

**Course Name:** Ship Construction and Stability-II

**Credit:** 3

**Contact Hour:** 42

**Learning Outcomes:** The student will be able to describe/identify/explain/discuss/analyze:

- Ship building technology including mechanical and electrical works carried out in shipyard.

**Syllabus Content:**

## **1. Ship construction:**

Bow and stern regions: Describes the provisions of additional structural strength to withstand pounding, describes and illustrates the structural arrangements forward to withstand panting, describes the function of the stern frame, describes and sketches a stern frame for a single-screw ship, describes and illustrates the construction of a transom stern, showing the connections to the stern frame, Fittings: describes and sketches an arrangement of modern weather-deck mechanical steel hatches, describes how water tightness is achieved at the coamings and cross joints, describes the cleating arrangements for the hatch covers, describes the arrangement of portable beams, wooden hatch covers and tarpaulins, sketches an oil tight hatch cover, describes roller, multi-angle, pedestal and Panama fairleads, Rudder and propellers: describes the action of the rudder in steering a ship, reproduces drawings of modern rudders: semi balanced, balanced and spade, explains the purpose of the rudder carrier and pintles, explains how the weight of the rudder is supported by the rudder carrier, describes the rudder trunk, describes the arrangement of a watertight gland round the rudder stock, explains the principle of screw propulsion compares fixed-pitch with controllable-pitch propellers, sketches the arrangement of an oil-lubricated stern tube and tail shaft, describes how the propeller is attached to the tail shaft, sketches a cross-section of a shaft tunnel for water cooled and oil cooled type, explains why the shaft tunnel must be of watertight construction and how water is prevented from entering the engine-room if the tunnel becomes flooded

## **2. Stability:**

Draught, trim and stability: defines 'deadweight' and 'displacement tonnages, sketches a ship's load line indicating marks for various seasonal zones, areas and periods, uses a ship's hydrostatic particulars and given mean draughts to determine the approximate weight loaded or discharged, uses a deadweight scale to determine the change in mean draught resulting from loading or discharging a given tonnage, given the present draughts and the density of dock water, calculates the draughts in seawater, given the draught amidships and dock-water density, calculates the amount to load to bring the ship to the appropriate load line in seawater, uses hydrostatic data to find the position of the centre of flotation, MCT and TPC for a given draught, calculates the change of trim resulting from loading or discharging a given weight at a specified position, List and its correction, Effect of slack tanks.

**Course Code:** BMST 2109

**Course Name:** Electronic Navigation System

**Credit:** 3

**Contact Hour:** 42

**Learning Outcomes:** The course will enable the student to understand the satellite and Hyperbolic navigational equipment including their principles, function, operation, and limitation. Also the course will enable the student to understand the electronic chart display and information system.

**Syllabus Content:**

Basic Principles of Hyperbolic Navigation Systems, Loran-C & Enhanced Loran ( e-Loran) ECDIS, Global Navigation Satellite Systems & GPS System, Differential GPS, GLONASS, GALILEO, Automatic Pilot, AIS, VDR and SVDR, Echo Sounder, Course Recorder, Gyro Compass, Magnetic Compass, Steering System.

**Course Code:** BMST 2111

**Course Name:** Chart Work- I

**Credit:** 3

**Contact Hour:** 42

**Learning outcomes:** Students will enable to understand the tide effect during navigation also to find out the course and speed made good and to steer counteracting the wind and current.

#### **Syllabus Contents:**

Tides: Explains the basic theory of tides, defines 'spring tide', 'neap tide', 'height of tide' 'high water' and 'low water'; 'mean high water springs' 'mean high water neaps', mean low water springs', 'mean low water neaps', 'range', 'chart datum', calculates the spring and ranges for standard and secondary ports, finds the predicted time and height of high and low water at standard and at secondary ports, Course and Distance made good with current: To find compass error by transit bearings, To find the position of a point on the chart by its latitude and longitude, To find the position of a point on the chart by its bearing and distance from a navigational mark, To plot ship's position given the compass bearings of two or more shore objects, The Cocked hat' and the reasons for its formation, To plot ship's position using three shore objects by horizontal sextant angles (given Horizontal sextant angle less than 90, equal to 90, or greater than 90), To plot a position line obtained by an astronomical observation, To find compass course between two positions on the chart, To find the course and distance made good, given course steered, set and drift of current and leeway, To find the course and speed made good and the set and drift, given the course steered, speed, duration and the initial and final observed positions, To find the course from a given position so as to pass a lighthouse at a given position so as to pass a lighthouse at a given distance when abeam, To plot ship's position, given the rising or dipping bearing of a light. Caution during abnormal refraction, To plot ship's position, given vertical sextant angles and bearing of light house, To plot a position lines obtained by Radio Aids to navigation, To find compass course to steer between two positions on the chart so as to counteract the given and drift of current and given leeway, IALA Maritime Buoyage system

**Course Code:** BMST 2113

**Course Name:** Collision Prevention Regulation- I

**Credit:** 3

**Contact Hour:** 42

**Learning Outcomes:** This course will enable the student to understand the light and shapes to be

shown by various types of vessel as per COLREG including the conduct of vessel in any condition of visibility.

### **Syllabus Content:**

Introduction, application and History of COLREG 71, Lights and shapes, states the application of the rules concerning lights and shapes, describes the sound signals to be used by vessels , describes the use of signals to attract attention, Distress Signals, lists the distress signals set out in Annex IV of COLREG 72, Application and Intent of COLREG 72, explains the application of the rules as set out in Rule 1, defines the term 'traffic separation scheme', states the responsibility to comply with the rules as set out in Rule 2, describes and cite examples of precautions which may be required by the ordinary practice of seamen or by the special circumstances of the case, gives examples of circumstances which may make a departure from the rules necessary, states the general definitions which apply throughout the rules, explains the term 'vessel constrained by her draught, distinguishes between 'under way' and 'making way', explains 'a proper look-out' and interpret the intent of 'full appraisal of the situation and the risk of collision, explains the use of radar in the context of Rule 5, explains what is meant by a safe speed, describes, with reference to court cases, how 'proper and effective action' and 'within a distance appropriate to the prevailing circumstances and conditions' may be interpreted, states the factors to be taken into account in determining a safe speed, explains how the use of radar affects the determination of safe speed, explains what is meant by risk of collision, describes the proper use of radar equipment in determining whether a risk of collision, explains the dangers of making assumptions on the basis of scanty information, citing examples from clear weather as well as the use of radar, illustrates, using examples from court cases, how failure to plot may lead to a lack of appreciation of a developing situation, illustrates, using examples from court decisions, the following actions to avoid collision referred to in Rule.

**Course Code:** BMST 2102

**Course Name:** Advance Seamanship Sessional

**Credit:** 1.5

**Contact Hour:** 42

**Learning outcomes:** The students will enable to understand the advance level of seamanship on board specially slinging, rigging and the care and maintenance of hatch cover and water tight elements.

### **Syllabus Contents:**

Slinging staging and rigging, Painting, Greasing and Lubrication, Means of Access, Hatch Cover maintenance, Anchor operation, Mooring Operation, Blocks, Purchases, Derricks, Cranes and Hatch covers: states various types of blocks (wooden and steel), describes various parts of different blocks and derricks, hallen derrick, velle derrick, stuelcken derrick, different types of derricks and its connections, describes and demonstrates how to rig derricks, describes different types of cranes, describes and states use of various lashing materials describes care and

maintenance of hatchcover (i.e. greasing, oiling, painting and overhauling), corrosion Prevention, explains cathodic protection, explains bimetallic corrosion and design faults, describes plate preparation during building and repair periods, explains the terms - mill scale, flame cleaning, acid pickling, blast cleaning.

**Course Code:** BMST 2104

**Course Name:** Bridge Watch Keeping Sessional-I

**Credit:** 1.5

**Contact Hour:** 42

**Learning Outcomes:** The student will enable to understand the navigation including the operation and limitation of various bridge equipment while being used as navigational and collision avoidance aids.

**Syllabus Contents:**

Lights and shapes, states the application of the rules concerning lights and shapes, describes the sound signals to be used by vessels, describes the use of signals to attract attention, Distress Signals, lists the distress signals set out in Annex IV of COLREG 72, Watch Keeping Practice Radar Controls, Bridge Equipment Controls.

## **2nd Year 2nd term (4th Semester)**

**Course Code:** BMST 2201

**Course Name:** Meteorology and Ocean Science II

**Credit:** 3

**Contact Hour:** 42

**Learning Outcomes:** The students will understand the various wind and pressure system over the ocean including the structure of depression and anticyclone.

### **Syllabus Contents:**

Cloud and precipitation- Describe the probable base heights of the ten principal cloud types, defines 'precipitation,' defines 'rain', 'drizzle', 'hail', 'snow' and 'sleet', Visibility- states that visibility is reduced by the presence of particles in the atmosphere, near the earth's surface, defines 'fog', 'mist', 'haze', The wind and pressure systems over the oceans- describes a monsoon regime, lists the areas which experience a true monsoon regime, applies previous concepts to a qualitative explanation of the causes of monsoon regimes, Structure of depressions- defines 'air mass', explains the formation of an air mass, defines 'source region,' explains the characteristics required of a source region, describes the source region characteristics of arctic, polar, tropical and equatorial air-mass types, defines 'depression', identifies a depression on a surface synoptic or prognostic chart.

**Course Code:** BMST 2203

**Course Name:** Cargo and Shipboard Operation- II

**Credit:** 3

**Contact Hour:** 42

**Learning Outcomes:** The students will enable to understand the bulk cargo including grain cargo loading, stowing, securing, carrying and discharging procedure in safe manner also the advance level of ship board operation specially care, maintenance and operation of various types of cargo gear

### **Syllabus Contents:**

Securing cargoes, Monitor the loading, stowing, securing, care during voyage, unloading of cargoes, Deck cargo, Container cargo, Bulk cargo, Bulk grain cargo, Dangerous, hazardous and harmful cargoes, Oil tanker piping and pumping arrangements, Precautions before entering enclosed or contaminated spaces, Cargo calculations and cargo plans, Cargo space inspection Hatch covers inspection, Ballast tanks inspection, Damage report, Enhanced survey program.

**Course Code:** BMST 2205

**Course Name:** Celestial and Ocean Navigation- II

**Credit:** 3

**Contact Hour:** 42

**Learning Outcomes:** The students will be enable to understand the celestial PZX triangle and using which the students will able to find out the ship's position in deep ocean.

**Syllabus Content:**

Great Circle Sailing- demonstrates understanding of great circle sailing including composite and limited latitude great circles, calculates initial course and distance of a great circle track, calculates composite great circles, demonstrates the use of gnomonic charts for plotting the great circle between, two points, transfers a great circle from a gnomonic chart to a Mercator chart, Pole Star observations- identifies certain major stellar constellations and navigational stars, describes, their movement relative to Polaris and the movement of Polaris with change of latitude. Position fixing- combines the equinoctial and horizon system of coordinates to determine the centre and radius of a position circle and its direction in the vicinity of a selected position, applies the principles of a method of enabling the navigator to draw a small, part of the position circle in his vicinity to a practical problem, explains the assumptions made when plotting celestial position lines and the circumstances in which they may become significant, determines the direction of a position line through an observer and a position through which it passes, defines and evaluates the co-latitude, polar distance and zenith distance and uses them as the sides of the PZX triangle, solves the PZX triangle to find the calculated zenith distance of the body when it is out of the meridian, applies this calculated zenith distance to the true zenith distance of the body to find the intercept and the intercept terminal point

**Course Code:** BMST 2207

**Course Name:** Ship Construction and Stability- III

**Credit:** 3

**Contact Hour:** 42

**Syllabus Contents:**

**1. Ship construction:**

Ship stresses- describes in qualitative terms shear force and bending moments – explains what is meant by 'hogging' and by 'sagging' and distinguishes between them – describes the loading conditions which give rise to hogging and sagging stresses – describes how hogging and sagging stresses are caused by the sea state – explains how hogging and sagging stresses result in tensile or compressive forces in the deck and bottom structure – describes water pressure loads on the ship's hull – describes liquid pressure loading on the tank structures – calculates the pressure at any depth below the liquid surface, given the density of the liquid – describes qualitatively the stresses set up by liquid sloshing in a partly filled tank – describes racking stress and its causes – explains what is meant by 'pounding 'or 'slamming' and states which part of the ship is

affected – explains what is meant by ‘panting’ and states which part of the ship is affected – describes stresses caused by localized loading.

## **2. Load lines and draught marks:**

Explains where the deck line is marked, defines ‘freeboard,’ explains what is meant by ‘assigned summer freeboard’, draws to scale the load line mark and the load lines for a ship of a given summer moulded draught, displacement and tonnes per centimetre immersion in salt water , explains how the chart of zones, areas and seasonal periods is used to find the applicable load line, demonstrates how to read draughts, explains that the freeboard, measured from the upper edge of the deck line to the water on each side, is used to check that the ship is within its permitted limits of loading, lists the items in the conditions of assignment of freeboard, describes why the height of sill area varies between different type of vessels based on Load Line Rules

## **3. Stability:**

Trim and draught calculations using trim tables, actions to be taken in the event of partial loss of intact buoyancy, Stress tables and stress calculating equipment (loadicator)

**Course Code:** BMST 2209

**Course Name:** Radar Navigation and Advance Navigation Technology

**Credit:** 3

**Contact Hour:** 42

**Learning Outcomes:** The student will enable to understand the operations, principles, limitations of RADAR including the safe use of RADAR as navigational and collision avoidance aids.

### **Syllabus Content:**

Basic Theory and operation of a Marine Radar System, Set Up and Operate radar, Radar As a Navigational Aids, Radar as a Collision avoidance aids, Radar Plotting, ARPA, Performance monitoring of RADAR & ARPA, Basic Theory and operation of a Marine Radar System, describes fundamental principles of radar, explains the principles of range and bearing measurement, states the function and sitting of components, explains the importance of not storing radar spares nearer to magnetic compasses than the specified safe distances, states the safety precautions necessary in the vicinity of open equipment and the radiation hazard near antennae and open waveguides, explains characteristics of radar sets and states factors affecting performance and accuracy with reference to detection of targets, states the relationship between maximum range and pulse recurrence frequency, states the relationship between detection range and transmitted energy (power and pulse length)

**Course Code:** BMST 2211

**Course Name:** Chart Work-II

**Credit:** 3

**Contact Hour:** 42

**Learning Outcomes:** The student will enable to understand the information from Charts, list of

lights and other admiralty publication to prepare a passage plan and execute the voyage including correction of all publication from notices to mariners.

### **Syllabus Contents:**

To find compass error by transit bearings, to find the position of a point on the chart by its latitude and longitude, to find the position of a point on the chart by its bearing and distance from a navigational mark, to plot ship's position given the compass bearings of two or more shore objects, the 'Cocked hat' and the reasons for its formation, to plot ship's position using three shore objects by horizontal sextant angles (given Horizontal sextant angle less than 90, equal to 90, or greater than 90), to plot a position line obtained by an astronomical observation, to find compass course between two positions on the chart, to find the course and distance made good, given course steered, set and drift of current and leeway, to find the course and speed made good and the set and drift, given the course steered, speed, duration and the initial and final observed positions, To find the course from a given position so as to pass a lighthouse at a given position so as to pass a lighthouse at a given distance when abeam, to plot ship's position, given the rising or dipping bearing of a light. Caution during abnormal refraction, to plot ship's position, given vertical sextant angles and bearing of light house, to plot a position lines obtained by Radio Aids to navigation, to find compass course to steer between two positions on the chart so as to counteract the given and drift of current and given leeway

**Course Code:** BMST 2213

**Course Name:** Collision Prevention Regulation- II

**Credit:** 3

**Contact Hour:** 42

**Learning Outcomes:** The student will be able to conduct the safe navigational watch in any condition of the visibility and at any sea condition or at any situation such as coastal, near coastal, river, straits, or deep sea.

### **Syllabus Content:**

Bridge Equipment Requirement as Per SOLAS, Watch keeping at Sea and Anchor, Collision liability case studies, Explains how to decide when a vessel is an overtaking vessel, compares and analyzes the various avoiding actions which may be taken by an overtaking vessel, explains the application of Rule 14, Head-on situation, explains why the give-way vessel in a crossing situation shall, if the circumstances admit, avoid crossing ahead of the other vessel, explains the application of Rule 15 when crossing narrow channels and traffic lanes, explains how Rule 16 and Rule 8 relate regarding the action by a give-way vessel, explains the position of stand-on vessel in cases where a risk of collision exists between more than two vessels, explains how to decide when to take avoiding action as stand-on vessel, describes the actions which may be taken by the stand-on vessel, states the avoiding action which must be taken by the stand-on vessel, explains that a potential collision situation may be divided into the following four stages- at long range, before risk of collision exists and both vessels; are free to take any action; risk of collision applies, the give-way vessel is required to take; action and the other vessel must keep her course and speed,

the give-way vessel is not taking appropriate action; collision cannot be avoided by the action of the give-way vessel alone, explains the responsibilities between vessels with reference to Rule 18 & 3, explains the application of Rule 19, compares Rule 6 and Rule 19 regarding the determination of safe speed, explains how courts have interpreted 'a close-quarters situation', explains how courts have interpreted 'navigate with extreme caution, demonstrates, using a manoeuvring board or radar simulator, how to determine risk of collision and the proper action to take to avoid collision in restricted visibility

**Course Code:** BMST 2202

**Course Name:** Shipboard Operation Sessional

**Credit:** 1.5

**Contact Hour:** 42

**Learning outcomes:** The students will enable to understand the advance level of seamanship on board specially slinging, rigging and the care and maintenance of hatch cover and water tight elements.

#### **Syllabus Contents:**

1. Lifesaving appliances operation, care and maintenance
2. Firefighting appliances operation, care and maintenance
3. All type of Ladder operation, care and maintenance
4. Mooring Winch and anchor operation, care and maintenance
5. Hatch Cover operation, care and maintenance
6. All water tight door, ventilator operation, care and maintenance

**Course Code:** BMST 2204

**Course Name:** Bridge Watch keeping Sessional-II

**Credit:** 1.5

**Contact Hour:** 42

**Learning Outcomes:** The student will enable to understand the bridge navigation including the operation and limitation of RADAR while being used as navigational and collision avoidance aids.

#### **Syllabus Contents:**

Operates main controls (power, antenna), operates transmitter controls (standby/transit, pulse length, PRF), adjust receiver controls to give an optimal picture (tuning, gain, linear/logarithmic gain, sensitivity time control, fast time control), adjust display controls (brilliance, illumination, focus, shift, range selector, range rings, VRM, EBM, mechanical cursor, heading marker, clear scan, anti-clutter), demonstrates correct order of making adjustments and states the criteria for optimum setting of the controls, states that small or poor echoes may escape detection, describes the effects of saturation by receiver noise, states the importance of frequent changes in range scale, identifies different types of display mode (true motion, relative motion-unstabilized, relative

motion-stabilized, north up, course up, ship's head up, explains the advantages and limitations of the different types of display mode, explains the need for compass input for relative stabilized display , and compass and log input for true motion display, identifies effects of transmitting compass error on stabilized and true motion display, identifies effects of transmitting log error on true motion display, manual display, manual, speed input error, operations special controls (presentation, speed, re-set, course made good correction, compass repeater), identifies maladjusted controls and explains their effects and dangers, detects and corrects maladjustments

### **3<sup>rd</sup> Year (5<sup>th</sup> and 6<sup>th</sup> Semester)**

Course No	Course Title	Cr
<b>BMST 3102</b>	<b>On board Training</b> An approved seagoing service of not less than 12 months as part of an approved training program, which includes onboard training that meets the requirements of section A-II/1 of the STCW Code and is documented in an approved training record book. The training will be conducted under the supervision of professional instructor and finally assessed by assignment and presentation	12
<b>BMST 3104</b>	<b>Alternative</b> Students may perform 12 months apprenticeship in a ship management, owners, or agency company, port authority, Ship yard, dry-dock, marine workshop or any other similar organization approved by the Bangabandhu Sheikh Mujibur Rahman Maritime University. The training will be conducted under the supervision of professional instructor and finally assessed by assignment and presentation	12
	Total	<b>12</b>

## **4<sup>th</sup> Year 1<sup>st</sup> Term (7<sup>th</sup> Semester)**

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**Course Code:** BMST 4101

**Course Name:** Research Methodology & Professional Ethics

**Credit:** 3

**Contact Hour:** 42

**Learning Outcomes:** On completion of the course, the student must be able to collect, analyse and present his/her own data using grounded theory or qualitative content analysis

### **Syllabus Content:**

**Research Methodology:** Introduction to the Process of Conducting Research, introduction to Qualitative Research, interpreting Qualitative Data, introduction to Quantitative Research, Sampling Concepts, quantitative, introduction to Applied Statistics, descriptive Statistics, inferential Statistics, introduction to Mixed Methods Research, data Mining –Finding the Patterns and Problems in the World of Data, writing About Quantitative Findings, writing About Qualitative or Mixed Methods Findings, critically critiquing Research Reports, applying Research in the Security Environment.

**Professional Ethics:** Human Values, Engineering Ethics ,Engineering as Social Experimentation Safety, Responsibilities and Rights, Global Issues, Moral Leadership.

**Course Code:** BMST 4103

**Course Name:** Advance Navigation

**Credit:** 3

**Contact Hour:** 42

**Learning Outcomes:** This subject gives learners the practical knowledge on navigation using IALA buoyage system and other nautical publications.

### **Syllabus Contents:**

solar system, Celestial sphere and equinoctial system of coordinates , Hour angle, Daily motion, and horizontal system of coordinates ,sextant and altitude corrections ,Amplitude, Time and equation of time, Nautical Almanac, Information from charts, lists of lights and other publications IALA Buoyage system, Tides, Keeping a log, respond to emergencies precautions for protection and safety of passengers, Contingency plans for response to emergencies, Precautions for protection and safety of passengers in emergency situations, initial action following collision or grounding, Precautions when beaching a vessel, Actions following stranding/grounding, Actions following a collision, Initial damage assessment and control, Means of limiting damage and salvaging ship following fire or explosion, Procedures for abandoning ship, Use of auxiliary steering gear and rigging jury steering arrangements, Arrangements for towing and being towed, rescuing persons from the sea, assisting a ship in distress and port emergencies, Rescue of persons from a vessel in distress, Actions for emergencies in port, Measures for assisting a vessel in distress.

**Course Code:** BMST 4105

**Course Name:** Cargo Operation & Stability

**Credit:** 3

**Contact Hour:** 42

**Syllabus Content:**

Timber Deck Cargoes, RoRo Ship cargo operation , Oil Tanker cargo operation, Chemical Tanker Cargo Operation, Heavy weight cargo, Cargo and port watch, Corrosion and Its prevention, Cargo Gear maintenance, Planned maintenance schedule, Hatch Cover inspection, Ballast tank inspection, Damage report, Enhanced Survey Program.

**Course Code:** BMST 4107

**Course Name:** Ocean & Offshore Navigation

**Credit:** 3

**Contact Hour:** 42

**Learning Outcomes:** This subject is provides the learner with the practical knowledge positng fixing, Great Circle Sailings , use of Nautical Almanac, Sextant and Altitude Corrections, Amplitude, Pole star Observations, Latitude by Meridian Altitude, Errors of the Compass and Azimuths.

**Syllabus Contents:**

**1. Latitude by Meridian Altitude-** applies the true zenith distance of a body when it is on the observer's meridian to the declination of the body, to obtain the observer's latitude, applies these correctly when the declination and latitude have the same names, applies these correctly when the declination and latitude have different names, find the value of polar distance of the body , using its declination, applies the polar distance to the true altitude of a body at a lower transit to find the altitude of the elevated pole and the latitude, calculates the direction of the position line and the latitude of the observer by meridian altitude

**2. Errors of the Compass and Azimuths-** obtain the error of the magnetic compass or gyro-compass by comparing the compass bearing of the body with the true azimuth of the body obtained at the time of observation, obtain the azimuth of the body from tables, using GMT of observation, information from the Nautical Almanac , LHA of the body and the observer's DR position, obtains from tables or by calculation, using the observer's DR position and information from the Nautical Almanac, the true bearing of a heavenly body on rising or setting, i.e. solves an amplitude problem.

**3. Positon fixing by celestial body-** defines and evaluate the co-latitude, polar distance and zenith distance and use them as the sides of the PZX triangle, solves the PZX triangle to find the calculated zenith distance of the body when it is out of the meridian, applies this calculated zenith distance to the true zenith distance of the body to find the intercept and the intercept terminal point through which to draw the position line (Marcq. St.Helaires method), determines the true

azimuth of the body from tables and hence determine the direction of the position line, find the position of the observer at the time of the final observation, given two or more position lines with the courses and distances run between the observations.

**Course Code:** BMST 4109

**Course Name:** Coastal Navigation

**Credit:** 3

**Contact Hour:** 42

**Learning Outcomes:** The Cadets will be able to understand the various information which are available from chart and also to find the correct chart for passage plan and execution. The course will also help to draw the correct position and course line for different situations.

### **Syllabus Contents:**

**Chart work exercises:** Define ‘course’ and ‘distance,’ lays off true course between two positions and marks with appropriate symbol, finds the distance between two positions, calculates the speed between two positions, defines ‘set’, ‘rate’, ‘drift’ and ‘leeway’ due to wind, describes ‘ship’s speed’, ‘effective speed’, ‘course and distance made good’, ‘applied leeway’, finds the course and distance made good with a tidal stream or current, finds the course to steer, allowing for tidal stream or current, finds the set and rate of tidal stream or current from charts or tables, explains the term ‘running fix’ and uses the method to plot a position, finds positions by running fix in a tidal stream or current, calculates the actual set and rate of tidal stream or current from DR and fixed, positions

### **Information from publications for passage planning:**

Recognizes and demonstrates the use of the symbols and abbreviations on a chart, especially lighthouses, buoys, beacons, radio beacons and other navigational marks, identifies the characteristics and range of lights, calculates the distances of sighting lights and dipping distances, identifies the symbols for chart depths and nature of the bottom and explains the use of soundings, recognizes coastlines, coast and radar-responsive targets, interprets coastline contours, bottom topography, depths and nature of bottom, uses the tidal information given on a chart, recognizes traffic lanes and separation zones, explains the danger of placing implicit reliance upon floating navigational aids, explains the danger of approaching navigational aids too closely

**Course Code:** BMST 4111

**Course Name:** Meteorology for Navigators

**Credit:** 3

**Contact Hour:** 42

**Learning Outcomes:** This course will enable the students to understand the principle, operation and limitation of various navigational instruments on board at bridge. Also enable the students to use the instrument as navigational aids.

### **Syllabus Contents:**

Shipborne meteorological instruments, the atmosphere, its composition and physical properties Atmospheric pressure, Wind, Cloud and precipitation, Visibility, The wind and pressure systems over the ocean, 8 structure of depressions, Anticyclones and other pressure systems, Weather services for shipping, Recording and reporting weather, Weather forecasting

**Course Code:** BMST 4113

**Course Name:** Advance Ship Knowledge

**Credit:** 3

**Contact Hour:** 42

**Learning outcomes:** The objective of this course is to understand the advance operations of all type of cargo Ships. This course will provide fundamental different aspects all type of cargo operations. Students attending this course can build up cargo and shipboard operational skills, which they can utilize in their academic as well as professional life.

### **Syllabus Contents:**

Ship stresses, hull structure, bow and stern regions, fittings, rudders and propellers, load lines and draught marks, dry-docking, damage survey, P&I club, prevent, control and fight fires on board, operate life-saving appliances, apply medical first aid on board ship, ship's security.

**Course Code:** BMST 4102

**Course Name:** Bridge Team and Bridge resource Management Sessional

**Credit:** 1.5

**Contact Hour:** 42

### **Syllabus Contents:**

Care and Use of all radio communication equipment VHF, MF, HF, Navtex, Sat-C, Sat-B, SART, EPIRB, GMDSS Walkie Talkie, Sea Area, Requirement of Equipment, Radio Communication, Type of Communication Distress, Urgent, Safety, Routine, Radio Log, Radio Watch.

A. Detailed knowledge of the maritime mobile service and the maritime mobile-satellite service

A1. The principles and features of the maritime mobile service

A2. The principles and features of the maritime mobile-satellite service

B. Detailed theoretical knowledge and ability to use the basic equipment of ship station

B1. Principles of electricity and theory of radio and electronics relevant to GMDSS communications and ancillary equipment

B2. Use in practice the basic equipment of a ship station

B3. Digital selective calling (dsc)

B4. General principles of narrow band direct printing (nbdp) and telex over radio (tor) systems.

Use maritime nbdp and tor equipment in practice

B5. Usage of Inmarsat systems. Use Inmarsat equipment or simulator in practice

**Course Code:** BMST 4104

**Course Name:** Efficient Deck Hand Sessional

**Credit:** 1.5

**Contact Hour:** 42

**Syllabus Contents:**

Rescue of persons from a vessel in distress, actions for emergencies in port ,Measures for assisting a vessel in distress, LSA items demonstration, FFA items demonstration, ship handling practice information from charts, lists of lights and other publications , IALA buoyage system, tides, keeping a log, respond to emergencies, Precautions for protection and safety of passengers, Contingency plans for response to emergencies, precautions for protection and safety of passengers in emergency situations, initial action following collision or grounding: precautions when beaching a vessel, actions following stranding/grounding, actions following a collision, initial damage assessment and control, means of limiting damage and salvaging ship following fire or explosion, procedures for abandoning ship, use of auxiliary steering gear and rigging jury steering arrangements, arrangements for towing and being towed, Rescuing persons from the sea, assisting a ship in distress and port emergencies.

**Course Code:** BMST 4000

**Course name:** Thesis on Maritime Topics

**Credit:** 8

**Contact Hour:** 84

**Learning outcomes:** The goal is to provide students with hands-on research experience through completing a research project, starting with hypothesis development (if applicable), literature searching, experimental design, data collection, analysis, and interpretation. Students will also gain experience in written and oral scientific communication by submitting several written components including a research proposal, a progress report, and final thesis for evaluation as well as presenting the results of their research in a public oral presentation.

**Syllabus Content:**

Students will engage in independent research, to produce an original thesis on maritime topics. This may take the form of a paper or report with supporting documentation, images and notes. Research may consist of archival investigation and/or fieldwork, including personal interviews, site reports, and condition assessments. The process of writing and submitting a thesis will provide students with understanding and competence in research and writing about conservation and preservation issues, which will be of use in the professional field. Students will be assigned a thesis advisor, with whom they will meet regularly. The thesis should be 40-50 pages of text, with supporting documentation, images and notes. Research may consist of archival investigation and/or fieldwork, including personal interviews, site reports, and condition assessments. Students must consistently use a citation format of their choice. A small panel of 2 or 3 markers, which will

include the student's advisor, will decide the thesis grade. Students will meet with this panel for a Final Discussion. This will be a 30-minute conversation about the thesis where students will be given feedback and a chance to discuss future plans. The discussion will not impact the student's grade. There should be schedule and deadline including progress report and progress meeting to submit the thesis paper advising by the panel and research supervisor.

## **4<sup>th</sup> Year 2<sup>nd</sup> Term (8<sup>th</sup> Semester)**

**Course Code:** BMST 4201

**Course Name:** Maritime Law, Insurance and Risk Management

**Credit:** 3

**Contact Hour:** 42

**Learning outcomes:** The course will enable the student to understand the basic principles of contract, tort and property alongside the fundamentals of the shipping and commodity markets. It also cuts across the boundaries of public and private law.

### **Syllabus Contents:**

Introduction to shipping law, law of contracts, law of torts/delict, law of property, international trade law, international sale of goods, sale of goods legislation, (comparative law) international commercial terms, (incoterms) the united nations convention on contracts for the international sale of goods, 1980, nationality, registration and ownership of ships, proprietary interests in ships, Enforcement of maritime claims, carriage of goods by sea, law of marine insurance, partial losses, measure of indemnity, standard insurance clauses, hull and machinery insurance, cargo insurance, liability insurance, (P&I insurance)

**Course Code:** BMST 4203

**Course Name:** Shipboard, Shipping and Port Management

**Credit:** 3

**Contact Hour:** 42

### **Syllabus Contents:**

Introduction to the Shipping Industry: Shipping markets- Dry bulk, wet bulk, container, RoRo etc. Liner and tramp traders, Charters

Business Management Skills for the Ship Manager: Customer services- Strategic analysis, IT use and strategy, Project Management

3) Employ and Management of Marine Personnel for Vessel Activities: Key performance indicators, A 'just culture' versus a 'blame culture'

4) Vessels Support Services: Buy/Sell/Equip/Maintain/Supply

5) ISO Maritime Standards: Quality Management Systems, Environmental Management Systems Occupational Health and Safety Management Systems, (OHSMS) Information technology,

Security techniques, Information Security Management Systems, Energy Management Systems  
Social Accountability.

**Course Code:** BMST 4205

**Course Name:** Basic Computer Programming

**Credit:** 3

**Contact Hour:** 42

### **Syllabus Contents:**

Basic programming skills, How to write C++ programs to solve real world computational problems, How to use object-oriented programming to design modern software systems that adapt to highly rapid change, How best to use different data structures to represent, organize, and manipulate data, To inculcate design thinking for building system that scale, The importance of efficient algorithms in terms of time and space complexity

**Course Code:** BMST 4207

**Course Name:** Bangla Language

**Credit:** 3

**Contact Hour:** 42

**Learning Outcomes:** কার্সটি সফলভাবে সম্পন্ন করার মধ্যম শিক্ষার্থীরা বাংলাদশের সামাজিক, ঐতিহাসিক ও সাংস্কৃতিক অনুষঙ্গের সঙ্গে বাংলা সাহিত্যের সংযোগ স্থাপন করতে পারব।

### **Syllabus Contents:**

প্রথম খন্ড - ভাষা

১. বাংলা ধ্বনি/ বাগ ধ্বনি (Phone/ Speech Sound); বর্ণ (Letter); অক্ষর (Syllable)
  ২. বাংলা ধ্বনির উচ্চারণ স্থান ও রীতি (Point of Articulation & Manner of Articulation)
  ৩. বাংলা উচ্চারণ-প্রমিত (Standard), আঞ্চলিক (Dialectal), বৈচিন (Variation)
  ৪. অপিনিহিত, অতিক্রমি, স্বরসঙ্গতি, শাস্ত্রায়ত (Strees accent), স্বরভঙ্গ/ স্বরতরঙ (Intonation);
  ৫. বাংলা ও ইংরেজির তুলনা
  ৬. বাংলা লিখন দক্ষতা: সাধু/চলিত রীতি। বিরাম চিহ্ন প্রয়াগ। প্রমিত বাংলা বানানের নিয়ম (বাংলা একাডমি)
  ৭. ব্যাবহারিক বাংলা: সংক্ষিপ্ত আলাচনা
- একুশ ফেরেন্সারি, মুক্তিযুদ্ধ, বাংলাভাষা, বিশ্বায়ন, বাংলার উৎসব, ঘড়িখতু, বাংলা নববর্ষ, আধুনিক তথ্য -প্রযুক্তি, বাংলার লোক সংস্কৃতি, মানবতা ও নৈতিকতা।
- দ্বিতীয় খন্ড - সাহিত্য

কবিতা:

১. আবদুল হাকিম - নূরনামা
২. মাইকল মধুসূধন দত্ত - বঙ্গভাষা
৩. লালন সাহী- খাচার ভেতরে অচিন পাখি
৪. রবীন্দ্রনাথ ঠাকুর- নির্বারের স্বপ্নভঙ্গ
৫. কাজী নজরুল ইসলাম- আজ সৃষ্টি - সুখের উল্লাস
৬. জীবনন্দ দাশ- রূপসি বাংলা 27

৭. হাসান হাফিজুর রহমান- অমর একুশ
৮. আলাউদ্দিন আল আজাদ- সৃতি স্ন্ত
৯. শামসুর রহমান- তোমাক পাওয়ার জন্য হে স্বাধীনতা
১০. সৈয়দ শামসুল হক - পরিচয়

প্রবন্ধ:

১. বঙ্গিম চন্দ্র চট্টাপাধ্যায়- বাঙালা ভাষা
২. রবীন্দ্রনাথ ঠাকুর- সভ্যতার সংকট
৩. হরপ্রসাদ শাস্ত্রী- তৈল
৪. প্রমথ চৌধুরী- যৌবন দাও রাজটিকা
৫. কাজী নজরুল ইসলাম- বর্তমান বিশ্বসাহিত্য
৬. মুহম্মদ আবদুল হাই- আমাদর বাংলা উচ্চারণ
৭. কবীর চৌধুরী- আমাদর আত্ম পরিচয়

ছাটগাল্প অন্যান্য রচনা:

১. রবীন্দ্রনাথ ঠাকুর- পোষ্ট মাস্টার
২. রাকয়া সাখাওয়াত হোসন- অবরাধ বাসিনী
৩. বিভূতিভূষণ বন্দাপাধ্যায়- পুঁইমাচা
৪. সৈয়দ ওয়ালীউল্লাহ- নয়নচারা
৫. জাহানারা ইমাম- একাত্তরের দিনগুলি
৬. হাসান আজিজুল হক- ঘর-গরস্তি
৭. আখতারজামান ইলিয়াস- অপঘাত

নাটক:

১. কবর- মুনির চৌধুরী

**Course Code:** BMST 4202

**Course Name:** Bridge Navigation and GMDSS Sessional

**Credit:** 1.5

**Contact Hour:** 42

**Learning Outcomes:** The intent of the course is to ensure trainees gain experience in handling ships under various conditions and will make a more effective contribution to the bridge team during ship manoeuvring and emergency situations.

### **Syllabus Content:**

Review of the Basic Principles, Familiarization with the bridge, Standard Manoeuvres, Wind and Current effect, attitude and Cultural awareness, Briefing and Debriefing, challenge and Response, Shallow water effect, Bank, channel interaction effect, Planning Authority, Management on the bridge, Workload and stress, Anchoring and single buoy mooring, Human Factor in error, Master pilot relationship, Decision making, Planning and carrying out a voyage in normal and emergency situation, Bridge resource management- describes the basic principles of bridge resource management, explains how responsibility for the safety is clearly defined at all times, including periods when the master is on the bridge and while, under pilotage, demonstrates clear, concise communications and acknowledgements, (at a times) in a seaman-like manner, demonstrates the allocation, assignment and prioritization of resources, demonstrates the importance of ensuring the

effectiveness of communication between bridge team members, explains the importance of ensuring the effectiveness of information exchange with pilot, demonstrates effective information exchange, practice “situational leadership”, explains the relationship between assertiveness and leadership, explains the importance of challenge and response, explains the importance of obtaining and maintaining situational awareness, demonstrates appropriate challenges and responses

**Course Code:** BMST 4204

**Course Name:** Computer Programming Sessional

**Credit:** 1.5

**Contact Hour:** 42

**Learning Outcome:** Enable the students to be familiar with computer operations and various applications including the hardware and software.

**Syllabus content:**

1. Introduction to computer: What is Computer, Computer types, History and generation of computer, Specification of computer
2. Hardware Components: Basis organization and functional units of computer- input devices, central processing unit, memory unit, basics of microprocessor
3. Number system and Code: binary , octal, decimal and hexa decimal numbers, conversion between different number system, Binary arithmetic, BCD and ASCII codes, integers and floating number representation.
4. Logic gates and Boolean algebra: Different types of gates and their truth tables, Boolean algebra, de- morgan’s theorem
5. Software components: Types of software, system software, introducing computer languages, machine language, assembly language, system utilities, Application software
6. Operating system: Introduction, function and types of operating system, examples operating system DOS, Windows, Window NT, LINAX etc.
7. Office automation: Goals of office automation, characteristics of office and office automation system, obstacle to the growth of office automation, trends in office automation, Office automation tools and technology.
8. Word processing and Excel
9. GNUPLOT

**Course Title:** Advanced Oil Tanker cargo operation

**Course Code:** 4221

**Credit Hours:** 3

**Contact Hours:** 42

**Syllabus content:**

1. Knowledge of oil tanker design, systems and equipment;
2. Knowledge of pump theory and characteristics, including types of cargo pumps and their

safe operation

3. Proficiency in tanker safety culture and implementation of safety-management system
4. Knowledge and understanding of monitoring and safety systems, including the emergency shutdown
5. Loading, unloading, care and handling of cargo
6. Knowledge and understanding of oil cargo related operations
7. Development and application of cargo-related operation plans, procedures and checklists
8. Ability to calibrate and use monitoring and gas-detection systems, instruments and equipment
9. Ability to manage and supervise personnel with cargo-related responsibilities
10. Knowledge and understanding of the physical and chemical properties of oil cargoes
11. Knowledge and understanding of safe working practices, including risk assessment and personal shipboard safety relevant to oil tankers:
12. Knowledge and understanding of oil tanker emergency procedures
13. Actions to be taken following collision, grounding, or spillage
14. Knowledge of medical first aid procedures on board oil tankers
15. Understanding of procedures to prevent pollution of the atmosphere and the environment
16. Knowledge and understanding of relevant provisions of the International Convention for the Prevention of Pollution from Ships (MARPOL), as amended, and other relevant IMO instruments, industry guidelines and port regulations as commonly applied
17. Case Studies

**Course Title:** Advance Chemical Tanker Cargo operation

**Course Code:** 4223

**Credit Hours:** 3

**Contact Hours:** 42

#### **Learning Outcomes:**

After successful completion of this course, the students will have sufficient knowledge on:

- Chemical tanker designs, systems, and equipment;
- Pump theory and characteristics, including types of cargo pumps and their safe operation;
- Tanker safety culture and implementation of safety management system
- Ability to perform cargo measurements and calculations
- Development and application of cargo-related operation, Plans, procedures and checklists
- Ability to calibrate and use monitoring and gas-detection, Systems, instruments and equipment.

#### **Syllabus Content:**

1. Introduction (STCW Regulation V/1-1 para 6, Code Table A-V/1-1- 3), Chemistry and Physics, Hazards and control measures Chemistry and Physics, Rules and Regulations, Chemical tanker Design and Cargo Containment, Cargo-handling Systems, Occupational health and Safety and Pollution Prevention, Loading, unloading, care and Handling of cargo, Tank-cleaning Operations, Ship/Shore Interface, Response to Emergencies.

**Course Title:** Maritime Economics

**Course Code:** 4225

**Credit Hours:** 3

**Contact Hours:** 42

**Syllabus Content:**

**Introduction to maritime Economics:** Economic concepts; economics concerns; questions that maritime economics provides answers to; Maritime Transport Market; Main Characteristics of International Shipping; Factors of Production; Basic trade theory; Contributors to Trade Growth.

**Demand of Maritime Transport:** the structure of seaborne Trade, the features maritime demand

**Sea trade evolution and Maritime Geography:** The evolution of seaborne trade, the factors that affect maritime demand, the geographic features of maritime demand, Economic concept- Price elasticity of demand and supply

**Supply of Maritime Transport:** Factors regarding the size of supply, the structure of maritime supply and its evolution, the economics of ship's size and speed, the current supply in terms of major suppliers of various shipping services, Economic concepts: Economies of scale, Productivity and optimization and Laws of diminishing return

**Types of Shipping Organization:** The economic reasons for having different shipping organizations, the major features of tramp shipping and liner shipping, Economic Concepts: Market equilibrium under competition and monopoly, Maritime Cooperation and other related services.

**Maritime Cooperation and Other Related Services:** The main forms and features of maritime cooperation, the basic functions of a port and the relationship between port and shipping, the roles of shipping intermediates, Economic Concepts: Principle of substitution

**Maritime transport cost and financing:** The capital requirement of shipping, the major financing options and their main features, the concept of opportunity cost and the marginal utility theory, Economic Concept: Opportunity cost, Marginal utility.

**Cost analysis:** The running cost aspect of shipping companies, the basic cost structure of various shipping organizations, the economic concepts and principles regarding shipping cost and pricing, Economic Concepts: Fixed cost and variable cost, Marginal cost

**Maritime freight market:** The basic structure of maritime freight of both liner and tramp market, economics of freight market, the dry bulk freight index system and future market for maritime freight, Economic concepts: Perfect competition, monopolistic competition and monopoly

**Economics of maritime regulations:** The regulatory framework of maritime transport, the economics of shipping regulations, the economic implications and benefits of maritime regulations, Economic Concepts: Property right and externality, Market-based control measures

**Course Title:** Maritime Safety and Environment Administration

**Course Code:** 4227

**Credit Hours:** 3

**Contact Hours:** 42

**Learning outcomes:**

This course aims to provide comprehensive understanding of maritime administration activities in the context of IMO and essential management tools required to implement safety, security and environmental protection standards.

**Syllabus Content:**

**Introduction to IMO Member State Obligations:** The role of government in policy formulation and the administration of maritime affairs. To define and examine “maritime administration” conceptually. An overview about IMO member State obligations as flag, port or coastal State under the IMO III Code. To introduce the IMO member State auditing scheme as a tool to assess Member State performance.

**Maritime Risk Management:** Safety and risk, including risk assessment, safety and Formal Safety Assessment (FSA). The relationship between risk assessment and maritime casualty investigation. Essential tools for the consideration of all relevant factors involved in the development of maritime accidents, such as human and organizational factors.

**Maritime Human Element:** the relevant IMO and ILO instruments, including the MLC 2006, relating to maritime labour and welfare, and in particular the rights and expectations of seafarers in relation to occupational safety.

**Marine Environmental Protection:** Marine environmental protection and coastal and ocean governance in a context broader than shipping and the maritime sector. Sources of pollution, the science, mechanisms and technologies for pollution monitoring and control. The importance of emergency preparedness measures and contingency planning as part of the overall risk management process, Shipboard Issues in Maritime Safety and Marine Environmental Protection: Key aspects of design for safety principles and relate them to SOLAS requirements. Marine environmental operational issues and measures necessary to protect the marine environment as required by MARPOL, such as ballast water management, bio-security, anti-fouling systems and the recycling of ships.

**Course Title:** Integrated Coastal and Ocean and Management

**Code:** BNS 4229

**Credits:** 3

**Contact Hours:** 42

**Syllabus Contents:**

**Coastal Zone Management:** Integrated Coastal Zone Management concept and method, Implementation of Integrated Coastal Zone Management, Building harmonious and beautiful marine environment through integrated management of marine environment, Promoting development and build a beautiful living environment through integrated management of Bay area, Development of blue economy and boost marine emerging industry, Promoting marine culture and enhance public conscious of maritime activities, The future plan of marine functional zones in Bangladesh, Integrated Coastal Zone Management in various countries.

**Marine Fisheries Management:** Marine Fishery- Introduction, importance and opportunities of

Marine Fishery. Marine Ecosystem: Features of sea floor, Ecological division of marine environment, concepts on sea shore, estuaries, mangroves and coral reefs. Marine food chains and food webs. Fish & Shellfish Morphology & Classification: External feature, aims & methods of classification. Fish Migration: Definition, types, causes, significance and importance. Fish Population Dynamics: Concepts, significance, population dynamics of fish. Fishing ground detection: Aim & objectives. Fish school detection. Major fishing grounds of the Bay of Bengal. Marine Resources: Meaning, Major exploited marine fisheries of Bangladesh, their developmental history and present status. Major minerals and their present exploitation rate in the Bay of Bengal. Climate change & Sea level rise: Meaning, causes, effects on marine environment. GIS and remote sensing: Definition, types, importance and application in marine capture fishery.

**Aquaculture:** Aquaculture: Definition, objectives & importance, Species & Site selection: Criteria for suitable species & sites, Shore based aquaculture system: Traditional, semi-intensive, intensive aquaculture practice, Methods of aquaculture: Rafts, racks, cages, poles and ropes, Grower pond management: Pond Preparation, fertilization, culture operation & management, Aquaculture Planning: Major aspects, required basic data.

**Course Title:** Advance Marine Technology

**Course Code:** BNS 4231

**Credit:** 3

**Contact Hours:** 42

#### **Learning Outcomes:**

At the end of the course students will be able to familiarize and know marine offshore design, offshore oil and gas technology and offshore engineering.

#### **Syllabus Contents:**

History of the Maritime Offshore Industry, Introduction to the oil and gas industry, Maritime Offshore segments and ship types, Planning, documentation and execution of various safe offshore operations, Key rules and regulations related to the maritime offshore industry, Vessel and installation types and operations, off shore operations, Offshore logistics and supply chain, Vessel and installation cooperation, Human Factors, Design criteria and loadings, In-place analysis and code compliance, Fatigue analysis, Dynamic analysis, Certification and inspection.

**Course Title:** Marine Surveying and Casualty Investigation

**Course Code:** 4233

**Credit Hours:** 3

**Contact Hours:** 42

#### **Syllabus Contents:**

Introduction to Marine Surveying ,Relationship between Surveyors and their Clients ,Business Skills for Surveyors, Laws and Conventions relating to Marine Surveying Marine Surveying and Insurance, The Surveyor's Role in Incident and Accident Investigation, Naval Architecture for Marine Surveyors, Marine Engineering and Systems for Surveyors, Hull and Structural Surveys

,Safety and Security Surveys, Non-Liquid Cargo Surveys ,Liquid Cargo Surveys, Superyacht Surveys, Marine Environmental Surveys, Marine Engineering and Systems Survey, International Safety Management (ISM) Code Surveys, Marine Warranty Surveys, Mobile Offshore Drilling Unit Surveys, International legal basis for marine accident investigations, International Safety Management (ISM) Code and accident investigation ,Managing a marine accident investigation ,Marine accident site risk assessment and hazard identification ,Evidence preservation and collection issues in common marine accident scenarios, Advanced interview techniques, Human performance and human factors in marine accidents, Human factors analysis and classification tools, Collision, contact and grounding accidents, Ship fires, Ship structural failures, loading and stability problems, Mechanical failure and maintenance error accidents, Marine occupational health and safety accidents.

**Course Title:** International Trade and Ship Chartering

**Course Code:** 4235

**Credit Hours:** 3

**Contact Hours:** 42

### **Syllabus Contents:**

**International Trade and Shipping:** Seaborne trade of the world composition and direction of cargoes – different types of ships which carry them – Technological development – Role of Shipping on national economic development.

**Basic Structure of Shipping Industry:** Types of Shipping services – Liner and Tramp shipping – Role of Intermediaries in shipping business: Freight brokers, clearing and Forwarding Agents – Stevedores – Shipbrokers, Bunker and Stores suppliers etc. Shipping Agencies. Liner Trades – Characteristics – Liner Conferences – How Freight rates are fixed components of Liner Freight – Non-Conference lines – competition.

**Procedures of Shipping cargoes and related documentation:** Mate's Receipt. Bill of Lading. Unit load systems – containerization and multimodal transport.

**Chartering types:** Tramp Trades – Chartering – different types of chartering ships – their relevance to trades – Procedures and documentation relating chartering – Charter markets of the world – How freight/ charter hire is fixed.

**Organization of shipping company:** Manpower planning – Business and cargo management – Statutory regulations to be complied with like Foreign Exchange regulation.

**Role of ports:** Port locations – Functions and range services – Financial aspects of utilization and cargo handling. India's ports, their organization and administration. Modernization and development of ports.

**Role of Customs:** Customs Act and documents relating to customs relating to ship operations and trade,

**Maritime Frauds:** Safeguards to be taken to prevent frauds with special reference to shipping industry, operators and seafaring personnel.

**Role of International Organization:** IMF, World Bank, IMO, UNCTAD, WTO.

**Course Title:** Shipping Accounting and Finance

**Course Code:** BNS 4237

**Credits:** 3

**Contact Hours:** 42

**Syllabus Contents:**

Accounting:

1. Accounting and its environment
2. Recording process
3. Measuring business income
4. Completing the accounting cycle
5. Accounting for merchandising operations
6. Accounting for inventories
7. Accounting for plant assets

Finance:

1. Financial Environment
2. Source of Finance: Short, medium and long term sources of finance.
3. Risk and return
4. Managing current assets
5. Time value of money
6. Capital Structure theories
7. Cost of capital
8. The basics of capital budgeting