DIRECTORATE OF TECHNICAL EDUCATION

GOVERNMENT OF TAMILNADU

CENTRAL POLYTECHNIC COLLEGE

(AN AUTONOMUS INSTITUTION)

DIPLOMA IN MARINE ENGINEERING

SYLLABUS

CPC 2016– 2017

C - SCHEME

FROM THE ACADEMIC YEAR 2016 –2017

CENTRAL POLYTECHNIC COLLEGE
(AN AUTONOMUS INSTITUTION)

DIPLOMA IN MARINE ENGINEERING
C-SCHEME
(Implemented from the Academic year 2016 - 2017 onwards)

Chairperson
Thiru. N.Muralikrishniah M.E., M.I.S.T.E.
Principal (i/c)
Central Polytechnic College,
Chennai-600113.

Convener
Dr. M.Isakkimuthu, M.E., Ph.D.
Principal
Dr. Dharmambal Government Polytechnic College for Women
Chennai-600113

Coordinator
Tmt.R.Poongothai B.Sc.,M.E.,
HOD (i/c)/ Mechanical (SWC) & Marine
Central Polytechnic College,
Chennai-600113

Members:

Dr.K Pitchaimani M.E., Ph.D.
Principal
T.J.S Polytechnic College, Peruvoyal,
Gummidipoondi (Tk) Thriuvallur Dist.

Thiru.V.Srinivasan
Retd. Senior Manager (Marine)
Tamilnadu Fisheries Development
Corporation Ltd.

J.P.Mughil Nilavan B.E
Associate (Marine), Exports Auto doc.,
MAERSK Global service india (P) Ltd.

Thiru.V.Anbucheliyan B.E.,
Industrialist
PV Engineering Enterprises
Chrompet, Chennai - 600044

Thiru.M.Sugumaran M.E.,
Principal
Ramakrisna Mission Polytechnic College,
Mylapore , Chennai-600004.

Thiru.K.K.Kalatharan M.E.,
HOD (i/c)/ Mechatronics
Govt. Polytechnic College
Chennai-600012

Dr. A.R.Pradeep Kumar M.E, Ph.D,
Professor and HOD / Mechanical Engg.
Dhanalaksmi college of Engineering.
Chennai-601301.

CENTRAL POLYTECHNIC COLLEGE, CHENNAI – 113 (Autonomous Institution)
DIPLOMA COURSES IN ENGINEERING / TECHNOLOGY
(SEMESTER SYSTEM)
(Implemented from 2016 – 2017)
C –SCHEME
REGULATIONS

1. Description of the Course:

a. Full Time (3 years)

The Course for the Full time Diploma in Engineering shall extend over a period of three academic years, consisting of 6 semesters* and the First Year is common to all Engineering Branches.

b. Sandwich (31/2 years)

The Course for the Diploma in Engineering (Sandwich) shall extend over a period of three and a half academic years, consisting of 7 semesters* and the First Year is common to all Engineering Branches. The subjects of the three year full time diploma course are being regrouped for academic convenience.

During 4^{th} and /or during 7^{th} semester the students undergo industrial training for six months / one year. Industrial training examination will be conducted after completion of every 6 months of industrial training.

c. Part Time (4 years)

The course for the Part Time Diploma in Engineering shall extend over a period of 4 academic years containing of 8 semesters*, the subjects of the 3 year full time diploma courses are being regrouped for academic convenience.

*Each Semester will have 15 weeks duration of study with 35 hrs. / Week for Regular Diploma programme and 18 hrs. / Week (21 hrs. / Week 1 year) for Part – Time Diploma programmes.

The Curriculum for all 6 Semesters of Diploma courses have been revised and the revised curriculum is applicable for the candidates admitted from the 2016–2017academic year onwards.

2. Conditions for Admission:

Condition for admission to the Diploma courses is as follows:

The candidate shall be required to have passed in the S.S.L.C Examination of the Board of Secondary Education, Tamilnadu.

(Or)

The Anglo Indian High School Examination with eligibility for Higher Secondary Course in Tamilnadu.

(Or)

The Matriculation Examination of Tamil Nadu.

(Or)

Any other Examination recognized as equivalent to the above by the Board of Secondary Education, Tamilnadu.

Note: In addition, at the time of admission the candidate will have to satisfy certain minimum requirements, which may be prescribed from time to time.

3. Admission to Second year (Lateral Entry):

A pass in HSC (Academic) or (Vocational) courses mentioned in the Higher Secondary Schools in Tamilnadu affiliated to the Tamilnadu Higher Secondary Board with eligibility for

university Courses of study or equivalent examination, & should have studied the following subjects.

Sl. No.	Courses	H. Sc Academic	H. Sc Vocational	
		Subject studied	Subject studied	
			Related subjects	Vocational subjects
1	All the regular and Sandwich Diploma Courses	Mathematics, Physics & Chemistry	Mathematics, Physics & Chemistry	Related vocational subjects theory & practical

- For the Diploma Courses related with Engineering / Technology, the related/equivalent subjects prescribed along with Practical may also be taken for arriving the eligibility.
- Branch will be allotted according to merit through counseling by the respective Principal as per communal reservation.
- *Candidates who have studied Commerce subjects are not eligible for Engineering Diploma courses.*

4. Age Limit: No Age limit.

5. Medium of Instruction: English.

6. Eligibility for the Award of Diploma:

No candidate shall be eligible for the diploma unless he / she has undergone the prescribed course of study for a period of not less than 3 academic years in any institution affiliated to the State Board of Technical Education and Training, Tamilnadu, when joined in First Year and two years if joined under Lateral Entry scheme in the second year and passed the prescribed examination.

The minimum and maximum period for completion of Diploma courses are as given below:

Diploma Course	Minimum Period	Maximum Period
Full Time	3 Years	6 Years
Full Time (Lateral Entry)	2 Years	5 Years
Sandwich	3 ½ Years	6 ½ Years
Part Time	4 Years	7 Years

7. Subjects of Study and Curriculum outline:

The subjects of study shall be in accordance with the syllabus prescribed from time to time, both in theory and practical subjects. The curriculum outline is given in Annexure – I

8. Examinations:

Autonomous board examinations in all subjects of all the semesters under the scheme of examinations will be conducted at the end of each semester.

The internal assessment marks for all the subjects will be awarded on the basis of continuous internal assessment earned during the semester concerned. For each subject 25 marks are allotted for internal assessment and 75 marks are allotted for Autonomous Board Examinations.

9. Continuous Internal Assessment:

A. For Theory Subjects:

The Internal Assessment marks for a total of 25 marks, which are to be distributed as follows:

i) Subject Attendance **5 Marks**

Award of marks for subject attendance to each subject Theory / Practical will be as per the range given below:

80%	-	83%	1 Marks
84%	-	87%	2 Marks
88%	-	91%	3 Marks
92%	-	95%	4 Marks
96%	-	100%	5 Marks

ii) Test # **10 Marks**

2 Tests each of 2 hours duration for a total of 60 marks are to be conducted.
Out of which the best one will be taken and the marks to be reduced to: **05 Marks**
The Test – III is to be the Model test covering all the five units and the marks so obtained will be reduced to : **05 Marks**

Total **10 Marks**

TEST	UNITS	WHEN TO CONDUCT	MARKS	DURATION
Test I	Unit-I & II	End of 6th week	60	2 Hrs
Test II	Unit-III & IV	End of 12th week	60	2 Hrs
Test III	**Model Examination- Compulsory** Covering all the 5 Units. (Autonomous Board Examinations-question paper-pattern).	End of 15th week	75	3 Hrs

 # - From the Academic year 2016-2017 onwards.

Question Paper Pattern for the Periodical Test :(Test – I & Test – II)

With No Choice:

Part A Type questions: 8 Questions X 4 mark … … 32 marks
Part B Type questions: 4 Questions X 7 mark … … 28 marks
Total **60 marks**

(or)

Suitable as per Question pattern

iii) Assignment **10 Marks**

For each subject Three Assignments are to be given each for 20 marks and the average marks scored should be reduced for 10 marks

All Test Papers and Assignment notebooks after getting the signature with date from the students must be kept in the safe custody in the Department for verification and audit. It should be preserved for 2 Semesters and produced to the flying squad and the inspection team at the time of inspection/verification.

B. For Practical Subjects:

The Internal Assessment marks for a total of 25 marks which are to be distributed as follows:-

a) Attendance : **5 Marks**
(Award of marks as same as Theory subjects)

b) Procedure/observation and tabulation / : **10 Marks**

Other Practical related Work

c) Record writing : **10 Marks**

TOTAL **25 Marks**

- All the Experiments/Exercises indicated in the syllabus should be completed and the same to be given for final Autonomous Board examinations.
- The Record for every completed exercise should be submitted in the subsequent Practical classes and marks should be awarded for 20 for each exercise as per the above allocation.
- At the end of the Semester, the average marks of all the exercises should be calculated for 20 marks and the marks awarded for attendance is to be added to arrive at the internal assessment mark for Practical. (20+5=25 marks)
- The students have to submit the duly signed bonafide record note book/file during the Autonomous Practical Board Examinations.
- All the marks awarded for assignments, Tests and attendance should be entered in the Personal Log Book of the staff, who is handling the subject. This is applicable to both Theory and Practical subjects.

10. Life and Employability Skill Practical:

The Life and Employability Skills Practical with more emphasis is being introduced in IV Semester for Circuit Branches and in V Semester for other branches of Engineering. Much Stress is given to increase the employability of students.

10. Project Work: …… 25 Marks

The students of all the Diploma Programmes have to do a Project Work as part of the Curriculum and in partial fulfillment for the award of Diploma by the State Board of Technical Education and Training, Tamilnadu. In order to encourage students to do worthwhile and innovative projects, every year prizes are awarded for the best three projects i.e. institution wise, region wise and state wise. **The Project work must be reviewed twice in the same semester.**

a) Internal assessment mark for Project Work & Viva Voce:

Project Review I	**….**	**10 marks**
Project Review II	….	**10 marks**
Attendance	….	**05 marks** (Award of marks same as theory subject pattern)
Total	**….**	**25 marks**

Proper record is to be maintained for the two Project Reviews, and it should be preserved for 2 semesters and produced to the flying squad and the inspection team at the time of inspection/verification.

b) Allocation of Marks for Project Work & Viva Voce in Board Examinations:

Viva Voce	…	**30 marks**
Marks for Report Preparation, Demonstration &Presentation	…	**35 marks**
Total		**65 marks**

C) Written Test Mark (from 2 topics for 30 minutes duration) $:

ii)Environment Management 2 questions X 2 ½ marks = **5 marks**
iii)Disaster Management 2 questions X 2 ½ marks = **5 marks**

……
10 marks
…….

$ - Selection of Questions should be from Question Bank, by the External Examiner. No choice need be given to the candidates.

Project Work & Viva Voce in Autonomous Board Examination	--	**65 Marks**
Written Test Mark (from 2 topics for 1 hour duration)	--	**10 Marks**
TOTAL	--	**75 Marks**

A neatly prepared PROJECT REPORT as per the format has to be submitted by individual student during the Project Work & Viva Voce Autonomous Board examination.

12. Scheme of Examination:

The Scheme of examinations for subjects is given in Annexure - II.

13. Criteria for Pass:

1. No Candidate shall be eligible for the award of Diploma unless he / she has undergone the prescribed course of study successfully in an institution approved by AICTE and affiliated to the State Board of Technical Education & Training, Tamil Nadu and pass all the subjects prescribed in the curriculum.
2. A candidate shall be declared to have passed the examination in a subject if he / she secures not less than 40% in theory subjects and 50% in practical subjects out of the total prescribed maximum marks including both the Internal Assessment and the Autonomous Board Examinations marks put together, subject to the condition that he / she secures at least a minimum of 30 marks out of 75 marks in the Autonomous Board Theory Examinations and a minimum of 35 marks out of 75 marks in the Autonomous Board Practical Examinations.

14. Classification of successful candidates:

Classification of candidates who will pass out the final examinations from April 2019 onwards (Joined in first year in 2016 – 2017) will be done as specified below.

First Class with Superlative Distinction:

A candidate will be declared to have passed in **First Class with Superlative Distinction** if he / she secures not less than 75% of the marks in all the subjects and passes all the semesters in the first appearance itself and passes all subjects within the stipulated period of study 3/ 3 ½ / 4 years (Full Time / Sandwich / Part Time) without any break in study.

First Class with Distinction:

A Candidate will be declared to have passed in **First Class with Distinction** if he / she secures not less than 75% of the aggregate marks in all the semesters put together and passes all the

semesters except the I and II semester in the first appearance itself and passes all subjects within the stipulated period of study 3/ 3 ½ / 4 years years (Full Time / Sandwich / Part Time) without any break in study.

First Class:

A candidate will be declared to have passed in **First Class** if he / she secures not less than 60% of the aggregate marks in all the semesters put together and passes all the subjects within the stipulated period of study 3/ 3 ½ / 4 years (Full Time / Sandwich / Part Time) without any break in study.

Second Class:

All other successful candidates will be declared to have passed in **Second Class.**

The above mentioned classifications are also applicable for the Sandwich / Part – Time students who pass out Final Examination from October 2019 / April 2020 onwards (both joined in First Year in 2016 – 2017)

15. Duration of a period in the Class Time Table:

The duration of each period of instruction is 1 hour and the total period of instruction hours excluding interval and Lunch break in a day should be uniformly maintained as 7 hours corresponding to 7 period of instruction (Theory & Practical).

16. Seminar:

For seminar the total seminar 15 hours (15 weeks x 1 hour) should be distributed equally to total theory subject per semester(i.e 15 hours divided by 3/4 subject). A topic from subject or current scenario is given to students. During the seminar hour students have to present the paper and submit seminar material to the respective staff members, who is handling the subject. It should be preserved for 2 semesters and produced to the flying squad and the inspection team at the time of inspections / verification.

DIPLOMA IN MARINE ENGINEERING

List of Equivalent Subjects of 'B' Scheme to 'C' Scheme

THIRD SEMESTER

B SCHEME		C SCHEME	
Subject Code	**Subject**	**Subject Code**	**Subject**
MRB310	Strength Of Materials And Fluid Mechanics	MRC310	Strength of Materials and Fluid Mechanics
MRB320	Workshop Technology I	MRC320	Workshop Technology I
MRB330	Ship Construction Technology	MRC330	Ship Construction Technology
MRB340	Strength of Materials and Fluid Mechanics Practical	MRC340	Strength of Materials and Fluid Mechanics Practical
MRB350	Workshop Technology I Practical	MRC350	Workshop Technology I Practical
MRB360	Ship Construction Practical	MRC360	Ship Construction Practical
MRB370	Computer Applications Practical	MRC370	Computer Applications Practical

FOURTH SEMESTER – W.E.F DECEMBER '17

B SCHEME		C SCHEME	
Subject Code	Subject	Subject Code	Subject
MRB410	Workshop technology II	MRC410	Workshop technology II
MRB420	Personal safety and social responsibilities	MRC420	Personal safety and social responsibilities
MRB430	Shipping Practice	MRC440	Shipping Practice
MRB440	Electrical Drives & Control*	MEC430	Electrical Drives & Control*
MRB450	Workshop Technology II Practical	MRC450	Workshop Technology II Practical
MRB460	Computer Aided Marine Engineering Drawing Practical	MRC470	Computer Aided Marine Engineering Drawing Practical
MRB470	Electrical Drives & Control Practical*	MEC460	Electrical Drives & Control Practical*

* Common with Mechanical Engineering

FIFTH SEMESTER

B SCHEME		C SCHEME	
Subject Code	Subject	Subject Code	Subject
B0001	Entrepreneurship and Resource Management	MRC510	Entrepreneurship and Resource Management
MRB520	Thermodynamics	MRC520	Thermodynamics
MRB530	Marine Auxiliary Machinery	MRC530	Marine Auxiliary Machinery
Elective Theory – I		Elective Theory – I	
MRB541	Seamanship and Life Saving Appliances	MRC541	Seamanship and Life Saving Appliances
MRB542	Rule of Road	MRC542	Rule of Road
MRB550	Marine Auxiliary Machinery Lab	MRC550	Marine Auxiliary Machinery Lab
Elective Practical – I		Elective Practical – I	
MRB561	Seamanship and Life Saving Appliances Lab	MRC561	Seamanship and Life Saving Appliances Lab
MRB562	Rule of Road Lab	MRC562	Rule of Road Lab
MRB570	Life and Employability Skills Practical **	C0001	Life And Employability Skills Practical **

SIXTH SEMESTER

B SCHEME		C SCHEME	
Subject Code	Subject	Subject Code	Subject
MRB610	Naval Architecture	MRC610	Naval Architecture
MRB620	Marine Diesel and Power Plant	MRC620	Marine Diesel and Power Plant
Elective –II Theory		Elective – II Theory	
MRB631	Elementary First Aid and Fire Fighting	MRC631	Elementary First Aid and Fire Fighting
MRB632	Personal Survival Technique	MRC632	Personal Survival Technique
MRB640	Marine Diesel and Power Plant Lab	MRC640	Marine Diesel and Power Plant Lab
Elective – II Practical		Elective - II Practical	
MRB651	Elementary First Aid and Fire Fighting Lab	MRC651	Elementary First Aid and Fire Fighting Lab
MRB652	Personal Survival Technique Lab	MRC652	Personal Survival Technique Lab
MRB660	Navigation and Meteorology Lab	MRC660	Navigation and Meteorology Lab
MRB670	Project Work	MRC670	Project Work

ANNEXURE - II

C- SCHEME

Implemented from 2016– 2017

1027: DIPLOMA IN MARINE ENGINEERING

CURRICULUM OUTLINE

THIRD SEMESTER

Subject Code	Subject	HOURS PER WEEK			
		Theory	Tutorial / Drawing	Practical	Total
MRC310	Strength of Materials and Fluid Mechanics	5			5
MRC320	Workshop Technology I	5			5
MRC330	Ship Construction Technology	6			6
MRC340	Strength of Materials and Fluid Mechanics Practical		4		4
MRC350	Workshop Technology I Practical			4	4
MRC360	Ship Construction Practical			6	6
MRC370	Computer Applications Practical			4	4
Seminar		1			
TOTAL		17	4	14	35

* Common with Mechanical Engineering

FOURTH SEMESTER

Subject Code	Subject	HOURS PER WEEK			
		Theory	Tutorial / Drawing	Practical	Total
MRC410	Workshop Technology II	5			5
MRC420	Personal Safety and Social Responsibilities	6			6
MEC430	Electrical Drives & Control*	5			5
MRC440	Shipping Practice	6			6
MRC450	Workshop Technology II Practical			4	4
MEC460	Electrical Drives & Control Practical*			4	4
MRC470	Computer Aided Marine Engineering Drawing Practical			4	4
Seminar		1			1
TOTAL		23		12	35

FIFTH SEMESTER

Subject Code	Subject	HOURS PER WEEK			
		Theory	Tutorial/ Drawing	Practical	Total
MRC510	Entrepreneurship and Resource Management	5			5
MRC520	Thermodynamics	6			6
MRC530	Marine Auxiliary Machinery	5			5
Elective - I Theory					
MRC541	Seamanship and Life Saving Appliances	5			5
MRC542	Rule of Road				
MRC550	Marine Auxiliary Machinery Lab			4	4
Elective - I Practical					
MRC561	Seamanship and Life Saving Appliances Lab			5	5
MRC562	Rule of Road Lab				
C0001	Life And Employability Skills Practical **			4	4
Seminar		1			1
TOTAL		**22**		**13**	**35**

** Common to all Diploma Courses

SIXTH SEMESTER

Subject Code	Subject	HOURS PER WEEK			
		Theory	Tutorial/ Drawing	Practical	Total
MRC610	Naval Architecture	6			6
MRC620	Marine Diesel and Power Plant	6			6
Elective - II Theory					
MRC631	Elementary First Aid and Fire Fighting	5			5
MRC632	Personal Survival Technique				
MRC640	Marine Diesel and Power Plant			4	4
Elective - II Practical					
MRC651	Elementary First Aid and Fire Fighting Lab			5	5
MRC652	Personal Survival Technique Lab				
MRC660	Navigation and Meteorology Lab			4	4
MRC670	Project Work			4	4
Seminar		1			1
TOTAL		**18**		**17**	**35**

ANNEXURE - II
C SCHEME
Implemented from 2016 – 2017

1027: DIPLOMA IN MARINE ENGINEERING (FULL TIME)

SCHEME OF EXAMINATION

THIRD SEMESTER

Sl.No	Subject Code	Name of the Subject	Duration of Exam Hrs.	Examination Marks			Min. Marks for Pass
				Allocation of Marks			
				IA	BE	Tot.	
1	MRC310	Strength of Materials and Fluid Mechanics	3	25	75	100	40
2	MRC320	Workshop Technology I	3	25	75	100	40
3	MRC330	Ship Construction Technology	3	25	75	100	40
4	MRC340	Strength of Materials and Fluid Mechanics Practical	3	25	75	100	40
5	MRC350	Workshop Technology I Practical	3	25	75	100	40
6	MRC360	Ship Construction Practical	3	25	75	100	40
7	MRC370	Computer Applications Practical	3	25	75	100	40

IV SEMESTER

Sl.No	Subject Code	Name of the Subject	Duration of Exam Hrs.	Examination Marks			Min. Marks for Pass
				Allocation of Marks			
				IA	BE	Tot.	
1	MRC410	Workshop Technology II	3	25	75	100	40
2	MRC420	Personal Safety and Social Responsibilities	3	25	75	100	40
3	MEC430	Electrical Drives & Control*	3	25	75	100	40
4	MRC440	Shipping Practice	3	25	75	100	40
5	MRC450	Workshop Technology II Practical	3	25	75	100	40
6	MEC460	Electrical Drives & Control Practical*	3	25	75	100	40
7	MRC470	Computer Aided Marine Engineering Drawing Practical	3	25	75	100	40

* Common with Mechanical Engineering

V SEMESTER

Sl.No	Subject Code	Name of the Subject	Duration of Exam Hrs	Examination Marks			Min. Marks for Pass
				Allocation of Marks			
				IA	BE	Tot.	
1	MRC510	Entrepreneurship and Resource Management	3	25	75	100	40
2	MRC520	Thermodynamics	3	25	75	100	40
3	MRC530	Marine Auxiliary Machinery	3	25	75	100	40
4	MRC541	Seamanship and Life Saving Appliances	3	25	75	100	40
4	MRC542	Rule of Road	3	25	75	100	40
5	MRC550	Marine Auxiliary Machinery Lab	3	25	75	100	40
6	MRC561	Seamanship and Life Saving Appliances Lab	3	25	75	100	40
6	MRC542	Rule of Road Lab	3	25	75	100	40
7	C0001	Life and Employability Skills **	3	25	75	100	40

** Common to all Diploma Courses

VI SEMESTER

Sl.No	Subject Code	Name of the Subject	Total Hrs per week	Duration of Exam Hrs	Examination Marks			Min. Marks for Pass
					Allocation of Marks			
					IA	BE	Tot.	
1	MRC610	Naval Architecture	6	3	25	75	100	40
2	MRC620	Marine Diesel and Power Plant	6	3	25	75	100	40
3	MRC631	Elementary First Aid and Fire Fighting	6	3	25	75	100	40
3	MRB632	Personal Survival Technique	6	3	25	75	100	40
4	MRC640	Marine Diesel and Power Plant Lab	4	3	25	75	100	40
5	MRC651	Elementary First Aid and Fire Fighting Lab	5	3	25	75	100	40
5	MRB652	Personal Survival Technique	5	3	25	75	100	40
6	MRC660	Navigation and Meteorology Lab	4	3	25	75	100	40
7	MRC670	Project Work	4	3	25	75	100	40

Autonomous Examination - Question paper pattern

Common for all theory subjects

Time: 3 Hrs. **Max.Marks: 75**

PART A - Carries 3 questions answer any two questions each carries 4 marks.

PART B - Carries 2 questions answer any one question carries 7 marks.

Unit	Part	No. of Question	Marks
I	A	2 x 4	**8** Marks
	B	1 x 7	**7** Marks
II	A	2 x 4	**8** Marks
	B	1 x 7	**7** Marks
III	A	2 x 4	**8** Marks
	B	1 x 7	**7** Marks
IV	A	2 x 4	**8** Marks
	B	1 x 7	**7** Marks
V	A	2 x 4	**8** Marks
	B	1 x 7	**7** Marks
Total			**75** Marks

Any tables required should be mentioned in the question pattern. Steam table, Design Data Book, Mollier chart, Psychometric Chart etc.

CENTRAL POLYTECHNIC COLLEGE

(AN AUTONOMUOUS INSTITUTION)

DIPLOMA IN MARINE ENGINEERING

C - SCHEME

2016 -2017 onwards

II YEAR

III SEMESTER

MRC 310– STRENGTH OF MATERIALS AND FLUID MECHANICS

MRC310: STRENGTH OF MATERIALS AND FLUID MECHANICS

Total Hours / Week	**:6 Hrs/Week**
Total weeks / Semester	**:15 Weeks/Sem**
Total Hours	**:90**

RATIONALE:

To understand the stresses and strains for different types of loads for various applications. The student is introduced to the mechanics of fluids through a thorough understanding of the properties of the fluids.

OBJECTIVES:

- At the end of this course the student should be able to understand the various forces and Stresses acting on a body.
- Further, he should understand the principle of centroid, and moment of inertia of sections.
- To understand the stresses developed in beams under transverse load He should be able to
- Comprehend the effect of shear force & bending moment on beams.
- The student should be able to understand the properties of fluid in motion and hydrostatic forces on surfaces, the fluid kinematics and fluid dynamics of motion. The applications of the conservation of laws to flow through pipes are studied.
- The student should also be able to comprehend functions of pumps. All these should be achieved both conceptually and through solved example.

Topics and Allocation of Hours

SI.No.	Topic	Time(Hrs)
1.	1. MECHANICAL PROPERTIES OF MATERIALS, STRESSES AND STRAINS 2. POISSON'S RATIO AND ELASTIC CONSTANTS 3. GEOMETRICAL PROPERTIES OF SECTIONS	17
2.	1. SHEARFORCE AND BENDING MOMENT DIAGRAMS 2. THEORY OF SIMPLE BENDING	17
3.	1. PROPERTIES OF FLUIDS AND PRESSURE MEASUREMENT 2. HYDROSTATIC FORCES ON SURFACES	17
4.	1. FLUID KINEMATICS and FLUID DYNAMICS 2. FLOW THROUGH PIPES	17
5.	1. RECIPROCATING PUMPS 2. CENTRIFUGAL PUMPS	17
	TEST AND REVIEW	05
Total		**90**

MRC310: STRENGTH OF MATERIALS AND FLUID MECHANICS
DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I	**1.1. MECHANICAL PROPERTIES OF MATERIALS, STRESSES AND STRAINS:** Introduction – Definitions of mechanical properties of Metals - elasticity, plasticity, ductility, malleability stiffness, toughness, brittleness, hardness ,wear resistance, machinability, castability and weld ability— Fatigue, Fatigue strength creep-temperature creep, cyclic loading and repeated loading— endurance. Introduction –definition – tensile stress:, compressive stress. Classification of force systems – tensile, compressive, shear, bending and tensional force systems – Behavior of mild steel bar in axial tension up to rupture –stress strain diagram, limit of proportionality, elastic limit, yield point, breaking point, proof stress, ultimate stress, percentage elongation, percentage reduction in area. Hook's Law, Young's Modulus, working stress, factor of safety. Definition – Composite bar- Problems in composite bars subjected to tension and compression only. **1.2. POISSON'S RATIO AND ELASTIC CONSTANTS**: Lateral strain – Poisson's ratio – volumetric strain, bulk modulus, elastic constants and their relationship. Problems connecting linear, lateral and volumetric deformations. Problems on volumetric strain, Poisson's ratio and E,C,K relation **1.3. GEOMETRICAL PROPERTIES OF SECTIONS:** Introduction – centroid, center of gravity, position of centroids on plane geometrical areas such as square, rectangle,circle,Trapizoidal, triangle. Determination of centriod of angles, channels, I and T sections – problems. Moment of Inertia – definition – parallel axis theorem – perpendicular axis theorem.	**17 Hrs**
II	**2.1. SHEARFORCE AND BENDING MOMENT DIAGRAMS**: Classification of beams – shear force and bending moment – sign convention – types of loads – S.F.D. and B.M.D., of SSB and Cantilever Beams subjected to concentrated load and UDL only – Maximum BM – Problems on SFD and BMD for Cantilever and SSB subjected to concentrated load and UDL only. **2.2. THEORY OF SIMPLE BENDING:** Introduction – theory of simple bending – assumptions – neutral axis – bending stress distribution – moment of resistance – flexural formula, M / I = f / y = E / R (STUDY ONLY). Section modulus – strength and stiffness of beam. Problems involving bending equation only.	**17 Hrs**
III	**3.1. PROPERTIES OF FLUIDS AND PRESSURE MEASUREMENT:** Fluids -Definition -Properties -Density -Specific weight -Specific volume – Relative density -Viscosity -Vapour pressure -compressibility. Surface tension -capillarity -classification -Pressure -Pressure head -Atmospheric pressure -Absolute pressure – Gauge pressure and vacuum pressure. Pressure Measurement -Manometers -Piezometer -simple manometer -Differential manometer -(excluding micro manometer) – Mechanical gauges -Bourdon tube pressure gauge -Pascal's law -Problems on absolute pressure, pressure measurement – simple and differential manometers.	**17 Hrs**

3.2. HYDROSTATIC FORCES ON SURFACES: Total pressure -Centre of pressure -Total pressure and centre of pressure on 1) a horizontal plane surface 2) vertical plane surface. 3) An inclined plane surface. Derivations - Total pressure and centre of pressure on. 1) A vertically immersed plane surface 2) An inclined immersed plane surface , problems on hydro static forces on the plane surfaces of 1) Square 2) Rectangular 3) Circular shapes only

IV **4.1. FLUID KINEMATICS and FLUID DYNAMICS** Types of flow - Laminar flow -Turbulent flow -Steady flow -Unsteady flow – Uniform flow - Non-uniform flow -flow pattern path line -stream line -mean velocity of flow -Continuity equation -Fluid dynamics – Different types of Heads (or Energies) of a liquid in motion -Bernoulli's equation -proof -Applications and limitations – Horizontal Venturimeters, Orifice meter, Pitot tubes. Problems on Horizontal Venturimeters, Orifice meter, Pitot tubes. **17 Hrs**

4.2. FLOW THROUGH PIPES: Laws of fluid friction for laminar and turbulent flow -Froude's experiment – Wetted perimeter -Hydraulic radius - area of flow -head lost due to friction -Darcy Weisbach equation -Chezy's formula –(Derivation Not Needed)-energy (head) losses due to sudden enlargement -sudden contraction -obstruction -entry into a pipe- exit from a pipe -loss of head due to change in direction of flow -Derivations for -Darcy-Weisbach equation (Description Only)

V **5.1 RECIPROCATING PUMPS** **17Hrs**

Definition of pump-Specification of pump -Reciprocating pump - Classifications -single acting -Double acting reciprocation pump -discharge of a reciprocating pump -theoretical power required -coefficient of discharge - slip -percentage slip-negative slip -acceleration head -air vessels -troubles - causes and remedies. Problems on discharge, slip, percentage slip, power required to drive the pump

5.2 CENTRIFUGAL PUMPS: Constructional details -Principle of working -classifications -types of casing -volute -vortex diffuser casings -types of impellers -closed, open and semi open impellers -multi stage pumps reasons-working and advantages

Text Books:

1 Strength of Materials, R.S.Kurmi. S.Chand & Company Ltd ,2008

2 Hydraulics, Fluid Mechanics and Hydraulic machines , R.S.Kurmi, S.Chand & Company Ltd 2003.

Reference Books:

1 Strength of Materials S. Ramamrutham ,Dhanpat Rai Company-2009

2 Hydraulics, Fluid Mechanics and Fluid machines, S. Ramamrutham ,Dhanpat Rai Company-2009

MRC310 Model Question Paper

Time: 3 hrs Max Marks:75

[N.B: 1. Answer all question choosing any two from part (a) and any one from part (b).
2. Each sub division in part (a) carries 4 marks and part (b) carries 7 marks]

1	a)	1.	Explain the terms of Elasticity and Plasticity.	4
		2.	Distinguish between toughness and Hardness	4
		3.	Define Poisson's ratio and Volumetric strain	4
	b)	1.	A square bar of size 40mmX 40mm and 300mm long is subjected to axial pull of 250 KN in the direction of its length. Determine the volumetric strain and the change in the volume of bar, if E= $2X10^5$ N/mm^2 .1/m = 0.25.	7
		2.	Find the centroid of a 120mm×120mm×10mm of T-section	7
2	a)	1.	Define shear force and bending moment	4
		2.	Write the assumptions in the theory of simple bending.	4
		3.	What is point of contra flexure?	4
	b)	1.	A cantilever 10mm long caries a point loads of 2.6kN and 3kN at a distance of 2m, 5m and 7m from fixed end. In addition to this beam carries a UDL of 1KN per metre run over the entire length of beam. Draw the S.F and B.M diagram	7
		2.	Calculate the maximum stress in a piece of rectangular steel strip 25mm wide and 3mm thick when its bend around a drum, 2.5mm diameter E=2×10^5 N/mm^2	7
3	a)	1.	Explain the terms atmospheric pressure and vacuum pressure	4
		2.	State Pascal Law	4
		3.	Define total pressure and centre of pressure	4
	b)	1.	Explain with a neat sketch the working principle of bourdans tube pressure gauge	7
		2.	Derive the total pressure and the centre of pressure on a vertically immersed plane surface	7
4	a)	1.	State the difference between steady flow and unsteady flow	4
		2.	State and prove the equation of continuity of flow	4
		3.	Define wetted perimeter and hydraulic radius	4
	b)	1.	State and prove Bernouils Theorem	7
		2.	Derive Darcys expression for loss of heat due to friction in pipes	7
5	a)	1.	Define slip, co-efficient of discharge	4
		2.	Explain the difference between single acting and double acting reciprocating pumps with line diagram	4
		3.	How will you clarify centrifugal pumps? Explain	4
	b)	1.	Explain the working principle of a single cylinder double acting reciprocating pumps with neat sketch	7
		2.	What one the reasons for multistaging? Explain the working of a multistage centrifugal pump with neat sketch	7

CENTRAL POLYTECHNIC COLLEGE

(AN AUTONOMUOUS INSTITUTION)

DIPLOMA IN MARINE ENGINEERING

C - SCHEME

2016 -2017 onwards

II YEAR

III SEMESTER

MRC 320– WORKSHOP TECHNOLOGY I

MRC320: WORKSHOP TECHNOLOGY - I

Total Hours / Week **:5 Hrs/Week**
Total weeks / Semester **:15 Weeks/Sem**
Total Hours **:75**

RATIONALE:

The student should able to comprehend knowledge on foundry practice To have knowledge on common basic machining operations

OBJECTIVES:

At the end of the study of III Semester the student will be able to

- To study and practice the various types of moulds and preparation of casting
- He should be able to comprehend the knowledge on Welding & heat treatments.
- To study and practice the various operations that can be performed in lathe and allied machines
- To equip with the practical knowledge required in the core industries

Topics and Allocation of Hours

SI.No.	Topic	Time(Hrs)
1.	FOUNDRY PATTERNS,MOULDING AND CASTING	14
2.	WELDING	14
3.	HEAT TREATMENTS	14
4.	CENTRE LATHE	14
5.	SEMI AUTOMATIC AND AUTOMATIC LATHES	14
	TEST AND REVIEW	05
Total		**75**

MRC320: WORKSHOP TECHNOLOGY -I

DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I	**FOUNDRY PATTERNS** – definition – pattern materials – factors for selecting pattern materials – single piece - solid, split patterns – pattern allowances – core prints. **MOULDING** – definition – moulding boxes, moulding sand – ingredients – silica – clay –miscellaneous materials – properties of moulding sand – moisture - sand additives – moulding sand preparation –mixing – tempering and conditioning – types of moulding – green sand – dry sand - core – CO2 process core making –types of core – core boxes. **CASTING** – definition – sand casting using green sand and dry sand – gravity die casting – pressure die-casting – hot and cold-chamber processes — cupola furnace – arc furnaces - crucible furnace - melting of non ferrous metals – melting of steel - cleaning of casting – tumbling, trimming, sand and shot blasting –defects in casting – causes and remedies – safety practices in foundry.	**14 Hrs**
II	**WELDING :** Welding – various types of welding joints-selection of Electrodes- arc welding definition — carbon arc, metal arc, Metal Inert gas (MIG), Tungsten inert gas (TIG), Atomic hydrogen, Plasma arc, Submerged arc and Electro slag welding, Gas welding definition– oxy – acetylene welding -Three types of flame. Selection of nozzles-Inspection and testing of welded joints – destructive and non destructive types of tests – magnetic particle test – radiographic and ultrasonic test- defects in welding – causes and remedies – safety practices in welding .	**14 Hrs**
III	**HEAT TREATMENTS** Heat treatment processes – purpose – procedures- Application of various Heat treatment process – Annealing, Normalizing, Hardening, Tempering - quenching medium –Types, merits and demerits- Case hardening-various types-carburizing- cyanding-nitriding-flame hardening –induction harding-Application.	**14 Hrs**
IV	**CENTRE LATHE** Theory of lathes, Types of Lathe -simple sketches – specifications – principal parts – head stock – back geared type – all geared type – tumbler gear mechanism – quick change gear box – apron mechanism – carriage cross slide – automatic, longitudinal and cross feed mechanism – tail stock and its functions – work holding device –face plate – three jaw chuck – four jaw chuck – catch plate and carrier – types of centres – machining operations done on lathe - straight turning – step turning-taper turning-knurling-Thread cutting-Facing-Boring -chamfering–-cutting speed-feed-depth of cut.	**14Hrs**

V SEMI AUTOMATIC AND AUTOMATIC LATHES **14 Hrs**

Semi automatic lathes: Types of semi automatic lathes – capstan and turret lathes – difference between turret and capstan – tools and work holding devices – self opening die head – collapsible taps.

Automatic Lathes: Automatic lathe – classification of single spindle automatic lathe – principle of automatic lathes – Types of Threads - automatic screw cutting machines – multi spindle automatic lathes – use of cams in automats.

Text Book :

1) Elements of workshop Technology By S.K Hajra Choudhury , A.K Hajra Choudhury & Nirjhar Roy Volume I & II, Media promoters & Publishers (P) Ltd-2004
2) A Text book of workshop Technology, R. S. Khurmi & J. K. Gupta, S.Chand & Co., Ram Nagar, New Delhi – 2006
3) A Text book of Foundry Technology, O.P.Khanna, Dhanpat Rai Publications(P) Ltd-2000
4) A Text book of Production Technology, O.P.Khanna, M.Lal, Dhanpat Rai Publications(P) Ltd-2002

Reference Book :

1) Shop Theory ,James Anderson, Earl E.Tatro Sixth Edition , Tata Macraw-Hill Publishing Co Ltd-2001.

2) Technology of Machine Tools, Fourth Edition, Steeve F.KRAR, J. William Oswald, Tata Macraw-Hill Publishing Co Ltd-Singapore-1991.

3) Automation production systems and computer –Integrated manufacturing, Mikell.P.Groover, Prentice-Hall of India private Ltd, 2003.

MRC 320 Model Question Paper

Time: 3 hrs Max Marks: 75

[N.B: 1. Answer all question choosing any two from part (a) and any one from part (b).
2. Each sub division in part (a) carries 4 marks and part (b) carries 7 marks]

1	a)	1.	List out the types of patterns. Explain any two types of pattern.	4
		2.	List out pattern allowances. Explain.	4
		3.	What are the properties of good mouding sand? Explain.	4
	b)	1.	Explain with neat sketches the procedure of making of green sand.	7
		2.	Explain the working of an electric arc furnace with neat sketch.	7
2	a)	1.	Explain the principle of arc welding.	4
		2.	List out the non destructive test. Explain any one test.	4
		3.	Explain three types of flames in gas welding.	4
	b)	1.	Explain with neat sketch TIG welding process.	7
		2.	Explain with neat sketch plasma arc welding process.	7
3	a)	1.	Explain the annealing process.	4
		2.	Explain different types of quenching medium	4
		3.	Explain with neat sketch the nitriding process	4
	b)	1.	Explain in detail about caburising.	7
		2.	Explain the flame hardening and its application, advantage and disadvantage.	7
4	a)	1.	Write the specifications of lathe.	4
		2.	Explain the purpose of tail stock	4
		3.	Name the work holding devices used in lathe.	4
	b)	1.	Explain with neat sketch all geared head stock.	7
		2.	Explain with neat sketch tumbler gear mechanism	7
5	a)	1.	What are the difference between automatic and semi automatic lathe?	4
		2.	What is the difference between capstan and turret lathe?	4
		3.	Write short note on uses of cams in automates.	4
	b)	1.	Explain with neat sketch the working of single spindle automatic lathe.	7
		2.	With neat sketch explain the swiss type automatic screw mechanism.	7

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C - SCHEME

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II YEAR

III SEMESTER

MRC 330– SHIP CONSTRUCTION TECHNOLOGY

MRC330: SHIP CONSTRUCTION TECHNOLOGY

Total Hours / Week **:6 Hrs/Week**
Total weeks / Semester **:15weeks/Sem**
Total Hours **:90**

RATIONALE:

In the field of shipping and marine engineering ship construction has an important place because latest technology is being employed in the field of construction and repair of ships. The knowledge of shipping terms, welding, hull construction, hull dynamics and launching is required for the marine engineer.

OBJECTIVES:

- At the end of the study of III Semester the student will be able to understand the ship terms, movement of ships and the various materials used in ship building.
- Acquire knowledge about different types of ships
- Study about different welding practices, welding tests, soldering and brazing in ships.
- Acquire broader ideas about shell & deck plating and stresses acting on the hull.
- Understand about hull dynamics and paintings.
- To study about ship trials and launching.

Topics and Allocation of Hours

SI.No.	Topic	Time(Hrs)
1.	SHIP TERMINOLOGY AND TYPES	17
2.	WELDING IN SHIP CONSTRUCTION AND STRESSES	17
3.	HULL CONSTRUCTION	17
4.	HULL DYNAMICS	17
5.	LAUNCHING OF NEW VESSEL AND DOCKING	17
	TEST AND REVIEW	05
Total		**90**

MRC330: SHIP CONSTRUCTION TECHNOLOGY

DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I	**SHIP TERMINOLOGY AND TYPES**	**17 Hrs**

The ship: parts of a ship- Terminology and dimensions-Construction . Meaning of various terms : Length overall -Forward perpendicular, After perpendicular, length between perpendicular, Amidships, Mid ship, breath Moulded, Draught Moulded, Draught, moulded base line, sheer, Camber, Rise of floor, Tumble home, Flare, Rake, Trim, Heel, List,Freeboard.- Starboard, port side - Classification of merchant ships: Factors considering design of merchant ships – Dry cargo ships, Bulk carriers, Oil tankers, RORO, Passenger ship, Containership – warship-Shipbuilding Materials: Steel, stainless steel, Aluminium alloy, wood, Bronze and brass, Plastics, FRP, ferro cement- Characteristics, advantage and disadvantages.

II	**WELDING IN SHIP CONSTRUCTION AND STRESSES**	**17 Hrs**

General Process of welding: Electrode-Various Position of welding-Speed of welding –types of weld joints-Butt weld – fillet weld-Lap weld-plate edge preparation -Electro slag welding- Tungsten Inert Gas welding –MIG welding- Gas welding - Gas cutting of metal – spot welding, soldering and brazing -Good welding practice in ship construction: Measurement of welds- Types of Distortion -Distortion control in welding – Control of residual stresses-tack welding-Weld faults-Destructive and Non destructive test-Safety in welding – Advantages of welding - Stresses in ship structures- Longitudinal stress, transverse stress, dynamic stress, localized stress, static stress, water pressure-factors affecting the ship, bend moment, Panting, pounding, Racking, Hogging and sagging-vibration

III	**HULL CONSTRUCTION**	**17 Hrs**

Mould lofting-line drawing, sectional drawings-laying of keel- Various types of keel – hull shapes– stem bar –stern bar – frames – longitudinal , transverse frame – Shell plating – bottom plating – seams, butts –strakes, garboard, sheer strakes – stringes- Deck plating- deck beams – Knees-hatches- hatch covers – bulwark stanchins -Twin decks.

Arrangments : Fore peak and after peak tanks- Ballasting tank -double bottom tank, tank top, tank side, tank brackets - Fore end arrangement: stem plating, arrangement to resist panting and pounding - bulbous bow, cable locker arrangement - Aft arrangement- stern frame – crusier stern - rudder- types of rudder - rudder trunk-rudder carrier-spectacle frame – kort nozzle.

Bulkheads: transverse and longitudinal Bulkheads ,Watertight Bulk heads-collision bulk heads- non watertight bulk heads- Machinery bulkhead, Corrugated bulkheads-Testing of bulkheads-Cofferdams - watertight Doors –vertical and horizontal door

Stern tubes: bearings- cooling of stern tubes and bearings- water cooled stern tubes- oil cooled stern tubes - assembly of propeller Shaft-super structure-navigation bridge-Mast derricks-Types and uses.

IV **HULL DYNAMICS** **17 Hrs**

Load lines: Various terms defining loads such as NRT,GRT etc- dead weight and light weight etc-International load line convention- ship survey for load line – load line marks-load line groups.

Ship dynamics: propellers, measurement of pitch -,slip –wake-controllable pitch propellers , contra-rotating propellers , vertical axis propellers – solid propellers – bow thrusters , rolling and stabilization, reduction of roll, bilge keels , fin stabilizers – tank stabilizers.

Corrosion control and paint systems: Nature and forms of corrosion-corrosion control-Cathodic corrosion-Sacrificial anode system-Impressed Current system - Protection by paints- anti corrosive primer - zinc chromet primer-Anti fouling paints – epoxy paints- various types of Surface preparation for painting.

V LAUNCHING OF NEW VESSEL AND DOCKING

Slipway, the dock, merits and problem, prelaunch survey, Hull integrity-need for inclining experiment, commission of DC, AC plant, cold room, galley-Sea trials -Basin trail, Ballasting fire fighting system preparation for sea trail, speed trail-records of trail performance-endurance and cargo capacity – anchors and cables. **17 Hrs**

Vibration test- classification society- survey requirement-registration-insurance, sea worthiness - call sign.

Text Book : Reeds ship construction – E.A. Stroke, -2005 Ship construction-Edrich Fernands Publishers: Pro-Navigator books Reference Book: Notes on ship construction -Capt. Dara E. Driver By Rumar Publications

Reference Book : Ship construction-Edrich Fernands Publishers: Pro-Navigator books Reference Book: Notes on ship construction -Capt. Dara E. Driver By Rumar Publications

MRC330 Model Question Paper

Time: 3 hrs Max Marks: 75

[N.B: 1. Answer all question choosing any two from part (a) and any one from part (b).
2. Each sub division in part (a) carries 4 marks and part (b) carries 7 marks]

1	a)	1.	Define length overall length between perpendiculars.	4
		2.	What do you mean by bulk carrier?	4
		3.	Explain flare, rake.	4
	b)	1.	What are the factors affecting the design of merchant ships?	7
		2.	Explain the characteristics, advantages and disadvantages of various ship building materials.	7
2	a)	1.	Explain tungsten inert gas welding	4
		2.	Differentiate between hogging and sagging	4
		3.	Describe automatic welding process.	4
	b)	1.	Discuss the different types of stress acting on ship structures.	7
		2.	Explain the measurements of welds and the advantages of welding.	7
3	a)	1.	Write short notes on testing of bulk heads	4
		2.	What is the function of rudder in ship?	4
		3.	What are corrugated bulk head?	4
	b)	1.	What is shell plating? What are the salient features of different types of shell plating.	7
		2.	Explain framing system in detail.	7
4	a)	1.	What is load line? Explain its importanace.	4
		2.	What is impressed current system?	4
		3.	Explain various types of stabilizers.	4
	b)	1.	Give detailed account on paints of ships.	7
		2.	What are various types of corrosion control systems in ships	7
5	a)	1.	What is prelaunch survey?	4
		2.	What is classification society?	4
		3.	Explain seaworthiness of a ship?	4
	b)	1.	Write an essay on anchors and cables.	7
		2.	What are the various trials that are taken for ship after launching?	7

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C - SCHEME

2016 -2017 onwards

II YEAR

III SEMESTER

MRC 340– STRENGTH OF MATERIALS AND FLUID MECHANICS PRACTICAL

MRC340: STRENGTH OF MATERIALS AND FLUID MECHANICS PRACTICAL

Total Hours / Week	**:4 Hrs/Week**
Total weeks / Semester	**:15 Weeks/Sem**
Total Hours	**:60**

RATIONALE:

To perform various types test like tension, compression impact tests in Laboratory.To perform experiments on various types of pumps and turbines to understand theircharacteristics.To understand the various mechanical properties by conducting tensile test.To understand the hardness value of different materials.To understand the concepts flow through different cross sections.To understand and draw characteristics of various pumps and turbines.

GUIDELINES:

- All the seventeen experiments given in the list of experiments should be completed and given for the end semester practical examination.
- In order to develop best skills in handling Equipments and taking readings in the practical classes , every five students should be provided with a separate experimental setup for doing experiments in the laboratory.

SCHEME OF EXAMINATION

Mechanics of Materials Practical (any one exercise) : 35 marks(1½ Hrs)

Fluid Mechanics Practical (any one exercise) : 35 marks(1½ Hrs)

Viva -voce : 05 marks

Total : 75 marks

LIST OF EXPERIMENTS

I STRENGTH OF MATERIALS PRACTICAL: (2Hrs/Week)

1. Test on Ductile Materials:

Finding Young's Modulus of Elasticity, yield points, percentage elongation and percentage reduction in area, stress strain diagram plotting, tests on mild steel and cast iron. (Equipment: UTM)

2. Hardness Test:

Determination of Brinell Hardness Number for various materials like mild steel, high carbon steel, brass, copper and aluminium. (Equipment : Brinell Hardness Testing Machine)

3. Torsion test:

Torsion test on mild steel – relation between torque and angle of twist-determination of shear modulus-determination of elastic constants for mild steel. (Equipment: Torsion testing machine)

4. Bending and deflection tests:

Determination of Young's Modulus for steel by deflection test.
(Equipment: Deflection testing arrangement)

5. Impact test:

Finding the resistance of materials to impact loads by Izod test or Charpy test.
(Equipment: Impact testing machine)

6. Tests on springs of circular section:

Determination of modulus of rigidity, strain energy, shear stress by load deflection method-Comparison and tension test (Closed coil spring only) (Equipment: Tension testing arrangements)

7. Shear test:

Shear test on M.S. bar
(Equipment: Shear testing machine)

II FLUID MECHANICS PRACTICAL: (2 Hrs/Week)

1. Verifying the Bernoulli's Theorem

(Equipment: The Bernoulli's Apparatus)

2. Determination of Coefficient of discharge of a Venturimeter / Orifice meter.

(Equipment: A Centrifugal pump having the discharge line with Venturimeter / Orifice meter arrangement)

3. Determination of the Friction Factor in a Pipe

(Equipment: An arrangement to find friction factor)

4. Performance test on a reciprocating pump and draw the characteristic curves.

(Equipment: A reciprocating pump with an arrangement for collecting data to find out the efficiency and plot the characteristic curves)

5. Performance test on a centrifugal pump and draw the characteristic curves.

(Equipment: A centrifugal pump with an arrangement for collecting data to find out the efficiency and plot the characteristic curves)

6. Performance test on an impulse turbine

(Equipment: An impulse turbine with an arrangement for collecting data to find out the efficiency)

7. Determination of Coefficient of discharge of a orifice / an external mouthpiece by constant head method.

(Equipment: An open tank fitted with a orifice / an external mouthpiece and a collecting tank with piezometer)

8. Determination of Coefficient of discharge of a orifice / an external mouthpiece by variable head method.

(Equipment: An open tank fitted with a l orifice / an external mouthpiece and a collecting tank with piezometer)

9. Making a suitable Pneumatic (or) Hydraulic circuit connection with DCVS, flow control valve and check valve to show the reciprocating motion of a double acting cylinder with metering-in control circuit.

(Equipment: Either Pneumatic trainer kit with air compressor (or) Hydraulic trainer kit with hydraulic power pack)

10. Making a suitable Pneumatic (or) Hydraulic circuit connection with DCVS, flow control valve and check valve to show the reciprocating motion of a double acting cylinder with metering-out control circuit.

(Equipment: Either Pneumatic trainer kit with air compressor (or) Hydraulic trainer kit with hydraulic power pack)

INSTRUCTIONS TO CARRY OUT THE PARCTICAL CLASSWORK AS WELL AS THE BOARD EXAMINATION PRACTICALS.

1. All the experiment given in the list of experiments should be completed and given for the end semester practical examination.

2. The record of every completed exercise should be submitted in the subsequent practical classes and marks should be awarded for 20 for each exercise.

3. At the end of the semester the average marks of all the exercises should be calculated for 20 marks and the marks awarded for attendance is to be added to arrive at the internal mark for practical.

4. All the marks entries for exercise should be entered in the personal log book of the staff, who is handling the subject

LIST OF EQUIPMENTS AND THE QUANTITY REQUIRED FOR A BATCH OF 30 STUDENTS

1. Universal Testing Machine (UTM) - 01
2. BrinellHardness Testing Machine - 01
3. Torsion testing machine - 01
4. Deflection testing arrangement - 01
5. Tension testing arrangements - 01
6. Impact testing machine - 01
7. Shear testing machine - 01
8. The Bernoulli's Apparatus - 01
9. Venturimeter / Orifice meter arrangement - 01
10. An arrangement to find friction factor - 01
11. Reciprocating pump - 01
12. Centrifugal pump - 01
13. Impulse turbine - 01
14. An open tank fitted with a orifice / an external mouthpiece and a collecting tank with Piezometer - 01
15. Either Pneumatic trainer kit with air compressor (or) Hydraulic trainer kit with hydraulic power pack – 01

SAFETY PRECAUTIONS TO BE FOLLOWED

1. Always wear shoes.
2. Always use good conditions tools during the work.
3. Appropriate safety device should be used.
4. Switch off the machines when not in use.

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C - SCHEME

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II YEAR

III SEMESTER

MRC 350– WORKSHOP TECHNOLOGY 1 PRACTICAL

MRC350: WORKSHOP TECHNOLOGY 1 PRACTICAL

Total Hours / Week	**:4 Hrs/Week**
Total weeks / Semester	**:15 Weeks/Sem**
Total Hours	**:60**

RATIONALE:

To provide exposure to the students with hands-on experience on lathe, foundry and welding.

GUIDE LINES:

- Introduction of tools and equipments
- Introduction about lathe and its parts
- Types of patterns
- Types of sand
- Preparation of sand moulds
- Core sands, preparation of cores
- Introduction about welding equipments and accessories
- Types of welded joint
- Edge Preparation.

SCHEME OF EXAMINATION

Lathe	:45 marks (2 hours)
Foundry / Welding (by lot)	:25 marks (1 hour)
Viva-voce	:05 marks
Total Marks	**:75 marks**

MRC350: WORKSHOP TECHNOLOGY 1 PRACTICAL

LIST OF EXERCISES:

I Lathe:

a) Plain turning

b) Step turning

c) Taper turning

d) Thread cutting

e) Drilling

f) Knurling

II Foundry:

Preparation of sand mould:

1. Solid pattern

   a. Stepped Pulley
   b. Bush bearing
   c. Gear Wheel
   d. T-pipe

2. Split pattern
   a.Tumbles

3. Loose Piece Pattern
   a.Dovetail

4. Cylindrical core making

III Welding

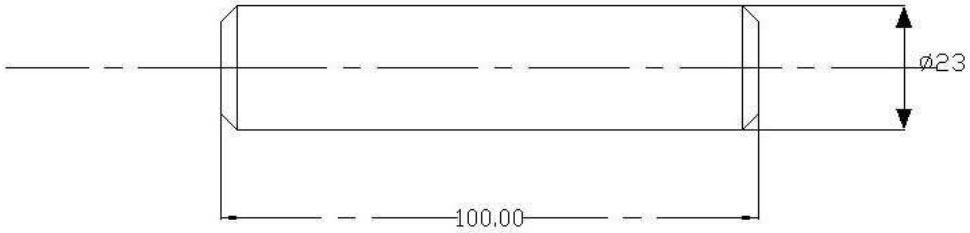
1 Arc welding
   1) Lap joint (Material: 25mm x 6mm MS Flat)
   2) Butt joint (Material: 25mm x 6mm MS Flat)
   3) T-joint (Material: 25mm x 6mm MS Flat)
   4) Corner joint (Material: 25mm x 6mm MS Flat)

2 Gas Welding
   1) Lap joint (Material: 25mm x 6mm MS Flat)
   2) Butt Joint (Material: 25mm x 6mm MS Flat)

3 Spot welding-Tray work.

EX.NO:1

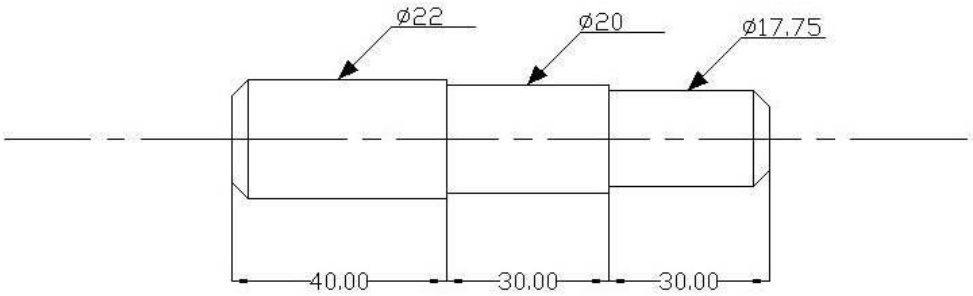
PLAIN TURNING



MATERIAL M.S OF SIZE DIA 25*105MM

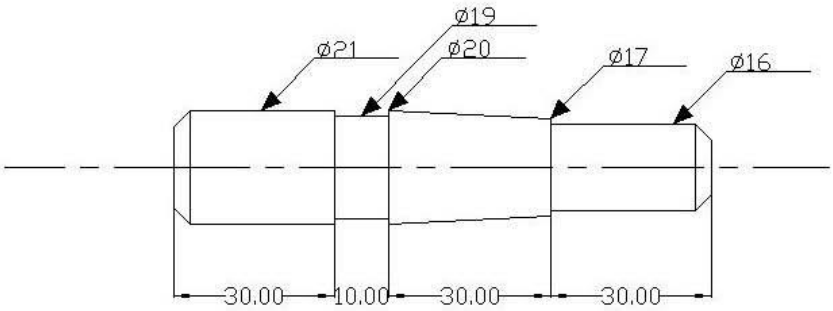
EX.NO:2

STEP TURNING



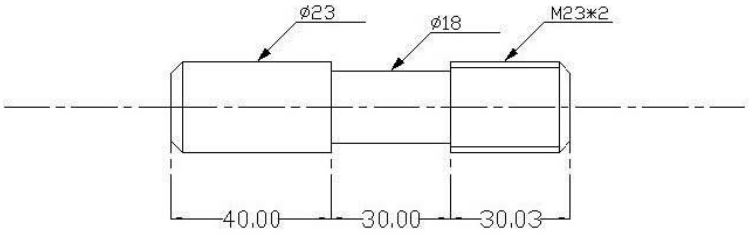
EX.NO:3

TAPER TURNING



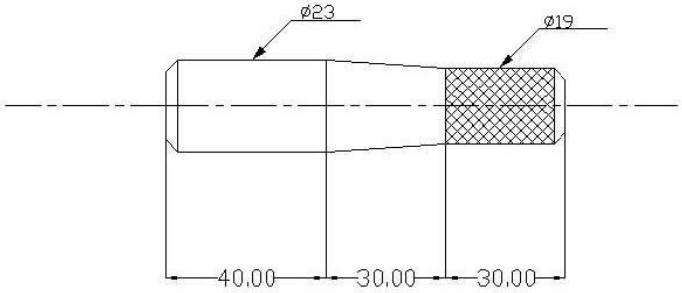
EX.NO:4

THREAD CUTTING



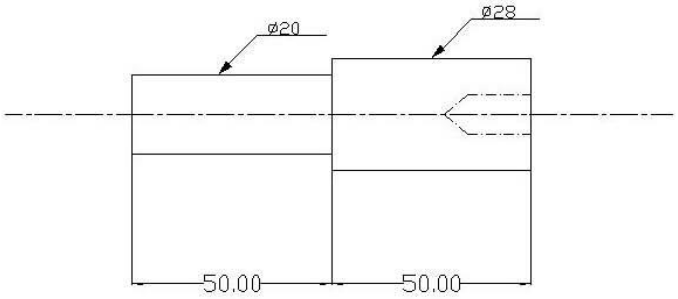
EX.NO:5

KNURLING



EX.NO:6

BUSHING



MODEL QUESTIONS FOR THE BOARD PRACTICAL EXAMINATIONS

Lathe

1. Use the lathe and machine the given specimen as per the drawing shown in the figures.

Foundry

1. To make a green and mould for the given pattern

Welding

1. To make a welded lab joint on M.S. flat, in flat position.
2. To make welded butt joint on M.S. flat, in flat position
3. To make welded corner joint on M.S. flat, in flat position

SPECIFIC INSTRUCTIONS TO CARRY OUT THE PRACTICAL CLASS WORK AS WELL AS THE BOARD EXAMINATION PRACTICALS.

1. All the experiment given in the list of experiments should be completed and given for the end semester practical examination.

2. The record of every completed exercise should be submitted in the subsequent practical classes and marks should be awarded for 20 for each exercise.

3. At the end of the semester the average marks of all the exercise should be calculated for 20 marks and the marks awarded for attendance is to be added to arrive at the internal mark for practical.

4. All the marks entries for exercise should be entered in the personal log book of the staff, who is handling the subject.

LIST OF EQUIPMENTS AND THE QUANTITY REQUIRED FOR A BATCH OF 30 STUDENTS

Centre lathe – 06

Foundry

1. Pattern (each)	- 07
2. Moulding box	- 15 (16” x 16” x 4”)
3. Runner	- 15
4. Riser	- 15
5. Shawel	- 05
6 Gate cutter	- 15
7. Spirit level	- 02
8. plastic bucket	- 05
9. moulding sand	- 500kg
10. Rammer	- 15
11 vent rod	- 15
12 Draws spike	- 15
13 mallet small size	- 05
14 Bellows	- 03

Welding

1 300 amps welding transformer with accessories - 02
2 Oxy – Acetylene gas welding set with accessories - 01
3 Spot welding m/c with accessories – 01

SAFETY PRECAUTIONS TO BE FOLLOWED

1. Always wear apron, head screen and shoes.
2. Always use good conditions tools during the work
3. Appropriate safety device should be used while welding.
4. Switch off the machines when not in use.
5. Do not leave the chuck key on the chuck.

CENTRAL POLYTECHNIC COLLEGE

(AN AUTONOMUOUS INSTITUTION)

DIPLOMA IN MARINE ENGINEERING

C - SCHEME

2016 -2017 onwards

II YEAR

III SEMESTER

MRC 360– SHIP CONSTRUCTION TECHNOLOGY PRACTICAL

MRC360: SHIP CONSTRUCTION PRACTICAL

Total Hours / Week	**:6 Hrs/Week**
Total weeks / Semester	**:15 weeks/Sem**
Total Hours	**:90**

RATIONALE:

To know the importance of design and constructions of ships parts To understand the basic concepts of design and constructions of ships parts.

Guidelines:

1 Introduction about Ship construction
2 To study Elements of ships
3 Types of tools and equipments
4 Preparation of different section of ships.(Welding)

SCHEME OF EXAMINATION

Fabrication of ship parts	:	50 Marks
Viva voce	:	25 Marks
Total marks	**:**	**75 Marks**

SHIP CONSTRUCTION TECHNOLOGY PRACTICAL

LIST OF EXERCISES:

1) Fabrication of Keel part
2) Fabrication of fore part.
3) Fabrication of after part.
4) Fabrication of Bulk heads.
5) Fabrication of Transverse Framing.
6) Fabrication of Hatches.
7) Fabrication of Mast and derricks.
8) Fabrication of Cable locker arrangement.
9) Fabrication of the Hull.
10) Fabrication of Super Structure

SPECIFIC INSTRUCTIONS TO CARRY OUT THE PRACTICAL CLASS WORK AS WELL AS THE BOARD EXAMINATION PRACTICALS.

1. All the experiment given in the list of experiments should be completed and given for the end semester practical examination.

2. The record of every completed exercise should be submitted in the subsequent practical classes and marks should be awarded for 20 for each exercise.

3. At the end of the semester the average marks of all the exercises should be calculated for 20 marks and the marks awarded for attendance is to be added to arrive at the internal mark for practical.

4. All the mark entries for exercise should be entered in the personal log book of the staff, who is handling the subject.

LIST OF EQUIPMENTS AND THE QUANTITY REQUIRED FOR A BATCH OF 30 STUDENTS

1. 300 Amps welding transformer with accessories	- 02
2. Sheet bending machine	- 01
3. Sheet cutting machine	- 01

SAFETY PRECAUTIONS TO BE FOLLOWED

1. Always wear apron/boiler suit, head screen and shoes.
2. Always use good conditions tools during the work.
3. Appropriate safety device should be used while welding.
4. Switch off the machines when not in use

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DIPLOMA IN MARINE ENGINEERING

C - SCHEME

2016 -2017 onwards

II YEAR

III SEMESTER

MRC 370– COMPUTER APPLICATION PRACTICAL

Total Hours / Week	**:4 Hrs/Week**
Total weeks / Semester	**:15 Weeks/Sem**
Total Hours	**:60**

RATIONALE:

The application of Computer knowledge is essential to the students of all disciplines of Engineering in addition to their respective branch of study. The Computer Application Practical course facilitates the necessary knowledge and skills regarding creating, working and maintaining the documents and presentation of documents with audio visual effects in a computer and produces necessary skills in E- Learning and Chatting tools..

GUIDELINES:

All the experiments given in the list of experiments should be completed and all the experiments should include for the end semester practical examination.

The computer systems should be 1:1 ratio for practical classes

SCHEME OF EXAMINATION

Section A	Writing Procedure	15	Marks
	Demonstration	15	Marks
	Results	5	Marks
Section B	Writing Procedure	15	Marks
	Demonstration	15	Marks
	Results	5	Marks
	Viva Voce	5	
	TOTAL	**75**	**Marks**

SYLLABUS

LAB EXERCISES
SECTION – A

GRAPHICAL OPEARTING SYSTEM

Introduction to GUI OS; Features and various versions of GUI OS & its use; Working with GUI OS; My Computer & Recycle bin ; Desktop, Icons and Explorer; Screen description & working styles of GUI OS; Dialog Boxes & Toolbars; Working with Files & Folders; simple operations like copy, delete, moving of files and folders from one drive to another, Shortcuts &Autostart; Accessories and Windows Settings using Control Panel- setting common devices using control panel, modem, printers, audio, network, fonts, creating users, internet settings, Start button & Program lists; Installing and Uninstalling new Hard ware & Software program on your computer - Copying in CD/DVD settings – Recording Audio files.

LAB EXERCISES

SECTION – A

WINDOWS

Introduction-History of Windows-screen saver and monitor resolution – Wallpaper setting-Folder manipulation – properties of a folder – Recycle bin – Short cuts – Sorting Folder – Switching between Application – Copying in CD/DVD settings – Recording Audio files.

Practice

1.	a.	Installing screen saver and change the monitor resolution by 1280X960
	b.	Setting wall papers
	c.	Creating, moving, deleting and renaming a folder
	d.	Copy, paste and cut a folder/file
	e.	Displaying the properties for a file or folder
2.	a.	Restoring files and folders from Recycle bin
	b.	Creating short cuts for folder/file
	c.	Finding a file or folder by name
	d.	Selecting and moving two or more files/folders using mouse
	e.	Sorting folders/files

1 & 2 only for practice.

WORD PROCESSING

Introduction to Word Processing – Examples- Creation of new documents, opening document, insert a document into another document. Page setup, margins, gutters, font properties, Alignment, page breaks, header footer deleting, moving, replace, editing text in document. Saving a document, spell checker.
Printing a document. Creating a table, entering and editing, Text in tables. Changing format of table, height width of row or column. Editing, deleting Rows, columns in table. Borders, shading, Templates, wizards, drawing objects, mail merge.

Exercises

3.. Create the following table and perform the operations given

CENTRAL POLYTECHNIC COLLEGE

e-governance particulars

Register No.	June	July	August	September	Cumulative (%)
16304501					
16304502					
16304503					
16304504					
16304505					

- Arrange Unit name as left align and other columns as right align.
- Use doubled Border to the Summary Title and fill with 15% gray colour.
- Implement merging and splitting two or more cells
- Give alternative fore colour for columns.
- Print the above table.

4. Create a standard covering letter and use mail merge to generate the customized letters for applying to a job in various organizations. Also, create a database and generate labels for the applying organizations.

5. Create a news letter of three pages with two columns text. The first page contains some formatting bullets and numbers. Set the document background colour and add ‘confidential’ as the watermark. Give the document a title which should be displayed in the header. The header/ footer of the first page should be different from other two pages. Also, add author name and date/ time in the header. The footer should have the page number.

SPREADSHEET

Introduction to Analysis Package – Examples - Concepts of Workbook & Worksheets Various Data Types; Using different features with Data, Cell and Texts; Inserting, Removing & Resizing of Columns & Rows; Working with Data & Ranges; Different Views of Worksheets; Column Freezing, Labels, Hiding, Splitting etc.; Using different features with Data and Text; Use of Formulas, Calculations & Functions; Cell Formatting including Borders & Shading; Working with Different Chart Types; Printing of Workbook & Worksheets with various options.

Exercises

6. Create a result sheet containing Candidate's Register No., Name, Marks for six subjects. Calculate the total and result. The result must be calculated as below and failed candidates should be turned to red.
   Result is Distinction if Total >= 70 %
   First Classif Total > = 60%and< 70%
   Second Class if Total >= 50 % and < 60 %
   Passif Total >= 35 % and <50%
   Fail otherwise
   Create a separate table based on class by using auto filter feature.

7. Create a table of records with columns as Name and Donation Amount. Donation amount should be formatted with two decimal places. There should be at least 15 records in the table. Create a conditional format to highlight the highest donation with blue colour and lowest donation with red colour. The table should have a heading.

8. Create line and bar chart to highlight the sales of the company for three different periods for the following data.

SALES BAR CHART

Period	Product1	Product2	Product3	Total
JAN	35	40	50	125
FEB	46	56	40	142
MAR	70	50	40	160

SECTION – B
DATABASE

Introduction – Menus – Tool bar – Create – Edit – Save – Data types – Insert – Delete – Update – View – Sorting and filtering – Queries – Report – Page setup – Print.

Exercises

9. Create Database to maintain at least 10 addresses of your class mates with the following constraints
   a. Roll no. should be the primary key.
   b. Name should be not null

10. Create a students table with the following fields: Sr.No, Reg. No, Name, Marks in 5 subjects. Calculate total and percentage of 10 students. Perform the following queries.
    - To find the details of distinction student
    - To find the details of first class students
    - To find the details of second class students

11. Design a report for the above exercise to print the consolidated result sheet and mark card for the student.

PRESENTATION

Introduction - Opening new presentation, Parts of PowerPoint window – Opening -Saving and closing presentations - Features of PowerPoint, Background design, Word art, Clip art, Drawings,3D settings - Animations, Sound, Views, types of views - Inserting and deleting slides, arranging slides, slides show, rehearsal, setup show, custom show - Creating custom presentations, action setting, auto content wizard, working with auto content wizard

Exercises

12. Make a marketing presentation of any consumer product with at least 10 slides. Use different customized animation effects on pictures and clip art on any four of the ten slides.

13. Create a Presentation about our institution or any subject with different slide transition with sound effect.

INTERNET

Introduction – Getting acquainted with Internet Connection - Browsers – Website URL - Open a website – Net Browsing - Email: Creating E-mail id – Sending , receiving and deleting E-mail - Email with Attachments – CC and BCC - Chatting – Creating Group mail - Google docs – Search Engines – Searching topics .

Most Popular Social Networking Sites : History – Features – Services – Usage of Face book , Twitter and Linkdln.

Transferring data through wifi / bluetooth among different devices.

Introduction to cybercrime – Software Piracy – Viruses – Antivirus Software

Exercises

14. Create an e-mail id and perform the following
    - Write an e-mail inviting your friends to your Birthday Party.
    - Make your own signature and add it to the e-mail message.

- Add a word attachment of the venue route
- Send the e-mail to at least 5 of your friends.

15. Create a presentation on Google docs. Ask your friend to review it and commenton it. Use "Discussion" option for your discussions on the presentation.

Hardware and Software Requirements

Hardware Requirements:

- Computers – 36Nos
- Intel Core i3 Processor
- 500 GB Hard Disk, 2 MB RAM
- 14" Monitor
- Projector – 1 No
- Laser Printer – 1 No
- Internet Connection – Minimum of 512 kB

Software Requirement

- Any GUI Operating System
- Open Source Software / MS- Office

MODEL QUESTION PAPER

Year / Sem : **II / III**
Subject : **COMPUTER APPLICATIONS PRACTICAL**
Code : **MRC370**

Answer all the questions **Max.Marks:75**

Section -I

1 Prepare line, bar and pie chart to illustrate the subject wise performance of the class for any one semester.

Section -II

2 Create an e-mail id and perform the following
Write an e-mail inviting your friends to your Birthday Party.

- Make your own signature and add it to the e-mail message.
- Add a word attachment of the venue route
- Send the e-mail to at least 5 of your friends.

SAFETY PRECAUTIONS TO BE FOLLOWED BY STUDENTS

- Do not touch, connect or disconnect any plug or cable without teacher's permission
- Don't attempt to touch any live wires
- Systems should be shutdown properly after completion of work

CENTRAL POLYTECHNIC COLLEGE

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DIPLOMA IN MARINE ENGINEERING

C SCHEME

2016 -2017 onwards

II YEAR

IV SEMESTER

MRC410– WORKSHOP TECHNOLOGY II

Total Hours / Week **:5 Hrs/Week**
Total weeks / Semester **:15 Weeks/Sem**
Total Hours **:75**

RATIONALE:

To provide the concepts and working principal of special machineries and recent trends in manufacturing.

OBJECTIVE

- To understand the concept and working of standard machine tools such as shaping, planner and allied machines, milling, drilling and allied machines.

- To understand the basic concepts of (CNC) computer Numerical Control of machine tools

Topics and Allocation of Hours:

Sl.No.	Topic	Time(Hrs)
1.	RECIPROCATING MACHINES	14
2.	DRILLING MACHINES	14
3.	MILLING MACHINES	14
4.	ABRASIVE PROCESS	14
5.	COMPUTER NUMERICAL CONTROL (CNC) MACHINES	14
	TEST AND REVIEW	05
TOTAL		75

MRC410: WORKSHOP TECHNOLOGY -II

DETAILED SYLLABUS

Unit	Name of the Topic	Hrs
I	**RECIPROCATING MACHINES:** **PLANER:** Types of planers –description of double housing planer-specifications-principles of operation-drives-quick return mechanism-feed mechanism-work holding devices **SHAPER:** Types of shapers-specifications-standard-plain universal -principles of operation –drives quick return mechanism-crank and slotted link-feed mechanism-work holding devices. **SLOTTER** :Types of slotter specifications-method of operations-Whitworth quick return mechanism-feed mechanism – work holding devices	14 Hrs
II	**DRILLING MACHINES:** Drills-twist drills –nomenclature-types of drilling machines-bench type-floor type -radial type-gang drill-multi spindle type – principle of operation in drilling—speeds and feeds of various materials-drilling holes –method of holding drill bit –drill chucks-socket and sleeve-drilling operation-reaming – counter boring-counter shinking-spot facing-tapping-deep hole drilling .	14 Hrs
III	**MILLING MACHINES:** Types-column and knee type –plain;universal milling machines-vertical milling machines-specifications of milling machines-principles of operation-work and tool holding devices-arbour-sub arbour-spring collet-adapter-milling cutters - cylindrical milling cutter -slitting cutter-side milling cutter-angle milling cutter-T-slot milling cutter-woodruff milling cutter-fly cutter-nomenclature of cylindrical milling cutter-milling process – conventional milling-climb milling-milling operations-straddle milling-gang milling-vertical milling attachment.	14 Hrs
IV	**ABRASIVE PROCESS**: Types and classification – specifications - rough grinding – pedestal grinders - portable grinders - belt grinders - precision grinding - cylindrical grinder - centerless grinders – surface grinder - tool and cutter grinder - planetary grinders - principles of operations - grinding wheels – abrasives - natural and artificial diamond wheels - types of bonds - grit, grade and structure of wheels - wheel shapes and sizes - standard marking systems of grinding wheels - selection of grinding wheel - mounting of grinding wheels - Dressing and Truing of wheels - Balancing of grinding wheels.	14 Hrs
V	**COMPUTER NUMERICAL CONTROL (CNC) MACHINES** Numerical control – definition – components of NC systems – development of NC – DNC – CNC and adaptive control systems – working principle of a CNC system – distinguishing features of CNC machines -advantage of CNC machines – difference between NC and CNC – types of turning centre: horizontal, vertical – types of machining centers: horizontal spindle, vertical spindle, universal machines – machine axis conventions – design considerations of NC machine tools.CNC EDM machine – Coordinate measuring machines: construction, working principles and specifications – maintenance of CNC machines.	14 Hrs

Text Books:

1) Elements of workshop Technology By S.K Hajra Choudhury , A.K Hajra Choudhury & Nirjhar Roy Volume I & II, Media promoters & Publishers (P) Ltd-2004

2) A Text book of workshop Technology, R. S. Khurmi & J. K. Gupta, S.Chand & Co., Ram Nagar, New Delhi – 2006

3) A Text book of Foundry Technology, O.P.Khanna, Dhanpat Rai Publications(P) Ltd-2000

4) A Text book of Production Technology, O.P.Khanna, M.Lal, Dhanpat Rai Publications(P) Ltd-2002

Reference Books

1) Shop Theory ,James Anderson, Earl E.Tatro Sixth Edition , Tata Macraw-Hill Publishing Co Ltd-2001.

2) Technology of Machine Tools, Fourth Edition, Steeve F.KRAR, J. William Oswald, Tata Macraw-Hill Publishing Co Ltd-Singapore-1991.

3) Automation production systems and computer –Integrated manufacturing, Mikell.P.Groover, Prentice-Hall of india private Ltd, 2003.

MRC410 MODEL QUESTION PAPER

Time: 3Hrs **Max Marks: 75**

[N.B: 1. Answer all question choosing any two from part (a) and any one from part (b).
2. Each sub division in part (a) carries 4marks and part (b) carries 7marks.]

1	a)	1.	Write the application of planner	4
		2.	Explain the application can be carried out in the shaper.	4
		3.	Explain work holding device for slotter	4
	b)	1.	Describe in detail the automatic feed mechanism of a planner .	7
		2.	With a neat sketch describe the constructional arrangement of tool head shaper.	7
2	a)	1.	Write the nomenclature for drill bit and write its inference.	4
		2.	Write short notes on gang drilling machine	4
		3.	Explain about operation carried out by drilling machine	4
	b)	1.	What are the operations to be performed drilling machine? Explain any six?	7
		2.	Write shorts on i) Deep hole drilling ii) Gang drilling machine	7
3	a)	1.	Explain two types of milling.	4
		2.	Write the Nomenclature of milling cutter and its inference.	4
		3.	List out the four movement of universal milling machine	4
	b)	1.	i) Explain with neat sketch about universal milling machine ii) Explain with neat sketch about vertical milling attachement	7
		2.	Explain with neat sketch Nomenclature of milling cutter.	7
4	a)	1.	Explain with neat sketch the mounting of grinding wheel.	4
		2.	What are the different feed used in center-less grinding?	4
		3.	Explain surface grinder, tool and cutter grinder.	4
	b)	1.	What are the various types of grinders?	7
		2.	How the standard marking system on the grinding wheels are followed?	7
5	a)	1.	Comparison of CNC and NC	4
		2.	Explain about adaptive control systems	4
		3.	What are the NC components	4
	b)	1.	Explain the various design considerations of NC tools	7
		2.	Explain the various types of CNC – EDM machines?	7

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DIPLOMA IN MARINE ENGINEERING

C SCHEME

2016 -2017 onwards

II YEAR

IV SEMESTER

MRC420– PERSONAL SAFETY AND SOCIAL RESPONSIBILITY

Total Hours / Week **:6 Hrs/Week**
Total weeks / Semester **:15 weeks/Sem**
Total Hours **:90**

RATIONALE:

Every marine engineer know about personal safety and social responsibiliteies. He should get more knowledge about personal safety equipments and emergency drill. Knowledge about pollution free environment and safety of life at sea is necessary.

OBJECTIVES:

At the end of the study of VI Semester the student will be able to:

- Understand the important of emergency drill.
- Acquire broad ideas about personal safety equipments.
- Understand the enclosed space entry and work.
- Acquire knowledge about maintenance of safety devices.
- Gain knowledge about marine pollution.
- Understand the SOLAS and PSC inspections.

Topics And Allocation Of Hours:

Sl.No.	Topic	Time(Hrs)
1.	TYPES OF EMERGENCIES, DRILLS, PERSONAL SAFETY EQUIPMENTS	17
2.	ENCLOSED SPACE ENTRY AND WORK PERMIT	17
3.	MAINTENANCE OF SAFETY DEVICES AND PRECAUTION OF FIRE EXPLOSIONS	17
4.	MARPOL 73-78- M.S ACT 1958	17
5.	INTERNATIONAL SAFETY MANAGEMENT (ISM), PORT STATE CONTROL INSPECTIONS	17
	TEST AND REVIEW	05
	TOTAL	90

MRC420: PERSONAL SAFETY AND SOCIAL RESPONSIBILITIES

DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I	**TYPES OF EMERGENCIES, DRILLS, PERSONAL SAFETY EQUIPMENTS** Emergency – types of emergency-main engine, steering gear failure , collision, flooding, man overboard. Action to be taken in the event of emergency , emergency signals , action to be taken on hearing emergency signal, muster list, muster station –fire station, boat station-drills–importance of training and drills , fire drill ,Survival craft drills,Protective Clothing and Equipments – General – Head protection – Safety helmets –nets and safety caps – Hearing protection – Face and eye protection -Respiratory protective equipment – Respirators –Breathing apparatus – Resuscitators – Hand and foot protection – gloves –Footwear – Protection from falls – Body protection	**17 Hrs**
II	**ENCLOSED SPACE ENTRY AND WORK PERMIT** Procedure & precautions on entry into dangerous space, duties and responsibilities of officer, Entering Enclosed or Confined Spaces – General – Precautions on Entering Dangerous Spaces – Duties and Responsibilities of a competent Person and of Responsible Officer – Identifying potential Hazards -oxygen Deficiency –Flammability – Other Hazards – Preparing and Securing the Space for Entry-work permit – Toxicity – Testing for oxygen Deficiency – Procedures and Arrangements Before Entry – Procedures and Arrangements During Entry – Drills and Rescue –Resuscitation Equipment – Laders – Gangways. Lighting – Safety signs – Guarding of openings	**17 Hrs**
III	**MAINTENANCE OF SAFETY DEVICES AND PRECAUTION OF FIRE EXPLOSIONS** Testing and maintaining of life boat, fixed CO_2 flooding – Various types of portable extinguisher, – Maintenance of Equipment – Training, Instruction and Information – Statutory Regulations. breathing apparatus – accident causes and prevention – engine room –scavenging fire - metal fire in boiler – battery room, main switch board - hot work permit check lists. Safety on Cargo handling – Storage Precautions – Precautions in Maual Handling of goods-Precautions in working afloat and outboard-Safey in Galley and Pantry.	**17 Hrs**
IV	**MARPOL 73-78 M.S 1958** MARPOL 73-78 M.S 1958.Purpose of the act. Annex-I-Use of oil record book 1 -Entry of oil record book -oil record book part 2 – Ship board oil pollution prevention emergency plan (SOPPEP) - Bunkering procedure. Annex-II-Definition – categories -disposal of noxious substances. Annex-III-Definition -IMDG Code – packing – marking – labelling – documentation – stowage -transportation Annex-IV-Definition -disposal of sewage Annex-V-Definition -disposal of garbage Annex-VI-Control of emission – CFC, Nitrous oxide, sulphur oxide, incinerator smoke - international air pollution certificate.	**17 Hrs**

V **INTERNATIONAL SAFETY MANAGEMENT (ISM), PORT STATE CONTROL INSPECTIONS** **17 Hrs**

ISM-objectives – safety and environmental protection policy-company responsibilities and authority – Designated person – master responsibility and authority -emergency preparedness-report and analysis of non conformities –maintenance of the ship and equipment-documentation – company verification and review and evaluation –certificate verification and control -master co operation of inspection –document verification of port state control officer –customs and other Govt. officials inspection of stores and personal verification of sailing staff & Passengers –Survey of safety equipments – code of signals.

Text Book: Ship board operation H.I.LAVERY Last Edition 1990 , Publisher British library cataloguing in publication data

SOLAS IMO publications Last Edition 2001 MARPOLE 73 / 78 IMO Last Edition 1997

Reference Book: Ship safety and environmental protection, Vikram Gokhale, N. Nanda Edition 2003 N.G. Engineering publications

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MRC420 MODEL QUESTION PAPER

Time: 3Hrs **Max Marks: 75**

[N.B: 1. Answer all question choosing any two from part (a) and any one from part (b).
2. Each sub division in part (a) carries 4marks and part (b) carries 7marks.]

1	a)	1.	How will you protect yourself against drowning?	4
		2.	Write short notes on safety helmets.	4
		3.	How do you protect face an eyes while rescue operation?	4
	b)	1.	Elaborate the action in the event of fire.	7
		2.	Discuss the application respirators.	7
2	a)	1.	How will you protect ladders and gang ways from corrosion?	4
		2.	What are the general advices to be given to sea fares on safety?	4
		3.	Write short notes on “Rope Ladders”	4
	b)	1.	Write an essay on construction standards of access equipment.	7
		2.	Write an essay on special circumstance and general guidance in ship.	7
3	a)	1.	Write on the arrangement before entry into confined spaces.	4
		2.	What are the responsibilities of a component person?	4
		3.	Write about Toxicity of OM cargoes.	4
	b)	1.	Give detailed account on potential hazards of oxygen deficiency.	7
		2.	Permit-to-work Explain in details.	7
4	a)	1.	Write about precautions against fire and explosion.	4
		2.	What are all the precautions to be taken during electric arc welding?	4
		3.	Write short notes on “ROPE”	4
	b)	1.	Write an essay on manual lifting general guidance to sea fares.	7
		2.	Explain the operation of welding equipments.	7
5	a)	1.	Give a brief account on stowage of cargo.	4
		2.	How to maintain refrigerator room?	4
		3.	What are the desired qualities of team members ?	4
	b)	1.	Write an essay on health and hygiene of sea farers.	7
		2.	Explain in detail- Housing keeping.	7

CENTRAL POLYTECHNIC COLLEGE

(AN AUTONOMOUS INSTITUTION)

DIPLOMA IN MARINE ENGINEERING

C SCHEME

2016 -2017 onwards

II YEAR

IV SEMESTER

MEC430– ELECTRICAL DRIVES AND CONTROL

MEC430: ELECTRICAL DRIVES AND CONTROL

Total Hours / Week **:6 Hrs/Week**
Total weeks / Semester **:15 Weeks/Sem**
Total Hours **:90**

RATIONALE:

The automation is being the order of the day to improve the production with high quality consciousness. Such automation involves electrically operated switches, sensors controlled through electrically driven motors and actuators. The subject aims in introducing the basic electrical DC and AC circuits and motors and also focuses Curriculum Development Centre, DOTE. Page 89
on the various special control devices like stepper, servo drives and its controlling elements.

OBJECTIVES:

Students must be able to:

- Explore fundamental electric circuit laws.
- Explain the working principle of DC and AC Electrical machines.
- Identify the effective uses of drives of Electrical machines.
- Analyze the various power supply circuits.
- Select the field controlled elements.
- Explain the construction and working of Transformer.
- Compare the different types of Logic gates.
- Appreciate the safety practices followed in Electrical system.
- Compare the use of servo motors and stepper motors in electrical driving
- system
- Identify PLC Input outputs.
- Identify the use of Control elements.

Topics and Allocation of Hours

SI.No.	Topic	Time(Hrs)
1.	DC CIRCUITS AND DC MACHINES	17
2.	AC CIRCUITS AND AC MACHINES	17
3.	STEPPER AND SERVO MOTORS & DRIVES	17
4.	POWER SUPPLIES AND LOGIC GATES	16
5.	CONTROL ELEMENTS AND PLC	16
	TEST AND REVISION	07
		90

MEC430: ELECTRICAL DRIVES AND CONTROL
DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I	**DC CIRCUITS AND DC MACHINES** Definition- Electric current, voltage and resistance -Ohm's law and Kirchoff's law. Resistance in series and parallel and series, parallel – simple problems electromagnetism(definitions only) – magnetic flux, flux density magnetic field intensity, MMF, permeability, reluctance, Faraday's law of electromagnetic induction, electrical and mechanical units DC generators – construction, principle of operation, types and application. DC motors: - construction, principle of operation, types and application. Necessity of starters: Three point, four point starters.	**17 Hrs**
II	**AC CIRCUITS AND AC MACHINES** Fundamentals of AC voltage, and current – peak, average, RMS value of sine wave, frequency, time period, amplitude, power and power factor (definition only)- star and delta connection relationship between phase, line voltage and current in star and delta connections. Transformer: Principle of operation and construction – EMF equation (no definition)- losses in Transformer – efficiency – application. Alternator construction – principle of operation – types and applications. AC machine: AC motors- Principle of operation of single phase capacitor start and universal motor induction motor- applications- Three phase induction motors – Squirrel cage and slip ring Induction motors (construction and working principle only) - application – speed control of 3Φ Induction motor -Necessity of starters – DOL and star/delta starter.	**17 Hrs**
III	**STEPPER AND SERVO MOTORS & DRIVES:** PMDC, Stepper motor- construction and working principle and applications - Servo motor – types: brushless servo motor, permanent magnet servo motor construction and applications. Industrial drives- types, group drive, individual drive, multi motor drive, block diagram of Variable frequency drive , stepper motor drive: single stepping and half stepping. Servo drives. Electrical safety: - importance of earthing - electric shock: first aid, precautions - causes of accident and their preventive measures. Energy conservation	**17 Hrs**
IV	**POWER SUPPLIES AND LOGIC GATES** Diode – terminals: anode and cathode, forward biasing and reverse biasing – use of diode in rectifiers – half wave and full wave – necessity of filters- Regulated power supplies: IC voltage regulators – SMPS, UPS and Inverters – General description and their applications. Display devices – LED, 7 segment LED, LCD	**16 Hrs**

Logic gates: Positive and negative logic, definition, symbol truth table, Boolean expression for OR, AND, NOT, NOR, NAND, EXOR AND EXNOR gates – Universal logic Gates: NAND, and NOR.

V CONTROL ELEMENTS AND PLC 16Hrs

Fuses – selection of fuse – necessity of fuse- fuse switch units.
Sensors: Photo electric sensor, Inductive proximity sensors, Temperature sensors.
Switches: Push button switch, selector switch, limit switch, pressure switch,
temperature switch, float switch and reed switch.
Relays – NO, NC – usage- bimetallic thermal overload relays.
Contactors- usage – necessity of contactor- Solenoid type contactor
Circuit breakers – Miniature case Circuit breaker (MCCB) and Miniature Circuit
breaker (MCB), Oil Circuit breakers (OCB), Earth leakage circuit breaker (ELCB)
Features of PLC-PLC Block diagram- PLC scan - Fixed and modular PLC Ladder logic-NO, NC contacts-Coils-AND, OR.

Text Books:

1) A course in electrical engineering - B.L.Theraja - Multi Colour Edition, S Chand & Co, Reprint 2006
2) Control of Machines - S.K Bhattacharya, Brijinder Singh – New Age Publishers, Second Edition- Reprint 2010
3) Electronic Circuits & System- Analog and Digital – Y.N.Bapat - Tata Mc Graw Hill.

Reference Books:

1) Electrical Technology – Hughes - 8th Edition, Pearson Education.
2) Electronic Device and Circuits- An introduction – Allen Mottershed - Prentice Hall of India

CENTRAL POLYTECHNIC COLLEGE

(AN AUTONOMOUS INSTITUTION)

DIPLOMA IN MARINE ENGINEERING

C SCHEME

2016 -2017 onwards

II YEAR

IV SEMESTER

MRC440– SHIPING PRACTICE

MRC440: SHIPPING PRACTICE

Total Hours / Week **:5 Hrs/Week**
Total weeks / Semester **:15 Weeks/Sem**
Total Hours **:75**

RATIONALE:

In an important place because latest technology is being employed in the field of construction and repair of ships. The knowledge of shipping terms, welding, hull construction, hull dynamics and launching is required for the marine engineer.

OBJECTIVES:

- At the end of the study of III Semester the student will be able to Understand the ship terms, movement of ships and the various materials used in ship building.
- Acquire knowledge about different types of ships
- Study about different welding practices, welding tests, soldering and brazing in ships.
- Acquire broader ideas about shell & deck plating and stresses acting on the hull.
- Understand about hull dynamics and paintings.
- To study about ship trials and launching.

Topics and Allocation of Hours:

Sl.No.	Topic	Time(Hrs)
1.	Shipping Company, Organisation and Chatering	15
2.	Carriage of Goods by Sea Act-Freight-shippapers	15
3.	Marine insurance	15
4.	Merchant Shipping Act, Lloyd's Register of Shipping	15
5.	Voyage estimate, containerisation	15
		05
TOTAL		80

MRC440: SHIPPING PRACTICE

DETAILED SYLLABUS

Unit	Name of the Topic	Hrs
I	**Shipping Company, Organisation and Chatering:** **1.1** The shipping company-organisation of shipping company-various Departments in the company-Liner ship-Tramp ship-Group Oragnisation-Different services-Passenger services-cargo services- specialised service-shipping card-closing date and time-Mate receipt-cargo plan **1.2** The ship owner-the ship owner and merchant-duties of ship owner-ship owner's liability-role of merchant shipper- forwarding in the groups shipper. **1.3** Bill of Lading-Various Types-importance-Liabilities-signing-Liner way bill **1.4** Chartering-charter parties-chartering vessels-various types of chartering-voyage-time-demise-bare boat	15 Hrs
II	**Carriage of Goods by Sea Act-Freight-ShipPapers:** **2.1** Carriage of Goods by Sea Act 1971 2.2 Indian Carriage of goods act by sea 1925,Right and Immunity under these rule-carrying of dangerous and hazardous cargo. **2.3** Freight-Calculation of freight - Various types of freights-actual-lumsum-dead-back-advance-stoppage in transitute **2.4** Ship papers and procedure of ship's entering and leaving port-Declartion of Health-Deratisation Certification-official log customs procedure.	15 Hrs
III	**Marine Insurance:** **3.1** Definition and Principles of marine Insurance-Insurable Interest-Utmost good Faith-Proximate cause-Indemnity- subrogation**.** **3.2** Ship owner's Liabilities-Contractual Liabilities-Third Party Liabilitie-Collision Liabilities **3.3** Marine Losses-Total Loss-Contructive Total Loss-Partial Loss-General Average Loss-Protection and Indemnity Clubs. **3.4** Marine Insurance act.General Insurance Corportion-Loss Prevention Association of India-Insurance surveyors-salvage association-Average Adjuster **3.5** Proposal for the insurance-content in proposal form-various risk coverages.Payment of premiums.Policy Conditions-Valuation.	15 Hrs
IV	**Merchant Shipping Act, Lloyd's Register of Shipping:** **4.1** Merchant shipping act 1958-Brief Content in MS Act- Amendment and Notices Issuing. **4.2** Lloyd's Register of Shipping-Rules and regulations-Lloyds underwriters-Lloyds Agents **4.3** Summary of Merchant Ship-statistical table-casuality of returns- summary of ships totally host- Lloyds column 1.7	15 Hrs
V	**Voyage Estimate,Containerisation:** **5.1** Voyage estimate-PrepAration-Importance-Bulk Carriers Estimate **5.2** Preparation of estimates for Tankers **5.3** Points to be observed during estimate-Cargo calculation **5.4**Containerization-advantage-disadvantages-documents for containerization	15 Hrs

Text Book **:** Reeds ship construction – E.A. Stroke, -2005 Ship construction-Edrich Fernands Publishers: Pro-Navigator books Reference Book: Notes on ship construction -Capt. Dara E. Driver By Rumar Publications.

Reference Book: Ship construction-Edrich Fernands Publishers: Pro-Navigator books Reference Book: Notes on ship construction -Capt. Dara E. Driver By Rumar Publications.

MRC440 MODEL QUESTION PAPER

Time: 3Hrs **Max Marks: 75**

[N.B: 1. Answer all question choosing any two from part (a) and any one from part (b).
2. Each sub division in part (a) carries 4marks and part (b) carries 7marks.]

1	a)	1.	Write down the duties of ship owner	4
		2.	Write down the importance of bill of lading.	4
		3.	Write the significance of demise charter	4
	b)	1.	Explain about organization of shipping company	7
		2.	Explain about ship owner's liability	7
2	a)	1.	Write short notes carrying dangerous cargo	4
		2.	Write about the cargo charge	4
		3.	Write shorts on customs procedure	4
	b)	1.	Explain about 1. Huge rules 2. Hamburg rules	7
		2.	Explain about procedures of entering and leaving the port	7
3	a)	1.	Write about marine insurance	4
		2.	Write short notes on marine losses	4
		3.	Write about the third party liability	4
	b)	1.	Explain about marine insurance act	7
		2.	Explain about contractual liabilities.	7
4	a)	1.	Write the purpose of MRPOL ACT 1973-78	4
		2.	Write short notes on ship building returns.	4
		3.	Write about containerization	4
	b)	1.	Explain about rules and regulation on construction of ship	7
		2.	Explain about summary of ships totally lost	7
5	a)	1.	Write down the purpose of voyage estimates	4
		2.	What are the points to be consider for voyage estimates	4
		3.	Write about cargo calculation	4
	b)	1.	Explain about preparation of voyage estimate	7
		2.	Explain about pollution caused by hazardous cargo	7

CENTRAL POLYTECHNIC COLLEGE

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C SCHEME

2016 -2017 onwards

II YEAR

IV SEMESTER

MRC450– WORKSHOP TECHNOLOGY II PRACTICAL

MRC450: WORKSHOP TECHNOLOGY-II PRACTICAL

Total Hours / Week	**:4 Hrs/Week**
Total weeks / Semester	**:15 weeks/Sem**
Total Hours	**:60**

RATIONALE:
To have knowledge on common basic machining operations

OBJECTIVES:

- Identify the parts of a drilling machine, milling machine and grinding machine and their functions.
- Use tools and instruments for drilling, milling, and grinding.
- Identify the work holding devices
- Hold the work in proper work holding devices.
- Set the tools for various operations.
- Operate drilling machine, milling machine and grinding.
- Machine a component drilling machine, milling machine and grinding machine
- Follow safety practices while machining.

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SCHEME OF EXAMINATION

Drilling	:35 Marks (1 ½ hrs)
Milling / Grinding (by lot)	:35 Marks (1 ½ hrs)
Viva-voce	:05 Marks
Total marks	**:75 Marks**

WORKSHOP TECHNOLOGY PRACTICAL – II

(Drilling, Milling and Grinding)

List of Exercises:

1. Drilling:

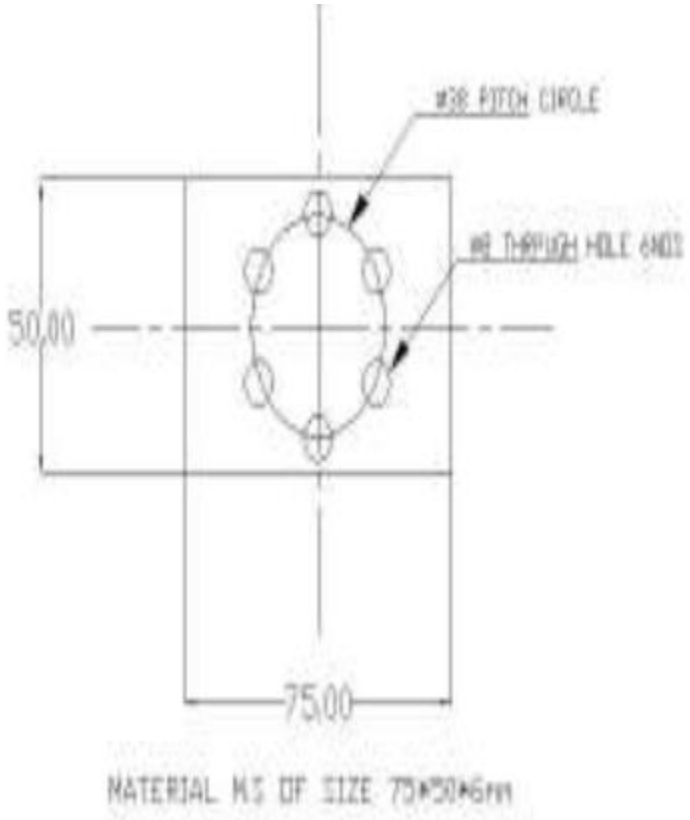
a) Through hole drilling
b) Through hole drilling with counter sunk
c) Part drilling
d) Through hole drilling (on pitch circle)

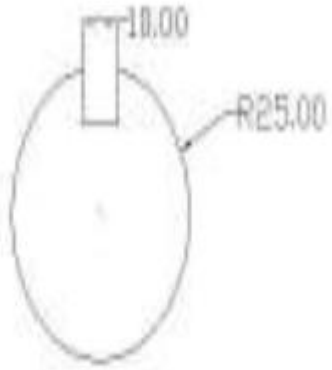
2.Milling:

a) Milling a cube
b) Milling a slot
c) Milling a gear

3.Grinding :

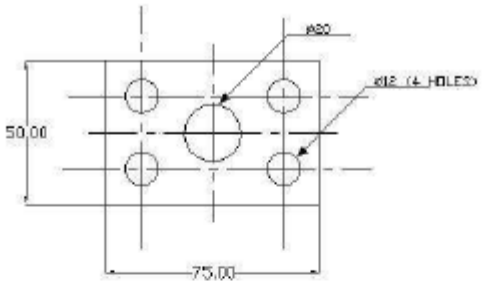
Surface grinding





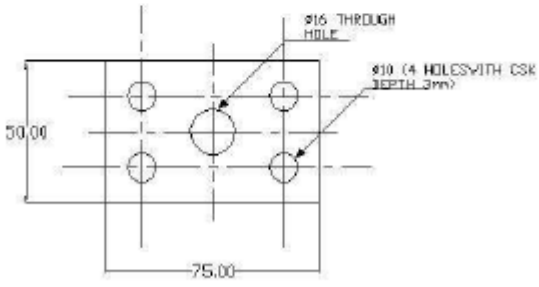
MATERIAL M.S OF SIZE Ø25

THROUGH HOLE DRILLING



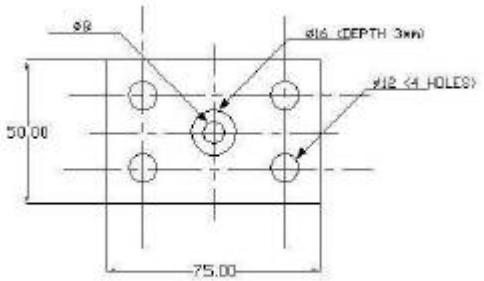
MATERIAL M.S OF SIZE 75*50*6MM

THROUGH HOLE DRILLING WITH COUNDER SUNK

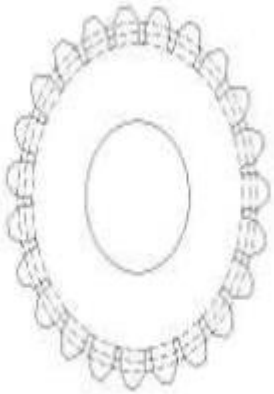


MATERIAL M.S OF SIZE 75*50*6MM

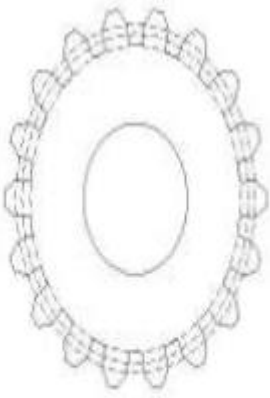
PART DRILLING



MATERIAL M.S OF SIZE 75*50*6MM



OUTERDIAMETER Ø =50mm
MODULE (m) =2mm
TEETH (T) =23nos



OUTERDIAMETER Ø =50mm
MODULE (m) =2mm
TEETH (T) =18nos

MODEL QUESTIONS FOR THE BOARD PRACTICAL EXAMINATIONS

1. Use the milling machines and machine given specimen as shown in the sketches.

2. Use the drilling machine and do the drilling operations the given specimen as per the drawing shown in figures.

3. Use the grinding machine and machine the surface as per the drawing shown in the figure.

SPECIFIC INSTRUCTIONS TO CARRY OUT THE PRACTICAL CLASS WORK AS WELL AS THE BOARD EXAMINATIONS PRACTICALS.

1. All the experiment given in the list of experiments should be completed and given for the end semester practical examination.

2. The record of every completed exercise should be submitted in the subsequent practical classes and marks should be awarded for 20 for each exercise.

3. All the end of the semester the average marks of all the exercise should be calculated for 20 marks and the marks awarded for attendance is to be added to arrive at the sessional mark for practical.

4. All the marks entries for exercise should be entered in the personal log book of the staff, who is handling the subject.

LIST OF EQUIPMENTS AND THE QUANTITY REQUIRED FOR A BATCH OF 30 STUDENTS

1. Surface grinding machine - 01
2. Milling M/C - 02
3. Drilling M/C - 02

SAFETY PRECAUTIONS TO BE FOLLOWED

1. Always worn apron, shoe and safety glasses.
2. Always check speed, feed and stroke length before running the machine.
3. Do not clean and clamp when machine running.
4. Do not hold the job in hand in drilling operation.
5. Switch off the machines when not in use.

CENTRAL POLYTECHNIC COLLEGE

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DIPLOMA IN MARINE ENGINEERING

C SCHEME

2016 -2017 onwards

II YEAR

IV SEMESTER

MEC460– ELECTICAL DRIVES AND PRACTICAL CONTROL

MEC460: ELECTRICAL DRIVES AND CONTROL PRACTICAL

Total Hours / Week	**:4 Hrs/Week**
Total weeks / Semester	**:15 weeks/Sem**
Total Hours	**:60**

OBJECTIVES:

- Identify starters for different motors.
- Study and prepare earthing
- Test the characteristics of DC and AC machines.
- Identify and select controlling elements.
- Explore the performance of ELCB, MCB.
- Design regulated power supplies.
- Identify display devices - LED, 7 segment LED, LCD.
- Identify the drive circuit for special motors.
- Test the speed control circuit of the special motors

Note: All the exercises are to be completed. One exercise from Part A and another one from Part B should be given for the Examination.

SCHEME OF EXAMINATION

Part A:	**35**	**MARKS**
Circuit diagram	05	MARKS
Connections & Readings	15	MARKS
Calculations & Graph	15	MARKS
Part B	**35**	**MARKS**
Circuit diagram	05	MARKS
Connections & Readings	15	MARKS
Execution	15	MARKS
Viva Voce	**05**	**MARKS**
Total	**75**	**MARKS**

MEC460: ELECTRICAL DRIVES AND CONTROL PRACTICAL

LIST OF EXPERIMENTS:

Part A:

1. Verification of Ohm's Law
2. Testing of DC starters – 3 point and 4 point starter
3. Load test on DC shunt motor
4. Testing of AC starters - DOL , star - Delta starter
5. Load test on single phase induction motor
6. Load test on three phase squirrel cage motor
7. Testing of relays, contactors, push buttons and limit switch
8. Connection and Testing of MCB, ELCB

Part B

9. Construction and testing of Half wave and Full wave rectifier.
10. Construction and testing of IC voltage regulator using IC 7805.
11. Verification of truth tables for logic gates.
12. Verification of universal gates.
13. Identification and testing of display devices- LED, 7 segment LED, Laser diode.
14. Testing of Stepper motor drive.
15. Testing of Servo motor drive.

LIST OF EQUIPMENTS

Electrical Lab

1. DC ammeter 0-5A - 1no
2. DC ammeter 0-25A - 1no
3. DC voltmeter 0-30V - 1no
4. DC voltmeter 0-300V - 1no
5. Rheostat 10.8 ,8.5A - 1no
6. AC ammeter 0-5A - 1no
7. AC ammeter 0-10A - 2nos.
8. AC voltmeter 0-50V - 3nos
9. AC wattmeter 5A-10A - 3nos (0-750W,0-600V)
10. Loading rheostat 5A,230V - 1no
11. Tachometer 0-1000rpm - 1no (Analog type)
12. Variac 20A,250V - 2nos (Auto transformer)
13. 3 point starter 20A,220V - 1no
14. DOL starter 16A,415V - 1no
15. Star /Delta starter 20a,600V - 1no
16. Over load relay 1 to 2.5A - 1no
17. Air break contactors 20A,220V - 4nos
18. Push button 2A ,220V - 2nos
19. Limit switch 20A,220V - 1no
20. MCB 20A single pole - 1no
21. MCB 20A double pole - 1no
22. ELCB 2pole 20A,100mA - 1no
23. ELCB 4POLE 20A,100mA - 1no

Electronics Lab

1. Transformer 230 / 9-0-9V, 1A - 4 nos.
2. Resistor 1 K□ / ½ W - 3 nos.
3. Capacitor 1000 F/25V - 4 nos.
4. IC 7805 - 1 no.
5. Logic Gates IC 7400, 7408, 7432, 7404, 7402, 7486- 1 each
6. Stepper Motor Drive kit - 1no.
7. Servo Motor Drive Kit - 1no
8. Digital Multimeter - 1no.
9. LED, 7Segment LED, Laser Diode - 1 each

CENTRAL POLYTECHNIC COLLEGE

(AN AUTONOMOUS INSTITUTION)

DIPLOMA IN MARINE ENGINEERING

C SCHEME

2016 -2017 onwards

II YEAR

IV SEMESTER

MRC470– COMPUTER AIDED MARINE ENGINEERING DRAWING PRACTICAL

MRC470: COMPUTER AIDED MARINE ENGINEERING DRAWING PRACTICAL

Total Hours / Week	**:5 Hrs/Week**
Total weeks / Semester	**:15weeks/Sem**
Total Hours	**:75**

RATIONAL:

The contemporary progressing world is fast with the latest production systems. The advanced manufacturing of products is developed instantly using CAD Software. Even a small scale industry is now using a CAD software as it has become the heart of the design department. So CAD has now become inevitable in industries. Accuracy and Precision are the two important things that decide the quality of a product to survive its competitors in the market. Using CAD software design, the uniform accuracy, multiples of copies and storing in a small space for long time are assured.

The CAD software considerably improves the creativity and flexibility of a designer. The syllabus here enables a candidate to draw an industrial drawing within the optimum reach of diploma cadre

OBJECTIVES:

- Appreciate the need of sectional view and types of sections.
- Draw sectional views using different types of sections.
- Explain the use of threaded fasteners and the types of threads.
- Compare hole basis system with shaft basis system.
- Select different types of fits and tolerance for various types of mating parts.
- Practice on AutoCAD commands in making 2D drawings.
- Draw assembled drawings of different types of joints and couplings using AutoCAD
- Draw assembled drawings of various types of machine elements using AutoCAD.

TOPIC AND ALLOCATION OF MARKS

Unit	**Topic**	**Time (Hrs)**
I.	Section views	5
II.	Limits, fits and tolerances	5
III.	Keys and surface finish	5
IV.	Screw Threads and fasteners	5
V.	Auto CAD Theory and Practice	50
Revision and Test		5
Total		**75**

MRC470- COMPUTER AIDED MARINE ENGINEERING DRAWING PRACTICAL

DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I		**5 Hrs**
	SECTION VIEWS: Introductions – need for sectioning – Hatching – Inclination of hatching lines – Spacing between hatching lines – Hatching of larger areas – Hatching of adjacent parts – sketch and explanation of full section, Half sections – types, Partial or local sections, Revolved or super unposed sections, Removed sections and offset sections.	
II	**LIMITS, FITS AND TOLERANCES:**	**5 Hrs**
	Introduction – Definition of various terms used in limits – Hole system – Shaft basis system – Types of fits – Selection of fits and applications – types of tolerances– form and position – Indication of tolerances and fits on the drawing.	
III	**KEYS AND SURFACE FINISH :**	**5 Hrs**
	Introduction – Types of keys – taper keys – Parallel or feather keys – wood druff keys-– Empirical relation between diameter of the shaft and width & thickness of key for the above types of keys. Definition – Nominal surface – roughness – waviness – lay – productions methods and surface quality – symbol for lay – Indication of surface roughness for various machining operations.	
IV	**SCREW THREADS AND THREADED FASTENERS:**	**5 Hrs**
	Introduction – Nomenclature of screw threads – Basic profiles and forms of screw threads – Left hand and right hand threads – Internal and external threads – Drawing of Vee and square threads – Application of threads – Bolts and Nuts – Drawing of Hexagonal bolt and Nut – Drawing of square head bolts – Riveted head – Types.	
V	**Auto CAD Theory and Practice :**	**15Hrs**
	Introduction – open-save-save as-exit-Limits, Units-Line command-Abs coordinate System-Relative Polar-Different toolbars in screen-explanation Draw commands-Circle-Arc-Ellipse-Rectangle-Spline-pline-Donut Editing Commands-Array-mirror-break-copy-rotate-chamfer-fillet-move-offset-scale-trim-extend-strecth-plineedit-pedit-xplode -Isoplane-isocircle-ortho-osnap-grid-snap-Display commands-Zoom-pan-oops-regen-viewres. Layer – Properties-create Layer-laytrans-matchprop-Text Command-text-mtext-textedit-mtedit-Dimensioning commands- DimLinear, Dimaligned, Dimradius, Dimdia, Dimangular, Dimbaseline, Dimcontinuous, Dimstyle, Dimedit,- BLOCK, Insert block, Divide, Measure, Bhatch-Attdef, attedit, Isometric Drawing, Pagesetup, Plot preview, plot	

Marine Component Drawing Practice **35 Hrs**

1. Isometric Drawing
2. Spigot and Cotter Joint.
3. Knuckle Joint.
4. Universal Coupling.
5. Protected Type Flange Coupling
6. Feed Check Valve
7. Stop Valve
8. Connecting rod of Diesel Engine
9. Steam Blow off Cock

Revision and Test **5Hrs**

Text Books:

1. N. D. Bhatt, Machine Drawing, Edn. 37, Charotar Publishing House, Opp. Amul Dairy, Court Road, Anand 388 001, India – 2002.

2. K. R. Goplakrishnan, Engineering Drawing, Dhanalakshmi Publishers, M97-B, 30th Cross Street, 7th Avenue, Besant Nagar, Chennai 600 090.

3. R.C.Parkinson, Engineering Drawing published by English University Press, London – 1986.

Reference Book:

A.C. Parkinsan, A First year Engineering Drawing. First Rep 1982, A.H. Wheeler & Company (P) Ltd., 15, L. B. Shastri Marg, Allaghabed – 211 001.

MRC470- COMPUTER AIDED MARINE ENGINEERING DRAWING PRACTICAL
MODEL QUESTION PAPER – 1

PART A

Answer all question: **1x10=10marks**

1. ---------- and ---------- two types of memory
2. ------ is the prompt used to get the last erased object
3. -------- and ---- are the available screen in Auto CAD
4. To resolute the drawing ---------- command is used.
5. @ 2.0 prompt is used in ---------- method.
6. @ 2<0 prompt is used in ---------- method.
7. --------- command removes the object from a drawing.
8. To great a drawing file ------ command is used.
9. Polygon is a ---------- object.
10. ---------- and --------- are the options to draw the polygon.

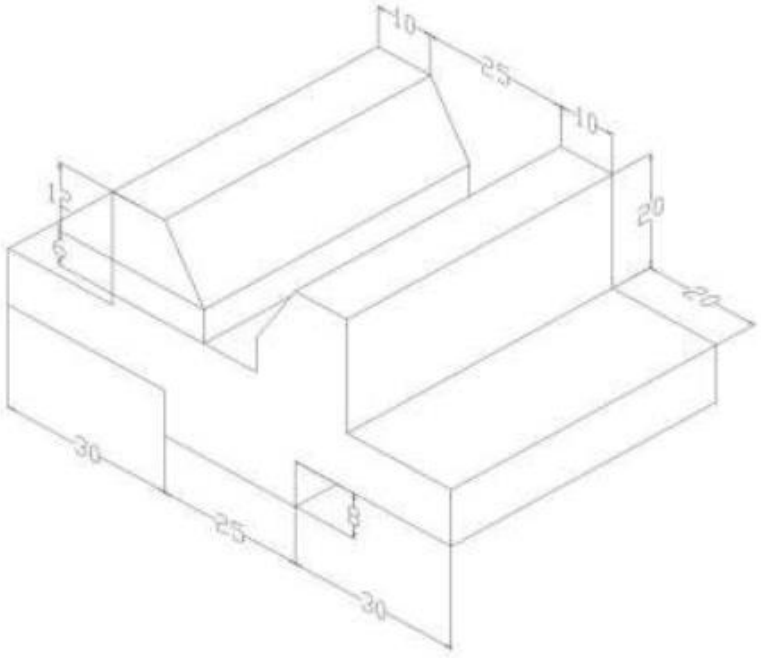
PART B **- 20 Marks**

Write a Auto CAD command for the given drawing in annexure-I

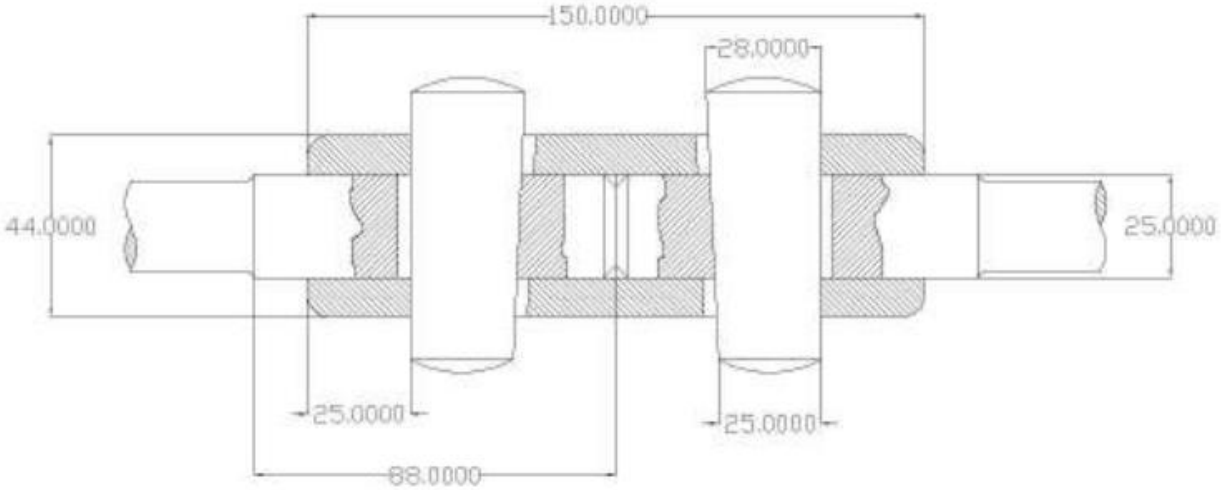
PART C **- 45 Marks**

The following assembled view for the given drawing in annexure –II

ANNEXURE – I



ANNEXURE - II



MRC470- COMPUTER AIDED MARINE ENGINEERING DRAWING PRACTICAL
MODEL QUESTION PAPER – 1

PART A **1x10=10 marks**

Answer all question:

1. --------- Command is used to type text in the drawing.
2. ---------- Command is used to edit your text.
3. Noun/Verb object selection can be used with trim command (T/F)
4. ---------- methods are in text's justify prompt.
5. %%O is used to get the --------- special character.
6. %%P is used to get the ---------- special character.
7. %% C is used to print the --------special character.
8. %% % is used to print the --------special character.
9. %% D is used to get the --------special.
10. %% U is used to get the --------special character.

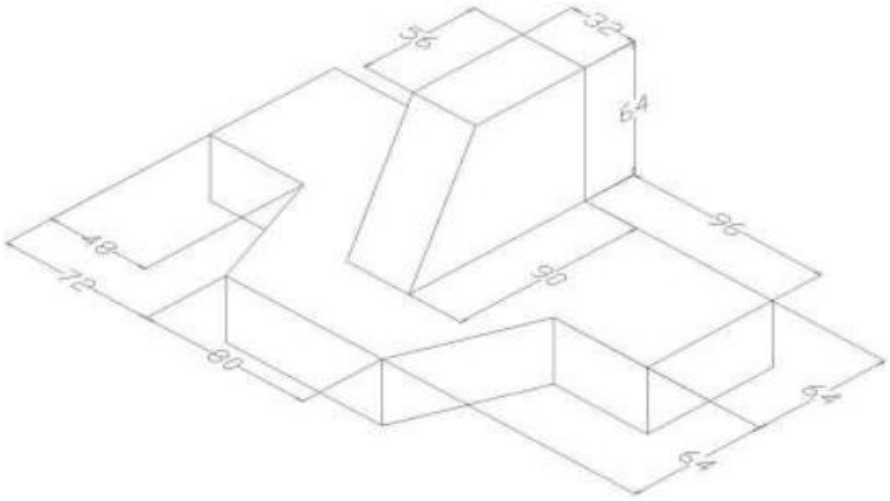
PART B **20 marks**

Write an Auto CAD command for the given drawing in annexure – I

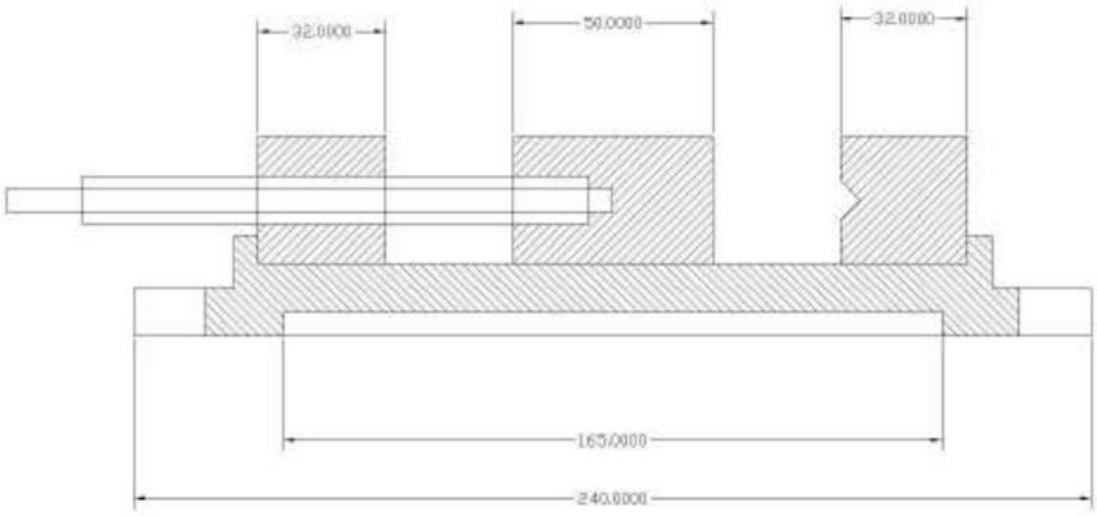
PART C **45 Marks**

Draw the following assembled view for the given drawing in annexure –II

ANNEXURE – I



ANNEXURE – II



SCHEME OF EXAMINATION

Sectional Elevation - 20
Plan (or) Side view - 15
Bill of materials - 5
Viva – voce – 5

LIST OF EQUIPMENT

1. Personal computer (With latest processor to suit Auto CAD) – 30 No’s
2. MS Windows OS – 30 No’s
3. AutoCAD software (release 2000 or above) – 30 Users

CENTRAL POLYTECHNIC COLLEGE

(AN AUTONOMUOUS INSTITUTION)

DIPLOMA IN MARINE ENGINEERING

C - SCHEME

2016 -2017 onwards

III YEAR

V SEMESTER

MRC510– ENTREPRENEURIAL DEVELOPMENT

MRC510 ENTREPRENEURIAL DEVELOPMENT

Total Hours / Week **:5 Hrs/Week**

Total weeks / Semester **:15 weeks/Sem**

Total Hours **:75 Hrs**

SI.No.	Topic	Time(Hrs)
1.	1.1 INTRODUCTION TO ENTREPRENEUR 1.2 CHARACTERISTICS OF AN ENTREPRENEUR. 1.3 CLASSIFICATION OF ENTREPRENEURS	14
2.	2.1. THE ENREPRENEURIAL SCENE IN INDIA 2.2. FACTORS INFLUENCING ENTREPRENEURSHIP	14
3.	3.1. ENREPRENEURIAL GROWTH 3.2. PROMOTIONAL AND DEVELOPMENTAL INSTITUTIONS/AGENCIES 3.3. FINANCIAL INSTITUTIONS	14
4.	4.1. WOMEN ENTREPRENEURS. 4.2. SMALL SCALE INDUSTRIES. 4.3. EXPORTS.	14
5.	5.1. STARTING OF AN ENTERPRISE (General Introduction Only). 5.2. PROJECT REPORT – (Brief introduction only)	14
	TEST AND REVISION	05
		75

MRC510: ENTREPRENEURIAL DEVELOPMENT

DETAILED SYLLABUS

Unit	Name of the Topic	Hrs
I	**1.1 INTRODUCTION TO ENTREPRENEUR.** Meaning – Origin of the term – Definition – Application of the term in Business – Historical Development of the entrepreneur – Need, Role and importance of Entrepreneurship – scope of Entrepreneurial Development. **1.2 CHARACTERISTICS OF AN ENTREPRENEUR.** An introduction – Characteristics of an Entrepreneur – Features of Successful Indian Entrepreneur – Related terms – common myths on Entrepreneur. **1.3 CLASSIFICATION OF ENTREPRENEURS.** Types of Entrepreneurs – Innovative Entrepreneurs – Initiative or Adaptive Entrepreneurs – Fabian Entrepreneurs – Drone Entrepreneurs – Classification of Entrepreneurs – According to Type of Business – According to Technology – According to Motivation – According to Growth – According to the Stage of Development – According to the Chosen path.	14 Hrs
II	**2.1. THE ENREPRENEURIAL SCENE IN INDIA..** The Past Scenario – Evolution of Indian Entrepreneurship – The advent of the East India Company – Swadeshi Campaign – Ideology of MahathmaGandhi on Entrepreneurship – The current Scenario – The future scenario – the Role of Entrepreneurship in Economic Development. **2.2. FACTORS INFLUENCING ENTREPRENEURSHIP.** Factors Influencing the Emergence of Entrepreneurship – Internal Factor – Family Atmosphere – Categories of Internal Factors – External Factor – Political Environment – Social and Cultural Environment – Economic Environment – Legal Environment – Lay off, Retrenchment and Closure – technological Environment – government and Non – Government policies, programmes and incentives – Barriers to Entrepreneurship.	14 Hrs
III	**3.1. ENTREPRENEURIAL GROWTH** Entrepreneurial Growth – Role of the Government and non-government agencies in promoting Entrepreneurship in India – Promotion role – Supportive role – Regulator Role – Role of various Agencies in Promoting Entrepreneurship. **3.2. PROMOTIONAL AND DEVELOPMENT INSTITUTIONS / AGENCIES. (Objectives, role and functions only):** Entrepreneurship Development programs (EDPS). – Industrial Estates – Khadi and village industries commission (KVIC) – Small industries service institutions (SISI) – State industries promotions corporations of Tamilnadu (SIPCOT) – Self employment schemes – small industries development corporation (SIDCO) – Technical Consultancy Organization (TCO) – Small Industry Extension Training Institute (SIETI) – The National Institute of Small industries Extension Training (NISIET) – National Small industries Corporation(NSIC) – Small Industries Development Organization(SIDO) – District Industries Centre(DIC) – Micro, Small and Medium Enterprises	14 Hrs

3.3. FINANCIAL INSTITUTIONS(Objectives, Roles and Functions only) :

Industrial Development Bank Of India (IDBI) – Industrial Finance Corporation Of India (IFCI) – Industrial Credit Corporation of India(ICICI) – Industrial Investment Bank of India (IIBI) – Small Industries Development Bank Of India(SIDBI) – Tamil Nadu Industrial Investment Corporation(TIIC) – Commercial Banks

IV **4.1. WOMEN ENTREPRENEURS.** **14 Hrs**

Women Entrepreneurs – Definition – problems of women entrepreneurs – Steps to encourage Women Entrepreneurs – business opportunities for Women Entrepreneurs – future of women Entrepreneurs – Rural Entrepreneurs – Definition – Problems.

4.2. SMALL SCALE INDUSTRIES.

Role of SSI to the growth of Indian Economy – Benefits to the SSI – Tax benefits – Seed Capital Assistance by IDBI and TIIC – Concessions – Subsidies to the SSI – Misuse of Concessions, Incentives and Subsidies – Problems of Small Enterprises – Sickness of SSI – Definition – Reasons for Sickness.

4.3. EXPORTS.

Small exporters – Export Promotion Measures – Any of Steps taken by the Government to Boost Exports – Export Procedures – Problems in Export – Import – Meaning – General introduction only.

V **1. STARTING OF AN ENTERPRISE (General Introduction Only).** **14 Hrs**

Various Stages of Starting An enterprise – Business Idea Generation Techniques = Identification of Business Opportunities – Marketing Feasibility – Financial and Economic Feasibility – Technical Feasibility – Legal Feasibility – Managerial Feasibility – Locational Feasibility – Other Feasibilities.

2. PROJECT REPORT – (Brief introduction only) Classification of projects - Meaning Of Project Report - Meaning Of Project Report – Cover Page – Table Of Content – Executive Summery – Industry and Company – Products and Services – market Research and Analysis – the Economies of Business – Marketing plan – Design and Development plans – Manufacturing and Operational Plan – Management Team – Overall Schedule – Risks and Problems – Financial plan – Proposed Company Offerings – Appendices. Project appraisal (Meaning only)

REFERENCE BOOKS:

Entrepreneurial Development By Dr. Jayashree Suresh, Marghan Publications
Entrepreneurial Development By Dr. S.S. Khanka, S.Chand&Company

MRC510 MODEL QUESTION PAPER

Time: 3hrs Max Marks: 75

[N.B: 1. Answer all question choosing any two from part (a) and any one from part (b).
2. Each sub division in part (a) carries 4 marks and part (b) **carries** 7 marks]

1	a)	1.	What are entrepreneur and its origin?	4
		2.	Explain about any 2 common myths about entrepreneurs?	4
		3.	What are the functions of an entrepreneur?	4
	b)	1.	Explain about the historical development of the term ‘’Entrepreneurs’’	7
		2.	Explain about the different types of Entrepreneurs.	7
2	a)	1.	What is the role of Entrepreneurs in Indian economic development?	4
		2.	What are the benefits and contributions made by Entrepreneurs in Indian Economy?	4
		3.	List out the factors influencing the Entrepreneurship.	4
	b)	1.	Discuss about the various Internal factors influencing Entrepreneurship.	7
		2.	Explain about the current scenario of Entrepreneurship in India.	7
3	a)	1.	What are supportive role of Govt. &non –Govt. agencies for Entrepreneurial growth in India.	4
		2.	List out any 4 Financial Institutions/agencies for Entrepreneurial development.	4
		3.	What are the functions of technical consultancy organization?	4
	b)	1.	Explain about the various schemes offered by TIIC.	7
		2.	Briefly explain about the role, functions Entrepreneurial development program.	7
4	a)	1.	What are the problems factors by the women Entrepreneurs?	4
		2.	Define ‘’Sick Industry’’. What are the symptoms of sick industry?	4
		3.	What are the problems in export?	4
	b)	1.	Discuss about various steps taken by the Govt. & Non Govt. organization to encourage women Entrepreneurs.	7
		2.	Briefly discuss about the problems of Rural Entrepreneurs.	7
5	a)	1.	What are the contents to be given in the cover page of a project report?	4
		2.	What is business idea generation and briefly explain.	4
		3.	What is Technical feasibility and briefly explain.	4
	b)	1.	What are the various stages of starting an Enterprise? Explain briefly	7
		2.	What is project report? Mention its importance.	7

CENTRAL POLYTECHNIC COLLEGE

(AN AUTONOMUOUS INSTITUTION)

DIPLOMA IN MARINE ENGINEERING

C - SCHEME

2016 -2017 onwards

III YEAR

V SEMESTER

MRC520– THERMODYNAMICS

MRC520: THERMODYNAMICS

Total Hours / Week **:6 Hrs/Week**
Total weeks / Semester **:15 Weeks/Sem**
Total Hours **:90 Hrs**

RATIONALE:

The marine engineer working in the engine room of the ship need to have a basic knowledge of thermodynamics. He should know about the theoretical cycles, steam and its properties. The engineer should know about the basic principle of working of engines. The engineer in watch keeping duty should have knowledge about thermodynamics to maintain the machineries in the engine room.

OBJECTIVES:

At the end of the study of V Semester the student will be able to

- Understand about the engine cycles and working of various engines.
- Study of steam and its properties.
- Know about the working of boiler, mountings and accessories
- Study about turbine, condenser, cooling towers.
- Acquire broader ideas about basic principles of refrigeration and air conditioning.

Topics and Allocation of Hours:

Sl.No.	Topic	Time(Hrs)
1.	BASIC THEORY AND STRESSES OF ENGINE	17
2.	STEAM	17
3.	BOILERS	17
4.	TURBINE, CONDENSER, COOLING TOWERS	17
5.	REFRIGERATION AND AIR CONDITIONING	17
	TEST AND REVIEW	05
TOTAL		90

MRC520: THERMODYNAMICS

DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I	**Basic theory and stresses of Engine :** Laws of Thermodynamics-Theoretical cycles-Carnot cycle – otto cycle – diesel cycle-comparison of cycle – compression ratio – engine specification–mean piston speed mechanical efficiency – engine testing – brake power-indicated horse power- Heat Equilance of IP,BHP – flash point – fire point – specific gravity – viscosity – calorific value of fuel – stress and strain – brittle fracture fatigue – engine dynamical system – the firing sequence of four and six cylinders.	**17 Hrs**
II	**Steam :** Introduction – formation of steam – wet steam – dry steam – super heated steam – advantage of super heated steam –dryness fraction –wetness fraction enthalpy of wet, dry, superheated steam – specific volume of water – specific volume of steam – density of steam – external work of evaporation internal energy of steam – latent heat – entropy of wet, dry, superheated steam – steam tables – T-s and H – s charts	**17 Hrs**
III	**Boilers :** Boiler-Introduction – classification-la-mont boiler – BHEL'S high pressure boiler – advantage of high pressure boiler –boiler mountings and accessories – safety valves – water level indicator-pressure gauge – fusible plug – steam stop valve –blow cock-man holes -air preheated – super heater – economiser -feed pump – feed check valve-steam dryer – steam trap-method of feed water treatment – internal and external treatment – starting of boiler in cold condition – safety precaution in boiler operation	**17 Hrs**
IV	**Turbine, condenser, cooling towers :** Introduction -steam power cycles – rankine cycle – carnot cycle – pressure compounding – velocity compounding – pressure velocity compounding – impulse turbine – reaction turbine – comparition of impulse and reaction turbine. Condenser – introduction – elements of condensing plant – classification of condenser – surface condenser(down flow, central flow ,evaporative condenser) – merits and demerits of surface condenser – condenser vacuum – condenser efficiency – cooling towers terms – dry cooling towers(direct and indirect type) – wet cooling tower(forced draft and induced draft)	**17 Hrs**
V	**Refrigeration and Air conditioning :** Refrigerator -Introduction –classification –refrigeration cycle – common refrigerant – Primary and Secondary Refrigerant - ammonia sulphur dioxide – carbon di oxide – refrigerants of Freon – Humidity – Humidity Ratio – Ozone depletion - Air conditioning **–** introduction – psychometric properties – dry air – moist air – dry bulb temperature – wet bulb temperature – dew point temperature -dew point depression – humidity – relative humidity – psychometric chart – sensible heating process – sensible	**17 Hrs**

cooling process – comfort air conditioning – industrial air conditioning – window air conditioning – central air conditioning system – loads encountered in air conditioning system- Infiltration and ventilation loads – procedure for calculating heating loads

Text Book **:** 1.Thermal Engg,P.L.Ballaney,DhanbatRai publication,
2.Thermal Engg, R.S. Khurumi, shandich publication

MRC520 MODEL QUESTION PAPER

Time: 3hrs Max Marks: 75

[N.B: 1. Answer all question choosing any two from part (a) and any one from part (b).
2. Each sub division in part (a) carries 4 marks and part (b) carries 7 marks]

1	a)	1.	Explain (i) Carnot cycle (ii) Compression ratio.	4
		2.	Explain about different types of stress.	4
		3.	Explain about Fatigue and Brittle fracture.	4
	b)	1.	Explain & Write important factor to be consider in 4 strokes in line cylinder Engine firing order. N	7
		2.	Explain (i) Otto cycle (ii)diesel cycle	7
2	a)	1.	Write the comparison of impulse & reaction turbine.	4
		2.	Explain the wet cooling towers.	4
		3.	Explain about dryness fraction and its importance.	4
	b)	1.	Explain the classification of steam.	7
		2.	Explain the Dryness fraction enthalpy wet, dry and superheated steam?	7
3	a)	1.	Write short notes on starting of boiler in cold conditions.	4
		2.	Explain about safety precautions in boiler operation.	4
		3.	Explain about types of condenser.	4
	b)	1.	Explain the Lamont boiler with neat sketch.	7
		2.	Explain (i)) Economizer (ii) Method of feed water treatment.	7
4	a)	1.	Explain about evaporative condensers.	4
		2.	Explain about the steam stop valve.	4
		3.	What are the merits of surface condensers?	4
	b)	1.	Explain (i) ranking cycle (ii) Carnot cycle.	7
		2.	Explain the surface condensers (i) Down flow (ii) Central flow (ii) evaporative condensers.	7
5	a)	1.	Explain about the Sensible cooling process.	4
		2.	Write the desirable properties for refrigerant.	4
		3.	Define 1. Dew point temperature 2. DBT.	4
	b)	1.	Explain the central Air conditioning system.	7
		2.	Explain the properties of the following Refrigerant, (i) Ammonia sulphur di- oxide (ii) Freon (iii) CO_2.	7

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C - SCHEME

2016 -2017 onwards

III YEAR

V SEMESTER

MRC530– MARINE AUXILLARY MACHINERY

MRC530: MARINE AUXILIARY MACHINERY

Total Hours / Week **:6 Hrs/Week**
Total weeks / Semester **:15 Weeks/Sem**
Total Hours **:90 Hrs**

RATIONALE:

The students have learned about marine diesel engines in the fifth semester marine engineering. It should be noted that the main engine need the support of auxiliary machineries. The engineers are responsible for the repair and maintenance of all auxiliary machineries onboard the ship. Hence a basic knowledge about the working of auxiliary machineries is required.

OBJECTIVES:

At the end of the study of VI Semester the student will be able to

- Understand about the fresh water system, oil water separator deck machinery.
- Know about the working of steering machineries.
- Study about incinerator, sewage plant, pumps and purifiers.
- Acquire broader ideas about refrigeration and air conditioning plants in ships.
- Understand about piping system and vibration.

Topics and Allocation of Hours:

Sl.No.	Topic	Time(Hrs)
1.	FRESH WATER SYSTEM, MARINE POLLUTION MACHINERY, DECK MACHINERY	17
2.	BLOWERS AND COMPRESSORS, STEERING SYSTEM,	17
3.	SHIP BOARD EQUIPMENTS, PUMPS AND PURIFIERS	17
4.	MARINE REFRIGERATION, VENTILATION, HEAT EXCHANGERS	17
5.	PIPING SYSTEM AND VIBRATION	17
	TEST AND REVIEW	05
TOTAL		90

MRC530: MARINE AUXILIARY MACHINERY
DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I	**Fresh Water System, Marine Pollution Machinery, Deck Machinery:** Evaporators: Construction and operation of boiling type and flash type evaporators -fresh water generator and Domestic water treatment plant. Pollution prevention oily bilge separators their construction and operation – oil content monitoring system-Bilge level maintenance-bilge pump (gear with reciprocating) -type of deck machinery used in ships (winch - windlass-davits-derricks-cranes, their requirements operation and maintenance.)	**17 Hrs**
II	**Blowers and Compressors, Steering System :** Construction and operation of Blowers and compressors used on board ships -uses of compressed air -steering gears -Construction and operation of 2-RAM steering system ,4-RAM steering system , rotary vane steering system . Telemoter systems -transmitters and receivers, variable delivery pumps used in steering gears-Emergency steering arrangement under water fittings (propellers, rudder, bow thrusters)-maintenance of hull.	**17 Hrs**
III	**Ship board equipments, Pumps and Purifiers :** Auxiliary engines (power generators) – Incinerators-chemical sewage treatment plant – biological sewage treatment plant –blocks- Different types of ship stabilizer -Different types of bearings used for marine machineries. Pumps used in ships-centrifugal pump –reciprocating pump - gear pumps –screw pump-axial flow pump –jet pump-purifiers (fuel oil and lube oil) - pipe fittings-Various types of belts in use.	**17 Hrs**
IV	**Marine Refrigeration, Ventilation, Heat exchangers :** Vapour compression system –COP-vapour absorption system-Refrigerants used in marine practice and their justification-properties of refrigerant-Control of temperature in various rooms in Cargo or domestic plants, Ventilation necessity – International requirements for ventilation- Types of air circulation-control in Humidity in Air Conditioning plants, operation and maintenance of Air Conditioning plants control and safety equipment – heat exchangers (shell & tube and plate type) –compressor type-performance-condensers-Evaporators-Expansion Devices.	**17 Hrs**
V	**Piping system and Vibration** Piping Systems – fire main systems –fixed Carbon dioxide system -fresh water systems – sea water systems-fuel oil systems -lubricating oil systems – main steam systems – Bilge systems -overflow systems –vents Vibration-source of vibration-various modes of vibration (forced, damped, transverse, longitudinal and torsional). vibrations mountings-Noise – source of noise on ships – noise suppression techniques – noise level measurement	**17 Hrs**

Text Book : Marine Auxiliary Machinery by Mc. George
Reference Book : Marine Auxiliary Machinery by Smith

MRC530 MODEL QUESTION PAPER

Time: 3hrs Max Marks: 75

[N.B: 1. Answer all question choosing any two from part (a) and any one from part (b).
2. Each sub division in part (a) carries 4 marks and part (b) carries 7 marks]

1	a)	1.	Briefly explain the operation of an oily bilge separator.	4
		2.	Explain MARPOL ACT.	4
		3.	Explain fresh water generator.	4
	b)	1.	Explain the various types of deck machinery used in ships.	7
		2.	What are the methods of preventing oil pollution?	7
2	a)	1.	What is a compressor and write the uses of compressed air?	4
		2.	State hunting action of steering gear.	4
		3.	Compare axial displacement type steering and radial displacement type steering gear.	4
	b)	1.	Explain the working of FOUR RAM mechanism with a neat sketch.	7
		2.	Explain the procedure for removal and fitting of a propeller.	7
3	a)	1.	Write note on anchor tackles.	4
		2.	Write a note on hull protection arrangements.	4
		3.	Compare rotary pumps and gear pumps.	4
	b)	1.	Write an essay on different types of bearing used for marine machineries.	7
		2.	Write short notes on i) Bilge pumps ii) Drain pumps iii) screw pumps.	7
4	a)	1.	Write a short note on refrigerator.	4
		2.	What is the necessity of ventilation?	4
		3.	Write note on air conditioning and safety equipment.	4
	b)	1.	Explain the property of refrigerants used specifically for marine practice Justification.	7
		2.		7
5	a)	1.	Explain the ballast piping system with a neat sketch.	4
		2.	Write short notes on vibration and noise.	4
		3.	Write a note on torsi graph.	4
	b)	1.	With neat sketch explain torsional vibration dampers.	7
		2.	Write notes on the following i) Brine system ii) Fuel oil system iii) vent system.	7

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C - SCHEME

2016 -2017 onwards

III YEAR

V SEMESTER

MRC541– SEAMANSHIP AND LIFE SAVING APPLIANCES

MRC541: SEAMANSHIP AND LIFE SAVING APPLIANCES

Total Hours / Week **:5 Hrs/Week.**
Total weeks / Semester **:15 Weeks/Sem.**
Total Hours **:75 Hrs.**

RATIONALE:

Diploma holders in marine engineering should have enough knowledge about different types of ropes and their uses. Ropes are used to tie knots and to lift heavy materials. Different types of ropes have different properties and they are made up of different materials. Blocks and tackles are use to handle heavy materials. Ship maintenance is very important because the ship is sailing in rough weather and in salt water. Different life saving appliances is used in ship.

OBJECTIVES:

At the end of the study of V Semester the student will be able to

- Understand about different types of ropes and their properties.
- Know about the blocks, tackles and cargo work.
- Study about tank and bilge soundings in the ship.
- Acquire broader ideas about life saving appliances.
- Understand about abandon ship and boat sailing.

Topics and Allocation of Hours:

Sl.No.	Topic	Time(Hrs)
1.	ROPES, TYPES AND CONSTRUCTION	14
2.	BLOCKS, TACKLES AND CARGO WORK	14
3.	SHIP MAINTENANCE AND DUTIES	14
4.	LIFE SAVING APPLIANCES	14
5.	ABANDON SHIP AND BOAT SAILING	14
	TEST AND REVIEW	05
TOTAL		75

MRC541: SEAMANSHIP AND LIFE SAVING APPLIANCES

DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I	**Ropes, types and construction :** Ropes –Various types of ropes - Usage of Ropes on Board Ship - Vegetable fibre ropes, construction, coiling, faking, cheesing down, whipping, opening a new coil. Characteristics, care and maintenance Steel wire ropes – Construction, special types, coiling and uncoiling, cutting, opening a new coil, care and maintenance. Synthetic fibre ropes – material used, construction, special charecteristics and care of synthetic ropes – Splicing of Ropes, Handling of Ropes, Storing of Ropes, Comparision between Wire Rope Manila and Polyamide Rope	**14 Hrs**
II	**Blocks, tackles and cargo work :** Blocks – Various types of Blocks – Purpose for using Blocks - Parts of block, types of blocks, overhauling blocks, marking. Tackles, parts of tackles, types of tackles, power gained, Cargo works – Accident prevention when working cargo, Draft marks, Load lines, Hatch covers, preparing ship for sailing, Ventilation of cargo during the voyage. Tank and Bilge soundings – Shackles – Timbles – Wire Clamps, Hooks, Eyebolts, Turn Buckles – Lifting Equipment on Board – Mast Derricks – Deck Crane Etc.	**14 Hrs**
III	**Ship maintenance and duties** Ship Maintenance – Chipping, scrapping, painting, paint brushes, paints, types of paints, painting defects, Maintenance of wooden decks, Caulking.Watches and Bells. Bridge duties – Lights and signals for power driven ships under way, Ships at anchor, Ships not under command, ship ran aground – Avoidance of Collision requirements.	**14 Hrs**
IV	**Life saving appliances** Life saving appliances -Life buoys, Life jackets, Life boat, Marking on a life boat, Parts of life boat, Davits, Types of davits,Life boat equipment and their uses, Inflatable life raft and its equipments, Opening and operating lifecraft during emergency, Rigid life raft. Pyrotechniques – Hand flares, Rocket parachutes, Buoyant smoke signals – Immerssion suit-Thermal Protective aids – Requirement of life rafts and things to be kept – survey requirement of Life rafts-Anchor-Types os Anchor-Anchor Cable-Classification	**14 Hrs**
V	**Abandon ship and Boat sailing** Abandon ship – Emergency signal, Abandon ship signal, Survival at sea, Search and Rescue, Landing boat in a surf – EPIRB -SART -Boat sailing – Types of rig, Parts of a sail, Setting sail, Trimming the sails, Tending the helm, Sailing the boat, Sailing terms and orders, Reefing the sail.	**14 Hrs**

Text Book :Seamanship Primer By Capt J. Dinger

MRC541 MODEL QUESTION PAPER

Time: 3hrs Max Marks: 75

[N.B: 1. Answer all question choosing any two from part (a) and any one from part (b).
2. Each sub division in part (a) carries 4 marks and part (b) carries 7 marks]

1	a)	1.	Write about tank tops.	4
		2.	Explain about draft marks.	4
		3.	Explain briefly about polar water bergs.	4
	b)	1.	Write an essay on precaution in sailing tropical water.	4
		2.	Explain characteristic of wire rope.	7
2	a)	1.	Write briefly about purchase.	7
		2.	Explain about lockers.	4
		3.	What is the use of hatches in cargo ships?	4
	b)	1.	Write an essay on jumbo derricks.	7
		2.	What is the use of anchor? Explain any one type of anchor.	7
3	a)	1.	Explain about life buoys. Why it is called M.O.B marker?	4
		2.	Explain about life draft.	4
		3.	Write different types of life boat. Explain any one.	4
	b)	1.	Write rigging procedure for inflatable life raft.	7
		2.	Explain detection procedure of abandoned personal.	7
4	a)	1.	Explain about linear measurement.	4
		2.	Write about wet and dry bulb temperature. What is the use of it?	4
		3.	Explain about Echo sounder.	4
	b)	1.	Explain about rain gauge, how it measures the rain?	7
		2.	Explain gyro magnetic compass.	7
5	a)	1.	Explain abbreviation of charts.	4
		2.	Write about dead recording.	4
		3.	Explain current.	4
	b)	1.	Write an essay on winds action.	7
		2.	Write an essay on weather chart.	7

CENTRAL POLYTECHNIC COLLEGE

(AN AUTONOMUOUS INSTITUTION)

DIPLOMA IN MARINE ENGINEERING

C - SCHEME

2016 -2017 onwards

III YEAR

V SEMESTER

MRC542 – RULE OF THE ROAD

MRC 542: RULE OF THE ROAD

Total Hours / Week **:5 Hrs/Week**
Total weeks / Semester **:15 Weeks/Sem**
Total Hours **:75 Hrs.**

RATIONAL:

For safe navigation of the ship certain rules have been implemented. Every marine engineer should know about the international rules and regulations that are being followed the shipping industry. Enough knowledge about the maintenance of equipments is required.

OBJECTIVES:

At the end of the study of VI Semester the student will be able to

- Understand about the risk of collision and action to avoid collision.
- Know about the manoeuvring of ships.
- Study about different types of signals.
- Acquire broader ideas about the guidelines of IMO and other authorities.

Understand about lighthouse authorities and marks.

TOPICS AND ALLOCATION OF HOURS:

SI.NO.	**Topic**	**Time(Hrs)**
1.	ACTIONS AND RESPONSIBILITIES AT DIFFERENT SITUATIONS	14
2.	TRAFFIC REGULATIONS AND MANEUVERING	14
3.	SIGNALS AND BELLS	14
4.	IMOGUIDLINES	14
5.	LIGHTHOUSE AUTHORITIES AND MARKS	14
	TEST AND REVIEW	05
TOTAL		75

MRC 542 :RULE OF THE ROAD

DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I	**ACTIONS AND RESPONSIBILITIES AT DIFFERENT SITUATIONS:** Application-Responsibility – General definitions – Look out – Safe speed – Risk of collision – Action to avoid collision – Narrow channels – Traffic seperatoin schemes – Sailing vessels-Overtaking – Head on situation – Crossing situation – Action by give way vessel-Action by stand on vessel – responsibilities between vessels – conduct of vesselsin restricted visibility – Light and shapes – Definitions – visibility of lights – Power driven vessels underway – towing and puhsing – sailing vessels underway and vessels under oars – Fishing vessels	**14 Hrs**
II	**TRAFFIC REGULATIONS AND MANEUVERING** Vessels not under command or restricted in their ability to man-oeurve – vessels constrained by their draught – Pilot vessels anchored vessels and vessels aground – Seaplanes – Sound and light signals – Definitions – Equipment fir sound signals – Manoeurving and warning signals – Sound signals in restricted visibility – Signals to attract attention – Distress signals – Exemptions – Positioning and technical details of lights and shapes – Definition – Vertical positioning and spacing of lights – Details of location of direction indicating lights for vessels – Dredgers and vessels engaged in underwater operations – Screens for sidelights – Shapes colour specification of lights – Intensity of lights – Horizontal sectors – vertical sectors – Intensity of non-electric lights – Manoeurving light – High speed craft – Approval	**14 Hrs**
III	**SIGNALS AND BELLS** Additional signals for fishing vessels fishing in close proximity – signals for trawlers – Signals for purse seiners – Technical details of sound signal alliances - Whistes – Frequencies and range of audibility – Limits of fundamental frequencies – Sound signal intensity and range of audibility – Positioning of whistles – Fitting of more than one whistle – Combined whistle systems – Bell or gong – Intensity of signal – Construction – Approval – Distress signals	**14 Hrs**
IV	**IMO GUIDELINES** **I.M.O.'s** Guidance for the uniform application of certain rules of the 1972 coliision regulations – Clarification of the definition ''vessel constrained by her draught '', - Clarification of the application of the word ''underway', - Clarification of the implification of the words 'not to impede'as appearing – Clarification of the relation between – Clarification of the transference within a lane – Clarification on the use of inshore traffic zones by small vessels – Clarification of the relation between – Basic principles to be observed in keeping a navigational watch – Fitness or duty – Navigation – Navigation with pilot embarked – protection of the marine environment	**14 Hrs**

V LIGHTHOUSE AUTHORITIES AND MARKS **14 Hrs**

International association of lighthouse authorities maritime buoyage system – General principles of the system – Lateral marks – Cardinal marks – Isolated danger mark – safe water marks – Special marks – New dangers – Maritime buoyge system rules – scope – Type of marks – Method of characterizing marks – Definition of 'Conentional direction buoyage – Buoyage regions – Desription of lateral marks used in region.

Text Book Seamanship Primer By Capt J.Dinger

Reference Book Survial in Life boat and life raft By Capt. S.K.Puri

Survival at sea The life boat and life craft C.H.Wright Edition 1993 Brownson & Furguson Ltd., Ship board operation H.I.Lavery 1993 British library cataloguing in publication.

MRC542 MODEL QUESTION PAPER

Time: 3hrs Max Marks: 75

[N.B: 1. Answer all question choosing any two from part (a) and any one from part (b).
2. Each sub division in part (a) carries 4 marks and part (b) carries 7 marks]

1	a)	1.	Explain about the narrow channels.	4
		2.	Explain about towing.	4
		3.	Explain about the power driven vessel.	4
	b)	1.	What are the regulations to be followed when vessel under way and vessel under oars?	7
		2.	Explain the traffic separation scheme.	7
2	a)	1.	What are sound signals?	4
		2.	Explain about sea planes.	4
		3.	Define signal density.	4
	b)	1.	Explain the positioning and technical details of lights and shapes.	7
		2.	Explain the operation of dredger and vessel engaged in under water operation.	7
3	a)	1.	Define positioning of whistles.	4
		2.	What are trawlers?	4
		3.	Explain about gong.	4
	b)	1.	Explain the technical details of sound signal alliances.	7
		2.	Explain the important signals for trawlers and purse seiners.	7
4	a)	1.	Define collision.	4
		2.	Define traffic cones.	4
		3.	What is navigation?	4
	b)	1.	Explain and write the brief notes on collision.	7
		2.	What are the basic principles to be observed in keeping navigation watch?	7
5	a)	1.	Define new danger.	4
		2.	What is light house?	4
		3.	Why different marks required?	4
	b)	1.	Explain the international association of light house authorities.	7
		2.	Explain the description of lateral marks used in region.	7

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C - SCHEME

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III YEAR

V SEMESTER

MRC550– MARINE AUXILLARY MACHINARY PRACTICAL

MRC550: MARINE AUXILIARY MACHINERY PRACTICAL

Total Hours / Week	**:4 Hrs/Week**
Total weeks / Semester	**:15 Weeks/Sem**
Total Hours	**:60 Hrs**

RATIONALE:

The students are to learn about marine diesel engines in the sixth semester marine engineering. It should be noted that the main engine need the support of auxiliary machineries. The engineers are responsible for the repair and maintenance of all auxiliary machineries onboard the ship. Hence a basic knowledge about the working of auxiliary machineries is required.

Guidelines:

- All the Ten experiments given in the list of experiments should be completed and given for the end semester practical examination.
- In order to develop best skills in handling Equipments and taking readings in the practical classes, every five students should be provided with a separate experimental setup for doing experiments in the laboratory.

SCHEME OF EXAMINATION

Demonstration	:25 Marks
Procedure	:25 Marks
Diagram with parts	:10 Marks
Result	:10Marks
Viva	:05 Marks
Total Marks	**:75 Marks**

MARINE AUXILIARY MACHINERY PRACTICAL

LIST OF EXPERIMENTS

1. Dismantling and assembling of winch.
2. Dismantling and assembling of oil-water separator.
3. Dismantling and assembling of centrifugal pump.
4. Dismantling and assembling of reciprocating pump.
5. Dismantling and assembling of gear with reciprocating pump.
6. Dismantling and assembling of purifier.
7. Study about corrosion. Practice of chipping and painting of corroded parts.
8. Dismantling and assembling of compressor.

LIST OF EQUIPMENTS

1. Winch -1 No.
2. Oil-water separator -1 No.
3. Centrifugal pump -1 No.
4. Reciprocating pump -1 No.
5. Gear with reciprocating pump -1 No.
6. Purifier -1 No.
7. Chipping hammer, wire brush, paint and painting brush - 6 sets.
8. Air compressor -1 No.

INSTRUCTIONS TO CARRY OUT THE PARCTICAL CLASS WORK AS WELL AS THE BOARD EXAMINATIONS PRACTICALS.

1. All the experiment given in the list of experiments should be completed and given for the end semester practical examination.
2. The record of every completed exercise should be submitted in the subsequent practical classes and marks should be awarded for 20 for each exercise.
3. All the end of the semester the average marks of all the exercise should be calculated for 20 marks and the marks awarded for attendance is to be added to arrive at the sessional mark for practical.
4. All the marks entries for exercise should be entered in the personal log book of the staff, who is handling the subject.

SAFETY PRECAUTIONS TO BE FOLLOWED

1. Always wear shoes.
2. Always use good conditions tools during the work
3. Appropriate safety device should be used
4. Switch off the machines when not in use.

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C - SCHEME

2016 -2017 onwards

III YEAR

V SEMESTER

MRC561– SEAMANSHIP AND LIFE SAVING APPLIANCES PRACTICAL

MRC561: SEAMANSHIP AND LIFE SAVING APPLIANCES PRACTICAL

Total Hours / Week	**:5 Hrs/Week**
Total weeks / Semester	**:15 Weeks/Sem**
Total Hours	**:75 Hrs**

RATIONALE:

Diploma holders in marine engineering should have enough knowledge about different types of ropes and their uses. Ropes are used to tie knots and to lift heavy materials. Different types of ropes have different properties and they are made up of different materials. Blocks and tackles are use to handle heavy materials. Ship maintenance is very important because the ship is sailing in rough weather and in salt water. Different life saving appliances is used in ship.

GUIDELINES:

 All the experiments given in the list of experiments should be completed and given for the end semester practical examination.
 In order to develop best skills in handling Instruments/Equipment in the practical classes, every two students should be provided with a separate experimental setup for doing experiments in the laboratory.
 The external examiners are requested to ensure that a single experimental question should not be given to more than four students while admitting a batch of 30 students during Board Examinations.

SCHEME OF EXAMINATION

Demonstration	:30 Marks
Diagram with parts	:15 Marks
Procedure	:20 Marks
Viva voce	:10 Marks
Total Marks	**:75 Marks**

MRC561: SEAMANSHIP AND LIFE SAVING APPLIANCES PRACTICAL

LIST OF EXPERIMENTS

Seamanship:

1. Study about the construction of different types of ropes and its uses (Bends and Hitches).
2. Preparation of different types of knots and its uses.
3. Study of different types of blocks and purchases and its applications.
4. Study about the construction and working of EPIRB.

Life saving appliances:

5. Study about the construction and working of life boat.
6. Study about the construction and working of life raft (inflatable).
7. Study about the construction and working of life raft (rigid).
8. Study about the construction and working of life buoy.
9. Study about the construction and working of life jacket.

LIST OF EQUIPMENTS

1. Different types of ropes (Bends and Hitches).
2. Different types of knots
3. Settings of sail
4. Different types of blocks
5. Emergency position indicating radio beacon (EPIRB).
6. Life boat.
7. Life raft (inflatable).
8. Life raft (rigid).
9. Life buoy.
10. Life jacket.

SAFETY PRECAUTIONS TO BE FOLLOWED BY STUDENTS

1. The ropes should not be stowed carefully away from moisture, heat and direct sunlight
2. Sharp edges should be kept away from the ropes.
3. Opened life rafts should not be kept with filled air. They should be stowed after releasing air.
4. The engine in the life boat should be kept disengaged from the propeller shaft.
5. Safety shoes and helmets should be used in the laboratory.
6. Shoe should not be worn while entering the life raft.

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C - SCHEME

2016 -2017 onwards

III YEAR

V SEMESTER

MRC562– RULE OF THE ROAD PRACTICAL

MRC562: RULE OF THE ROAD PRACTICAL

Total Hours / Week	**:5 Hrs/Week**
Total weeks / Semester	**:15 Weeks/Sem**
Total Hours	**:75 Hrs**

RATIONALE:

Every marine engineer should know about the international rules and regulations that are being followed in the shipping industry. Enough knowledge about the maintenance of equipments is required. For safe navigation of the ship certain rules have been implemented.

GUIDELINES:

- All the experiments given in the list of experiments should be completed and given for the end semester practical examination.
- In order to develop best skills in handling Instruments/Equipment in the practical classes, every two students should be provided with a separate experimental setup for doing experiments in the laboratory.
- The external examiners are requested to ensure that a single experimental question should not be given to more than four students while admitting a batch of 30 students during Board Examinations.

SCHEME OF EXAMINATION

Demonstration	:10 Marks
Figure with parts	:15 Marks
Procedure	:30 Marks
Result	:05Marks
Viva	:10 Marks
Total Marks	**:75 Marks**

RULE OF THE ROAD PRACTICAL

LIST OF EXPERIMENTS

1. Demonstration and study of lights and shapes.
2. Demonstration and study of sound and light signals
3. Demonstration and study about risk of collision
4. Demonstration and study about action to avoid collision
5. Demonstration and study of towing and pushing
6. Demonstration and study about positioning of lights and shapes
7. Demonstration and study of different types of buoyage
8. Demonstration and study of international code of signals
9. Demonstration and study of semaphore signal

QUESTION PAPER - RULE OF THE ROAD PRACTICAL

1. Explain and demonstrate lights and shapes.
2. Explain and demonstrate sound and light signals
3. Explain and demonstrate the risk of collision
4. Explain and demonstrate action to avoid collision
5. Explain and demonstrate towing and pushing
6. Explain and demonstrate the positioning of lights and shapes
7. Explain and demonstrate different types of buoyage
8. Explain and demonstrate international code of signals
9. Explain and demonstrate semaphore signal

INSTRUCTIONS TO CARRY OUT THE PARCTICAL CLASS WORK AS WELL AS THE BOARD EXAMINATIONS PRACTICALS.

1. All the experiment given in the list of experiments should be completed and given for the end semester practical examination.
2. The record of every completed exercise should be submitted in the subsequent practical classes and marks should be awarded for 20 for each exercise.
3. All the end of the semester the average marks of all the exercise should be calculated for 20 marks and the marks awarded for attendance is to be added to arrive at the sessional mark for practical.
4. All the marks entries for exercise should be entered in the personal log book of the staff,who is handling the subject.

LIST OF EQUIPMENTS

1. Navigational lights and shapes.
2. Navigational sound and light signals
3. Different types of buoyage
4. Semaphore signals

SAFETY PRECAUTIONS TO BE FOLLOWED BY STUDENTS

1. Do not touch, connect or disconnect any plug or cable without teacher’s permission
2. Don’t attempt to touch any live wires
3. Equipments should be switched off properly after completion of work

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C - SCHEME

2016 -2017 onwards

III YEAR

V SEMESTER

C0001– LIFE AND EMPLOYABILITY SKILLS PRACTICAL

C0001: LIFE AND EMPLOYABILITY SKILLS PRACTICAL

Total Hours / Week **:4 Hrs/Week**
Total weeks / Semester **:15 Weeks/Sem**
Total Hours **:60 Hrs**

RATIONALE

The present scenario unfolds a series of challenges that require a mastery of life skill. To confront with the challenges in the changing job environment and also to keep up with the rapid pace of modern life, life skills are to be honed and nurtured. Apart from the good understanding of the subject, the ability to communicate what one has in mind alone can take a student to greater heights. In an attempt to develop the communication skill, thereby, making them employable, the syllabus has been devised and titled as "Life and Employability Skills". At the end of the course, the students become viable in the job market and with the aid of the life skill they have acquired they can maintain their poise and mental equilibrium even in a stressful work environment.

SPECIFIC INSTRUCTIONAL OBJECTIVES TO

1. Emphasize and Enhance Speaking Skills
2. Increase Ability to Express Views & Opinions
3. Develop and Enhance Employability Skills
4. Induce Entrepreneurial skills
5. Accentuate Life Skills for Effective Managerial Ability

LIFE AND EMPLOYABILITY SKILLS PRACTICALSYLLABUS

Unit	Topics	Activity	Hours
I	**Communication, Vocabulary Enrichment, Listening, Training, Facing Interviews, Behavioural Skills**	_ "Wordsmithy" (Words within a word ,a vocabulary game) -- Visual Description -- FAQs in interviews self- introduction/another higher official in company – describe/explain product – frame questions based on patterns – make sentences based on patterns	**30**
II	**Entrepreneurship, Project Preparation**	-- prepare an outline of a project to obtain loan from bank in becoming an entrepreneur – prepare a résumé	**10**
III	**Productivity – comparison with developed countries, Effective Management, Occupational Accident &First Aid, Labour Welfare Acts & Rights**	-- search in the website -- prepare a presentation – discuss & interact	**05**

IV	**Interview Techniques, Effective Persuasive Communication, Non verbal Communication, Intercultural Communication, Business Etiquettes**	-- search in the website -- prepare a presentation – discuss & interact	**05**
V	**Environment, Global Warming, Pollution, Communal Harmony**	-- taking down notes / hints – answering questions -- filling the blanks with the exact words heard	**10**

LEARNING STRUCTURE **100 Marks**

-- Focus more on Speaking & Listening Skills
-- Attention less on Reading & Writing Skills
-- Apply the skills in fulfilling the Objectives on Focused Topics

a) Listening	**25 Marks**
1. Deductive Reasoning Skills (taking down notes/hints)	10
2. Cognitive Skills (answering questions)	10
3. Retention Skills (filling in the blanks with the exact words heard)	05
b) Speaking Extempore/ Prepared	**30 Marks**
1. Expressive Skills (describe/explain things)	10
2. Interview Skills&Behavioural skills(answering Questions in an interview)	05
3. Assertive Skills (introducing oneself/others)	05
4. Fluency/Compatibility Skills (dialogue)	05
5. Leadership/Team Spirit Skills (group discussion)	05
c) Writing & Reading	**20 Marks**
1. Vocabulary Enrichment	05
2.a. Creative & Reasoning Skills (frame questions on patterns)	03
b.Creative & Composing Skills (make sentences on patterns)	02
3. Attitude & Aim Skills (prepare a résumé)	05
4. Entrepreneurship Skills (prepare an outline of a project)	05
d) Continuous Assessment (Internal Marks)	**25 Marks**

(search,read, write down, speak, listen, interact & discuss)
1. Cognitive Skills (Google search on focused topics)
2. Presentation Skills& Interactive Skills (after listening, discuss)

Note down and present in the Record Note on any 5 topics (Focused Topics) **10 Marks**

Other activities recorded in the Record note (All the exercises in the syllabus under Listening, Speaking, Writing & Reading) **10 Marks**

Attendance **05 Marks**

INTERNAL MARKS	**25 MARKS**
EXTERNAL MARKS AT THE END EXAMINATION	**75 MARKS**

MODEL QUESTION

Time: 3 Hours **Maximum Marks: 75**

A. LISTENING **25 Marks**

1. Listen to the content and take down notes/hints 10
2. Listen to the content and answer the following questions. 10
3. Listen to the content and fill in the blanks with the exact words heard. 05

B. SPEAKING **30 Marks**

1. Describe the given picture/illustration in your own words 05
2. Imagine you are in an interview and answer the questions 05
3. Imagine, a consultant has come to your department. Introduce him to your subordinates. 05
4. Speak with your immediate boss about the progress you have made.(Dialogue) 05
5. Discuss within the group on the topic of focus in the syllabus. 10

C. WRITING & READING **20 Marks**

1. Find at least five different words (atleast 4 letters long) within the word ENTERTAINMENT. 05

2.a. Frame THREE new questions from the given pattern by changing sets of words with your own. 03

a.	When	do	you	return?
b.	How	is	his performance?	
c.	Where	has	the manager	gone?

b. Make TWO sentences from the given pattern by changing sets of words with your own. 02

a.	The workers	are	on strike	
b.	The laborers	are paid	well	in this factory.

3. Imagine you are Selvan S.Mohan of Chennai. Prepare a resume for the post of Department Manager. 05

4. Prepare an outline of a project to obtain a loan. (Provide headings and subheadings) 05

I. **Guidelines for setting the question paper:**

A. LISTENING : only topics related to pollution /environment / global warming / communal harmony are to be taken. These topics are common for all the three types of evaluation. For 1.& 2. A passage of a minimum of 100 words may be chosen 3. A passage of a minimum of 50 words may be given

B. SPEAKING :

1. A VISUAL / an ILLUSTRATION from the Daily / Magazine can be given.
2. Frequently asked questions in the interviews may be put forth to the students .

3. Questions such as "Introduce yourself as an engineer with Designation" or "Introduce the official visiting your company/department" may be asked.
4. Dialogue must be with someone in the place of work.
5. Group of six/eight, Discuss the focused topic prescribed in syllabus

C. WRITING & READING:

1. Word smithy -Words within a word- a vocabulary game
a. Words should be at least 4 letters long
b. Proper nouns do not count
c. Letters cannot be duplicated.
2. a. & b. provide five (Questions under section A and Statements under section B).different structures. Students are to substitute and make at least 3 questions from a) and two from b) with some other word/words.
3. Provide some post related to industries.
4. Outline of the project (skeleton/structure)
Only the various headings and subheadings are to be provided. Content is not needed

II. Guidelines for recording the material on the Focused Topics in the Record note

Write in the record note, **on any five topics,** from the list of topics given below. **10 Marks** (5 topics x 10 marks = 50 marks. Thus, the **Average of 5 topics is 10 Marks**)

1. Interview Techniques
2. Effective Persuasive Communication.
3. Non verbal Communication.
4. Intercultural Communication.
5. Business Etiquettes.
6. Entrepreneurship
7. Effective Management
8. Productivity in Industries – Comparison with developed countries
9. Occupational Accident and First Aid
10. Labor Welfare Acts and Rights

LABORATORY REQUIREMENT:

1. An echo-free room
2. Necessary furniture and comfortable chairs
3. A minimum of two Computers with internet access
4.A minimum of two different English dailies
5. A minimum of Three Mikes with and without cords
6. Colour Television (minimum size – 29")
7. DVD/VCD Player with Home Theatre speakers
8. Smart board
9. Projector

Suggested Reading:

1. Production and Operations Management by S.N. Chary, TMH
2. Essentials of Management by Koontz &Weihrich, TMH
3. Modern Production / Operations Management by E.S. Buffa and R.K. Sarin, John Wiley & Sons
4. Production Systems: Planning, Analysis and Control by J.L.Riggs, 3rd ed., Wiley.
5. Productions and Operations Management by A.Muhlemann, J.Oakland and K.Lockyer, Macmillan
6. Operations Research - An Introduction by H.A.Taha, Prentice Hall of India

7. Operations Research by J.K.Sharma, Macmillan
8. Business Correspondence & Report Writing by R.C. Sharma and K.Mohan, TMH
9. How to prepare for Group Discussion & Interview (With Audio Cassette) by Prasad, TMH
10. Spoken English – A self-learning guide to conversation practice (with Cassette)
11. Introduction to Environmental Engineering by Mackenzie, L. Davis and A. David, Cornwell, McgrawHill, 3rd Ed.
12. Environmental Engineering by Peary, Rowe and Tchobanoglous, McgrawHill
13. Total Quality Management – An Introductory Text by Paul James, Prentice Hall
14. Quality Control and Applications by Housen&Ghose
15. Industrial Engineering Management by O.P. Khanna
16. Influence:The Psychology of persuasion by Robert B. Cialdini, Collins.
17. Non verbal communication by Albert Mehrabian, Routledge,2007.
18. Indian Business Etiquette by Raghu palat, JAICO, 2008.
19. Intercultural Communication :The Indian Context by Ramesh N Rao & Avinash Thombre,SAGE India, 2015.

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DIPLOMA IN MARINE ENGINEERING

C SCHEME

2016 –2017onwards

III YEAR

VI SEMESTER

MRC610– NAVAL ARCHITECTURE

Total Hours / Week **:6 Hrs/Week**
Total weeks / Semester **:15 weeks/Sem**
Total Hours **:90**

RATIONALE:

Diploma holders in marine engineering should have enough knowledge about different parts of ship. They should know about the basic principles of naval architecture. They should know how the ship floats. Basic knowledge about the area and volume is required. They should know about propellers and rudders

OBJECTIVES:

At the end of the study of V Semester the student will be able to

- Understand how the ship floats in water.
- Know about the basic principles of naval architecture.
- Study about position of centre of gravity of the ship.
- Acquire broader ideas about area, volume and moment.
- Understand about stability of ships.
- Study about propellers and rudder.

Topics and Allocation of Hours:

Sl.No.	Topic	Time(Hrs)
1.	HYDROSTATICS AND CENTRE OF GRAVITY	17
2.	AREA, VOLUME AND MOMENT	17
3.	TRANSVERSE STABILITY	17
4.	LONGITUDINAL STABILITY AND RESISTANCE	17
5.	PROPELLER AND RUDDER	17
	TEST AND REVIEW	05
TOTAL		90

MR610: NAVAL ARCHITECTURE

DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I	**Hydrostatics and Centre of gravity:** Density -Relative density - Archimedes' principle -Floating bodies-Law of floatation- Displacement – Buoyancy –centre of Buoyancy- TPC –Immersion of vessel in sea water and fresh water-Coefficient of forms -Wetted surface area –Taylor's formula and Denny's formula-Similar figures. Centre of gravity -Shift in centre of gravity due to addition of mass -Shift in centre of gravity due to movement of mass -Effect of suspended mass.	**17 Hrs**
II	**Area, Volume and Moment :**Calculation of Area -Simpson's first rule – Second rule –Third rule-Application of Simpson's rule for calculation of Volume -Use of intermediate ordinates -Application of Simpson's rule for calculation of First and second moments of area -Calculation of Centroid - Trapezoidal rule –application-Tchebycheff's rule-application.	**17Hrs**
III	**Transverse Stability :**Definitions: Heel,List,Meta centre,Meta-centric height, Intact stability, Stiff and Tender ships, Angle of Loll.- Stability of ships -Statical stability at small angles of heel –Definitions-Righting Lever-Righting moment-Calculation of K.B,B.M,K.M,K.G and G.M of vessals of simple configurations-Stable, Unstable and Neutral equilibrium -Determination of the position of transverse metacentre -Calculation of KM for rectangular and triangular cross section Metacentric diagram - Inclining experiment -Free surface effect -Effect of tank divisions on free surface -Stability at large angles of heel -Dynamical stability -Stability of wall sided ship.-various stresses on ship, various curves used for calculation of strength.	**17 Hrs**
IV	**Longitudinal Stability and Resistance :**Definitions: Longitudinal B.M, Longitudinal G.M, Longitudinal meta-centric height MCT 1cm.- Trim - Centre of flotation -Mean draught -Change in draught due to addition of masses -Change in mean draught due to change in density – Bilging - Reserve buoyancy -Permeability. Shocking stability, Loss of stability due to grounding and docking Resistance – Frictional resistance -residuary resistance and total resistance -Effective power -Ship correlation factor - Admiralty Coefficient -Fuel coefficient and Fuel consumption.	**17 Hrs**
V	**Propeller and Rudder:** Propellers – Diameter – Pitch -Pitch ratio - Theoretical speed -Apparent slip -Real slip – Wake -Projected area - Developed area -Blade area ratio -Disc area ratio – Thrust -Relation between powers -Relation between mean pressure and speed - Measurement of pitch – Cavitation -Built and Solid propellers. Rudders - Force on rudder -Torque on stock -Angle of heel due to force on rudder - Angle of heel when turning.	**17 Hrs**

Text Book: Naval Architecture for Marine Engineers By E.A.Stokoe

Reference Books: Basic Ship Theory, Vol -I and Vol – II By Rawson and Tupper

MRC610MODEL QUESTION PAPER

Time: 3Hrs Max Marks: 75

[N.B: 1. Answer all question choosing any two from part (a) and any one from part (b).
2. Each sub division in part (a) carries 4marks and part (b) carries 7marks.]

1	a)	1.	Write short notes on about water plane area	4
		2.	What do you mean centre of buoyancy	4
		3.	Explain brief account about centroid of water plane	4
	b)	1.	Write an essay on centre on floatation and appendages	7
		2.	The equally spaced half ordinates of a water tight flat 27m long are 1.1, 2.7, 4.0, 5.1, 6.1, 6.9, and 7.7m respectively.	7
2	a)	1.	Write short notes about Co-efficient of form	4
		2.	Write about body plan calculation.	4
		3.	Explain shift in centre of gravity.	4
	b)	1.	A ship 135 long 18 m beam and 7.6m draught has a displacement of 140 tonnes. The area of the load water plane in 1925m^2 and the area of an immersed mid ship section is 130 m^2 . Calculate the water plane area co-efficient and mid ship section area co-efficient.	7
		2.	A ship of 500 tonnes displacement has a mass of 200 tonnes on the front deck 55 m forewords of mid ships. Calculate the shift in the centre of gravity of the ship if the mass in moved to a position 8m forward of mid ship.	7
3	a)	1.	Explain about stiff and tender ship	4
		2.	Write short notes on righting lever.	4
		3.	Write short notes on moment of statical stability.	4
	b)	1.	Write an essay on Inclining experiment.	7
		2.	Write an essay on stability of large angles of heels.	7
4	a)	1.	What is an orbit centres.	4
		2.	Write short notes on longitudinal stress in waves.	4
		3.	Write about mid ship section modulus.	4
	b)	1.	Explain (i) Hogging (ii) Sagging	7
		2.	Write about (i) Load curves (ii) Buoyancy Curves.	7
5	a)	1.	Write brief notes on Longitudinal G.M	4
		2.	Explain about moment to change trim 1 cm.	4
		3.	Write short notes on fresh water allowance.	4
	b)	1.	Write an essay about changes of trim and bilging	7
		2.	Give a detailed account an bilging an end compartment.	7

CENTRAL POLYTECHNIC COLLEGE

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DIPLOMA IN MARINE ENGINEERING

C SCHEME

2016 –2017onwards

III YEAR

VI SEMESTER

MRC620– MARINE DISEL AND POWER PLANT

Total Hours / Week **:6 Hrs/Week**
Total weeks / Semester **:15 weeks/Sem**
Total Hours **:90 Hrs**

RATIONALE:

The proper working and maintenance of the main engine is very important for the ship. Hence enough knowledge has to be acquired for proper running and maintenance of the main engine.

Knowledge about parts of the engine, working principles, functioning of cooling system, safety provisions and automation is necessary. Study of reciprocating steam engine, steam turbines and power generation by non conventional sources of the energy is also required.

OBJECTIVES:

At the end of the study of V Semester the student will be able to

- Understand the parts and working of I.C. engines.
- Acquire knowledge about starting and reversing system of marine diesel engines.
- Study about Cooling system, safety provision and Automation in marine diesel engines.
- Acquire broader ideas about reciprocating steam engine and steam turbines.
- Understand about power generation using conventional and non-conventional resources.

Topics and Allocation of Hours:

Sl.No.	Topic	Time(Hrs)
1.	MARINE DIESEL ENGINE – PARTS AND WORKING	18
2.	MARINE DIESEL ENGINE STARTING AND RUNNING	18
3.	COOLING SYSTEM, SAFETY PROVISION AND AUTOMATION IN MARINE DIESEL ENGINE	18
4.	STEAM ENGINE AND STEAM TURBINES	15
5.	POWER PLANT: GAS TURBINE, ATOMIC, SOLAR, WIND, TIDAL ENERGY	15
	TEST AND REVIEW	06
TOTAL		90

DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I	**MARINE DIESEL ENGINE – PARTS AND WORKING** Types of Engine – Classification of Engines - Engine components -cylinder-cylinder liner -Cylinder head-piston-piston rod – connecting rod-crank shaft-Stuffing box –cross head-piston rings – rocker arm arrangement – valves –inlet-exhaust –guides – springs – Valve guide -Push Rod - cam shaft – fly wheel-bed plates – Working Principles- 2 Stroke & 4 Stroke engines -working and comparison– spark ignition and compression ignition - working and comparison -types of scavenging systems -loop flow, cross flow and uni flow – turbo chargers and super charger – need of turbo charger for marine diesel engines - Factors affecting performance of marine engine – detonation and knocking.	**18 Hrs**
II	**MARINE DIESEL ENGINE STARTING AND RUNNING** Working of 4 cylinder and 6 cylinder in-line marine diesel engine – warm up procedure for main engine-various starting system - reversing systems - factors affecting perfomance of marine engine– Significant operating problems – Fuel systems – Timing Gears - Jerk and common rail systems need and importance of atomization – need for injector -design aspects of combustion chamber -compression pressure ratio – peak pressures –properties of fuel used in marinediesel engine- fuel grades and fuels Suitability – cetane value and octane number – Fuel Tank – Fuel Feed Pump.	**18 Hrs**
III	**COOLING SYSTEM, SAFETY PROVISION AND AUTOMATION IN MDE** Need for cooling- Types of Cooling -cylinder head and Jacket water cooling – lubrication oil cooling – piston cooling-.Need for safety provision – Governors -basic governor function and over speed governor-crank case explosion-oil mist detector-bursting disc to prevent explosion.Automation- Need for automation-viscosity controller, cooling water circuit – alarm system -scanning system	**18 Hrs**
IV	**STEAM ENGINE AND STEAM TURBINES** Marine Steam Engine classification, parts and working – steam turbines classification, parts and working. -Types of blades and methods of fixing -Warming up procedure for main propulsion turbine-methods of improving turbine efficiency –Comparision of reciprocating engine and turbine- - comparison of impulse and reaction turbine-general layout and description of modern geared steam turbine -materials used for various components in turbine-double reduction gearing for marine use.Throttle valve control and nozzle control governing, self closing emergency stop valve – Types of Gland – allowance for Expansions – Bearing – Thrust Blocks	**15 Hrs**
V	**POWER PLANT: GAS TURBINE, ATOMIC, SOLAR, WIND, TIDAL ENERGY** Warming up procedure for main propulsion turbine, -methods of improving turbine efficiency, emergency operation of turbines -Gas turbine working -Auxiliary Gas Turbine Engine -Combined gas turbine and steam turbine -Physical Principles of operation of Atomic Reactors-Construction and working of atomic power installations-Basic Diagrams of Atomic power Installations – Concept of Atomic Power installations on Sea going Vessels –Construction and working of thermal power plant- Solar powerplant-wind power plant – Hydral power plant-Tidal power plant	**15 Hrs**

Text Book **:** Marine Diesel engine -D.K. Sanyal,
Power Plant Engineering – Vijaya ragavan

Reference Book **:** Marine Diesel engine -Mc George Mc

MRC620 MODEL QUESTION PAPER

Time: 3 hrs Max Marks:75

[N.B: 1. Answer all question choosing any two from part (a) and any one from part (b).
2. Each sub division in part (a) carries 4 marks and part (b) carries 7 marks]

1	a)	1.	Define Otto Cycle.	4
		2.	Write the comparison of 2 strokes and 4 strokes Engine	4
		3.	Write the need of Fuel Injector	4
	b)	1.	Explain the Principal Components of Marine diesel Engine.	7
		2.	Explain the Starting System of Marine diesel Engine.	7
2	a)	1.	Write the classification of Steam Engine.	4
		2.	Explain pressure velocity Compounding	4
		3.	Explain Double casing Turbine.	4
	b)	1.	Explain the working of Marine Reciprocating Steam engine.	7
		2.	Explain the working of Parson's axial flow turbine.	7
3	a)	1.	Explain – Diaphragms.	4
		2.	Write short notes on Epicyclical Gear.	4
		3.	Explain Flexible Couplings.	4
	b)	1.	Explain the Types of Blades and method of fixing.	7
		2.	Explain the throttle valve and Nozzle control system.	7
4	a)	1.	Explain – Condenser vaccum control	4
		2.	Explain – Alignment checking.	4
		3.	Write short notes on Gas turbine.	4
	b)	1.	Explain warming up procedure of marine turbine.	7
		2.	Explain the physical principal and operation of atomic reactor.	7
5	a)	1.	Write the types of steam.	4
		2.	Write the classification of boilers	4
		3.	Explain – Safety valve in Boiler.	4
	b)	1.	Explain the working of BHEL High pressure boiler.	7
		2.	Explain (i) water level indicator (ii) Fusible Plug.	7

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C SCHEME

2016 –2017onwards

III YEAR

VI SEMESTER

MRC631– ELEMENTARY FIRST AID AND FIRE FIGHTING

MRC631 :ELEMENTARY FIRST AID AND FIRE FIGHTING

Total Hours / Week **:6 Hrs/Week**
Total weeks / Semester **:15 weeks/Sem**
Total Hours **:90**

RATIONALE:

A Regular physician may not be available in every ship. There is every likely hood of getting injuries when people work in ship. Hence a basic knowledge of first aid is necessary for every person who works on board ship. Fire is a major hazard in ship. When the ship is sailing in mid sea help cannot be expected from outside sources. Hence a mariner should have knowledge about the types of fire, occurrence of fire and the method of firefighting.

OBJECTIVES:

At the end of the study of VI semester the student will be able to

- Understand the structure and functions of human body
- Acquire knowledge about Wounds, Burns, Shocks, Poisoning and Chocking.
- Study about different heart problems and their first aid.
- Have enough knowledge and information about Vomiting and diarrhea.
- Acquire broader ideas about fire

Topics and Allocation of Hours:

Sl.No.	Topic	Time(Hrs)
1.	STRUCTURE AND FUNCTIONS OF HUMAN BODY	17 Hrs
2.	WOUNDS, BURNS, SHOCKS, POISONING AND CHOCKING	17 Hrs
3.	HEART ATTACK, STROKE, EXTERNAL HEART COMPRESSION, CARDIO RESUSCITATION	17 Hrs
4.	THEORY OF FIRE	17 Hrs
5.	FIRE FIGHTING EQUIPMENT	17 Hrs
	TEST AND REVIEW	05 Hrs
TOTAL		90 Hrs

MRC631: ELEMENTARY FIRST AID AND FIRE FIGHTING

DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I	**Structure and Functions of Human body:**Circulatory system (Heart and Blood vessels) – Respiratory system – the Digestive system and abdomen - Urinary system– Kidney- Urinary bladder -Nervous system – Central Nervous system- Cerebrum – cerebellum – spinal cord -Autonomous nervous system – Skin– Skeletal system – Muscular system.	**17 Hrs**
II	**Fracture, Wounds, Burns, Poisoning.:**Fractures –Signs and symptoms – management using bandages - Wounds Management – External and Internal bleeding – Signs & Symptoms of Bleeding – Infection -Management – Dressing – Application of Dressing - Burns and Scalds – Degree of Burns – the Estimation of percentage of burns – Management of serious burns and scalds – management of chemical burns – Burns of eye – Alkali burns – Infection – Foreign bodies in the eye – Treatment – Management – Poisoning – Types of Poisons – Principles in treating Poisoning – Alcohol poisoning – Acute Alcohol Poisoning – Complications – Prognosis - Management.	**17 Hrs**
III	**Shocks, Heart attack, Stroke, Choking:**Shock – Causes – Signs and Symptoms – Management - Dehydration - Signs and Symptoms - Unconsciousness – Degree of Unconsciousness – Causes for Unconsciousness – First aid for Unconsciousness – Heart attack – Contributing factors – Symptoms &Signs – First aid for heart attack. Strokes – Contributing factors – Signs & Symptoms– First aid for stroke.. Choking – Signs& symptoms – first aid for chocking. Vomiting and Diarrhoea –dehydration – Signs and Symptoms- first aid for Vomiting and Diarrhoea	**17 Hrs**
IV	**Theory of Fire:**Fire Triangle – Heat – Combustible materials – Requirement of Oxygen – Properties of flammable materials – Fire hazards and spread of fire – Fire prevention principle – Precautions to prevent fire – Types of fire – Class A fire – Class B fire – Class C fire – Class D fire – Class E fire – Principle of firefighting – Cooling – Smothering – and Starvation – Methods to Extinguish different types of fire – Appropriate extinguishing agents – Fire Detectors – types of Fire Detectors – Smoke Detectors – Heat Detectors – Flame Detectors – Automatic fire alarm.	**17 Hrs**
V	**Fire Fighting Equipments:**Fire Extinguishers – bureau Indian Standard Classification- Portable Fire Extinguishers – Water type Extinguishers – Chemical foam type – Mechanical foam type – Soda Acid Type Extinguishers – Dry Chemical Powder type Extinguishers – Carbon dioxide type Fire Extinguishers – Halon type Fire Extinguishers – Fire man outfit – Fire Hydrant – Pumps – Hoses and Nozzles – Fixed Installations – Fire mains – Water Sprinkler System – Carbon dioxide flooding system – Bulk CO_2 System.	**17 Hrs**

Text Book : Anatomy – Chaursia – 2005 Gross Anotomy – Shaw – 2002
Reference Book : Seamanship primeby Capt. J. Dinger Bhandarkar Publications

MRC631 MODEL QUESTION PAPER

Time: 3 hrs Max Marks:75

[N.B: 1. Answer all question choosing any two from part (a) and any one from part (b).
2. Each sub division in part (a) carries 4 marks and part (b) carries 7 marks]

1	a)	1.	Write about Circulation system.	4
		2.	Explain shortly digestive system.	4
		3.	Write briefly about injection.	4
	b)	1.	Write an essay of a Urinary system.	7
		2.	Write an essay of a skeletal system.	7
2	a)	1.	Explain about internal bleeding.	4
		2.	Explain about degree of burns.	4
		3.	Explain pain relief.	4
	b)	1.	Explain the dressing methods at the time of bleeding in wounds.	7
		2.	How will you protect your eyes from infectious disease?	7
3	a)	1.	Write about shock.	4
		2.	Explain signs and symptoms of unconsciousness.	4
		3.	Explain choking	4
	b)	1.	Write an essay of an Diarrhoea and dehydration.	7
		2.	Explain the various kinds of poisonings and their treatment.	7
4	a)	1.	Write short notes on barbiturates.	4
		2.	Explain clinical findings.	4
		3.	What are the important diagnoses?	4
	b)	1.	Explain mouth to mouth artificial respiration and external heat compression.	7
		2.	Write an essay of breathing circulation.	7
5	a)	1.	Define fire triangle.	4
		2.	Write the principle of operation of water type extinguisher.	4
		3.	Explain spray system.	4
	b)	1.	Write an essay of an Dry powder type extinguisher.	7
		2.	Write an essay of Personal Safety.	7

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III YEAR

VI SEMESTER

MRC632– PERSONAL SURVIVAL TECHNIQUES

Total Hours / Week **:6 Hrs/Week**
Total weeks / Semester **:15 weeks/Sem**
Total Hours **:90**

RATIONALE :

Any person working on board a ship should be ready to face any emergency situation that may occur during sailing. Seamen should have knowledge about handling life saving appliances. In an emergency situation the ship may need to abandoned. I such a situation passengers and crew members need to escape in survival crafts to save their lives. The officers in-charge need to give survival instructions to the passengers and other crew members.

OBJECTIVES :

At the end of the study of V Semester the student will be able to

- Understand about the stowage of life saving appliances.
- Know about the need for organization and training.
- Study about the survival techniques.
- Acquire broader ideas about survival instructions.
- Understand about search and rescue problems.
- Study about ration to be provided for the persons.

Topics and Allocation of Hours:

Sl.No.	Topic	Time (Hrs)
1.	STOWAGE OF LIFE SAVING APPLIANCES ORGANIZATION AND TRAINING	17
2.	THE ORDER 'ABANDON SHIP' SURVIVAL CAPSULES RIGHTING OF LIFE RAFT-JUMPING INTO SURVIVAL CRAFT	17
3.	INITIAL SITUATION IN SURVIVAL CRAFT COMMENCE FIRST AID TREATMENT FOR INJURED	17
4.	ATTRACTING ATTENTION SEARCH PROBLEM MAKING A SAFE LANDING	17
5.	WATER AND FOOD FIRST AID	17
	TEST AND REVIEW	05
TOTAL		90

MRC632: PERSONAL SURVIVAL TECHNIQUES

DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I	**Stowage of life saving appliances organization and training:**	**17 Hrs**
	Lifejackets –Rescue boats-Buoyant –apparatuses (passenger ships only)-Life rafts-Rescue boats –Lifeboats-Survival capsules-Retro reflective tape-Portable radiotelegraphy equipment (life boat radio)-Ship's line-throwing apparatus. Muster badge-Boat station lists-Musters and drills-Vital knowledge for crewmembers.	
II	**The order 'Abandon ship' Survival capsules Righting of Life raft-Jumping Into Survival craft:**	**17 Hrs**
	Ringing 'Finished with Engines'-The preparation and launching of survival craft-After emergency signal given –Lifeboats –Gravity davits-luffing davits-Inflatable life rafts-Rigid life rafts-Davit-Launched life rafts-Other survival craft-Rescue boats. Where no emergency signal given(i.e. crash abandonment)-Priorities for 'crash' abandonment-Important considerations in abandoning ship-Passengers-Early launching of survival craft in abandonment –Availability of ship's position. Jumping into water –Survival in the water –Necessity for immediate artificial respiration –Immediate action after entering survival craft- Life boats-Inflatable life rafts-Rigid life rafts-Davit-Launched life rafts-Fully-enclosed lifeboats-Survival capsules.	
III	**Initial Situation in survival craft Commence first aid treatment for injuried:**	**17 Hrs**
	Duties of lookout-Rescue of survivors in water Gathering and securing survival craft together-Arrangement of survivors and equipment among survival craft-Functioning of inflatable life-rafts- Preservation of body heat- Prevention of sea-sickness. Organization for survival maintenance of survival craft-Retaining buoyancy –Protection of occupants –Use of sea anchor of drogue-Lighting of survival craft-Securing survival craft together-Survival craft equipment-Equipment of a life raft.	
IV	**Attracting attention Search Problem Making a safe landing:**	**17Hrs**
	Assess the situation-Attracting attention-Portable radio –equipment-Parachute distress rockets-red hand flares-Emergency position –indication radio beacon E.P.I.R.B –Buoyant orange smoke signal-Signaling torch-Heliograph-Other means of attracting attention. Organization of the search-Methods of search-The search Rescue by ship Rescue net Litter-Rescue sling (strop)-After rescue. Breakers-Coral reefs-Cliffs-Tidal currents and rips-Shelter-Water and food-Attracting attention-Rescue.	
V	**Water and Food First Aid:**	**17 Hrs**
	Water-Issue of the water ration-Supplementing the water ration-Food-Issue of the food ration- Supplementing he food ration-Fish-Birds-Seaweed-Plankton-Turtles-Basic requirements for supplementing the food ration-Lookout-Rain sources-Food sources-Indications of land-Ships-aircraft-Dangers-Navigation-Finding direction-Estimating the rate of down-wing movement-Estimating position. Medical duties-Contents of	

first aid kit and their us –The signs of death-Disposal of dead persons-Continue first aid Treatment of –the apparently drowned and asphyxiated-Unconsciousness-Shock –Wounds –Burns-Fractures-Contamination by fuel, oil-Care of survivors –Hypothermia (exposure)- Immersion foot –Frostbite-Sunburn-Salt water boils and sores-Body functions-Dehydration-Delirium and mental disturbance –Hygiene.

Text Book : 1. Survival at sea. The life boat and life raft, C.H.Wright, Edition 993,Brownson & Furguson Ltd.,
2. Ship board operation H.I. Lavery 993 British library cataloguing in publications

Reference Book : 1. Seamanship primeby Capt. J. Dinger
2. Survival in Life boat and life raft By Capt. S.K. Puri

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DIPLOMA IN MARINE ENGINEERING

C SCHEME

2016 –2017onwards

III YEAR

VI SEMESTER

MRC640– MARINE DIESEL AND POWER PLANT PRACTICAL

MRC640: MARINE DIESEL ENGINE AND POWER PLANT PRACTICAL

Total Hours / Week	**:4 Hrs/Week**
Total weeks / Semester	**:15weeks/Sem**

Total Hours **:60Hrs**

RATIONALE:

To perform various types test like tension, compression impact tests in Laboratory. To perform experiments on various types of pumps and turbines to understand their characteristics. To understand the various mechanical properties by conducting tensile test.

To understand the hardness value of different materials. To understand the concept through different cross section. To understand and draw characteristic of various pumps and turbines.

GUIDELINES:

- All the sixteen experiments given in the list of experiments should be completed and given for the end semester practical examination.
- In order to develop best skills in handling equipments and taking readings in the practical classes , every five students should be provided with a separate experimental setup for doing experiments in the laboratory.

SCHEME OF EXAMINATION

Demonstration	: 35 Marks
Procedure	: 25 Marks
Result	: 10 Marks
Viva Vice	: 05 Marks
Total Marks	**: 75 Marks**

LIST OF EXPERIMENTS

PART A

1. Flash point and Fire point – Open cup apparatus
2. Flash point and Fire point - Closed cup apparatus
3. Viscosity of lubrication oils – Redwood Viscometer apparatus
4. Viscosity of lubrication oils –SayboltViscometer apparatus
5. Valve timing diagram of diesel engine – four stroke engine
6. Port timing diagram of diesel engine – two stroke engine

PART B

7. Performance of test on Multi cylinder Diesel Engine
8. Test on air compressor – Volumetric efficiency
9. Diesel engine injection Time setting
10. Dismantling and assembling of fuel injection pump (Study experiment)
11. Servicing and testing of diesel injector (Study experiment)
12. Dismantling and assembling of fuel feed pump (Study experiment)

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C SCHEME

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III YEAR

VI SEMESTER

MRC651– ELEMENTARY FIRST AID AND FIRE FIGHTING PRACTICAL

MRC651: ELEMENTARY FIRST AID AND FIRE FIGHTING PRACTICAL

Total Hours / Week	**:5 Hrs/Week**
Total weeks / Semester	**:15 weeks/Sem**

Total Hours **:75 Hrs**

RATIONALE:

A regular physician may not be available in every ship. There is every likely hood of getting injuries when people work in ship. Hence a basic knowledge of first aid is necessary for every person who works on board ship. Fire is a major hazard in ship. When the ship is sailing in mid sea help cannot be expected from outside sources. Hence a mariner should have knowledge about the types of fire, occurrence of fire and the methods of fire fighting.

GUIDELINES:

- All the experiments given in the list of experiments should be completed and given for the end semester practical examination.
- In order to develop best skills in handling Instruments/Equipment in the practical classes, every two students should be provided with a separate experimental setup for doing experiment in the fire fighting laboratory.
- The external examiners are requested to ensure that a single experimental question should not be given to more than four students while admitting a batch of 30 students during Board Examinations.

SCHEME OF EXAMINATION

Part – A	**20 marks**
Elementary first aid	
Part – B	
Diagram with parts and working	20 marks
Demonstration	25 marks
Viva-voce	10 marks
Total	**75 marks**

MRC651: ELEMENTARY FIRST AID AND FIRE FIGHTING PRACTICAL

LIST OF EXPERIMENTS

PART – A (Study experiments)

Elementary First Aid

1. First aid and method of the treatment for seasickness.
2. First aid and method of the treatment for fractures.
3. First aid and method of the treatment for burns and scalds.
4. First aid and method of the treatment for dehydration.
5. First aid and method of the treatment for unconsciousness.
6. First aid and method of the treatment for heart attack.
7. First aid and method of the treatment for strokes.
8. First aid and method of the treatment for poisoning.
9. First aid and method of the treatment for cardio pulmonary resuscitations.

PART – B

Fire Fighting

10. Demonstration and study about the construction and working of water sprinkler fixed fire fighting installations.
11. Demonstration and study about the construction and working of water type portable extinguishers.
12. Demonstration and study about the construction and working of mechanical foam type portable extinguishers.
13. Demonstration and study about the construction and working of chemical foam type portable extinguishers.
14. Demonstration and study about the construction and working of dry chemical powder type portable fire extinguishers.
15. Demonstration and study about the construction and working of carbon dioxide type portable fire extinguishers.
16. Demonstration and study about the construction and working of fire detectors.
17. Demonstration and study about the use of fire man outfit
18. Demonstration and study about the construction and working of emergency fire pumps.
19. Demonstration and study about the construction and working of hoses and nozzles.

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DIPLOMA IN MARINE ENGINEERING

C SCHEME

2016 –2017onwards

III YEAR

VI SEMESTER

MRC652– PERSONAL SURVIVAL TECHNIQUES PRACTICAL

MRC652: PERSONAL SURVIVAL TECHNIQUES PRACTICAL

Total Hours / Week **:5 Hrs/Week**

Total weeks / Semester **:15 weeks/Sem**
Total Hours **:75 Hrs**

RATIONALE:

Any person working on board a ship should be ready to face any emergency situation that may occur during sailing. Seamen should have knowledge about handling lifesaving appliances. In an emergency situation the ship may need to be abandoned. In such a situation passengers and crew members need to escape in survival crafts to save their lives. The officer in charge need to give survival instructions to the passengers and other crew members.

GUIDELINES:

- All the experiments given in the list of experiments should be completed and given for the end semester practical examination.
- In order to develop best skills in handling Instruments/Equipment in the practical classes, every two students should be provided with a separate experimental setup for doing experiment in the fire fighting laboratory.
- The external examiners are requested to ensure that a single experimental question should not be given to more than four students while admitting a batch of 30 students during Board Examinations.

SCHEME OF EXAMINATION

Demonstration	:	35 marks
Procedure	:	25 marks
Result	:	10 marks
Viva	:	05 marks
Total Marks	**:**	**75 marks**

LIST OF EXPERIMENTS :

Handling and Training Practices

Lifejackets, Lifebuoys, Buoyant apparatuses (passenger ships only), Liferafts, Rescue boats, Life boats, Survival capsules.

1. **Abandonment**
   The order 'Abandon Ship', Ringing 'Finished with engines', The preparation and launching of survival craft, After emergency signal given Lifeboats Gravity davits, Inflatable life-rafts, Davitlaunched life-rafts.

2. **Crash Abandonment**
   Early launching of survival craft – Additional equipment for survival craft – use of all survival craft in abandonment – Availability of ship's position – Righting of Life-raft – Jumping into survival craft – Jumping into water – Survival in the water – Necessity for immediate artificial respiration.

3. **Immediate action after entering survival craft**
   Lifeboats – Inflatable life-rafts – Rigid life-rafts – Davit-launched life-rafts – Fully – enclosed lifeboats – Survival capsules

4. **Detection**
   Attracting attention – Assess the situation – Attracting attention – portable radio equipment – Parachute distress rockets – Red hand flares – Emergency position indication radio neacon E.P.I.R.B – Buoyant orange smoke signal – Signaling torch – Heliograph.

MODEL QUESTIONS FOR THE BOARD PRACTICAL EXAMINATIONS

1. Determine handling and training practice life saving appliances.
2. Determine training practice for abandon ship.
3. Determine training practice of crash abandon.
4. Determine training practice of immediate action for after entering survival craft.
5. Determine training practice of detection.

INSTRUCTIONS TO CARRY OUT THE PRACTICAL CLASS WORK AS WELL AS THE BOARD EXAMINATIONS PRACTICALS:

1. All the experiment given in the list of experiments should be completed and given for the end semester practical examination.
2. The record of every completed exercise should be submitted in the subsequent practical classes and marks should be awarded for 20 for each exercise.
3. All the end of the semester the average marks of all the exercise should be calculated for 20 marks and the marks awarded for attendance is to be added to arrive at the sessional marks for practical.
4. All the marks entries for exercise should be entered in the personal log book of the staff who is handling the subject.

LIST OF EQUIPMENTS AND THE QUANTITY REQUIRED FOR A BATCH OF 30 STUDENTS:

1. Life boat
2. Life craft
3. Buoyant apparatus
4. Davit
5. EPIRB
6. Heligrop
7. Survival capsules

SAFETY PRECAUTIONS TO BE FOLLOWED

- Always wear shoes.
- Always use good conditions tools during the work.
- Do not touch connect or disconnect any plug or cable without teacher permission.
- Do not attempt to touch any live wires.
- Equipments should be switched off properly after work complete

CENTRAL POLYTECHNIC COLLEGE

(AN AUTONOMUOUS INSTITUTION)

DIPLOMA IN MARINE ENGINEERING

C SCHEME

2016 –2017onwards

III YEAR

VI SEMESTER

MRC660– NAVIGATION AND METEOROLOGY PRACTICAL

Total Hours / Week	**:4 Hrs/Week**
Total weeks / Semester	**:15 weeks/Sem**
Total Hours	**:60**

RATIONAL:

Diploma holders in marine engineering are expected to work on board ship. So they should have knowledge about the basic navigational equipments and metrological equipments. Persons working in shipyards also need to have basic knowledge about these equipments.

GUIDELINES:

- All the experiments given in the list of experiments should be completed and given for the end semester practical examination.
- In order to develop best skills in handling Instruments/Equipment in the practical classes, every two students should be provided with a separate experimental setup for doing experiments in the laboratory.
- The external examiners are requested to ensure that a single experimental question should not be given to more than four students while admitting a batch of 30 students during Board Examinations.

SCHEME OF EXAMINATION

Demonstration	:10 Marks
Figure with parts	:15 Marks
Procedure	:35 Marks
Result	:05Marks
Viva	:10 Marks
Total Marks	**:75 Marks**

MRC660: NAVIGATION AND METEOROLOGY PRACTICAL
LIST OF EXPERIMENTS

Navigation:

1 Study about the construction and working of navigational lights.
2 Study and demonstration of different types of navigational flags.
3 Study about the construction and working of sextant.
4 Study about the construction and working of magnetic compass.
5 Study about the construction and working of gyro compass.
6 Study about the construction and working of echo-sounder.
7 Study about the construction and working of radar.
8 Study about the construction and working of global positioning system.
9 Study about the construction and working of line throwing apparatus.

Meteorological equipments:

1 Study about the construction and working of rain gauge.
2 Study about the construction and working of anemometer.
3 Study about the construction and working of thermometer (wet bulb and dry bulb)
4 Study about the construction and working of barometer.
5 Study about the construction and working of hygrometer.
6 Study about the construction and working of hydrometer.

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MRC670– PROJECT WORK

Total Hours / Week **:4 Hrs/Week**
Total weeks / Semester **:15 weeks/Sem**
Total Hours **:60**

PROJECT WORK

The students of all the Diploma programmes (except Diploma in Modern office Practice) have to do a project work as part of the Curriculum and partial fulfilment for the award of Diploma by the state Board of Technical Education and Training, Tamil Nadu. In order to encourage students to do worthwhile and innovative projects, every year prices are awarded for the best three projects i.e institution wise, region wise and state wise. The selection of project work should be taken up in Vth Sem of study. The first project review should be done in 14th week of study in V Semester. The Second project review should be done in the 8th week of the study in the VIth Semester.

a) Internal Assessment mark for Project work & Viva Voce:

Project Review I	6th week	…	10 marks
Project Review II	14th week	…	10 marks
Attendance		…	05 marks

Total		…	25 marks

EVALUATION FOR BOARD EXAMINATION:

Details of Mark allocation	**Max Marks**
Marks for Report Preparation, Demo, Viva-voce	**65**
Marks for answers of 4 questions which is to be set by the external examiner from the given question bank consisting of questions in the following two topics Disaster Management and Environmental Management. Out of four questions two questions to appear from each of the above topics i.e. 2 questions x 2 topics = 4 questions 4 questions x 2 ½ marks = 10 Marks	**10**
Total	**75**

DETAILED SYLLABUS
ENVIRONMENTAL & DISASTER MANAGEMENT

1. ENVIRONMENTAL MANAGEMENT

Introduction – Environmental Ethics – Assessment of Socio Economic Impact – Environmental Audit – Mitigation of adverse impact on Environment – Importance of Pollution Control – Types of Industries and Industrial Pollution.

Solid waste management – Characteristics of Industrial wastes – Methods of Collection, transfer and disposal of solid wastes – Converting waste to energy – Hazardous waste management Treatment technologies.

Waste water management – Characteristics of Industrial effluents – Treatment and disposal methods – Pollution of water sources and effects on human health.

Air pollution management – Sources and effects – Dispersion of air pollutants – Air pollution control methods – Air quality management.

Noise pollution management – Effects of noise on people – Noise control methods.

2. DISASTER MANAGEMENT

Introduction – Disasters due to natural calamities such as Earthquake, Rain, Flood, Hurricane, Cyclones etc – Man made Disasters – Crisis due to fires, accidents, strikes etc – Loss of property and life..

Disaster Mitigation measures – Causes for major disasters – Risk Identification – Hazard Zones – Selection of sites for Industries and residential buildings – Minimum distances from Sea – Orientation of Buildings – Stability of Structures – Fire escapes in buildings - Cyclone shelters – Warning systems.

Disaster Management – Preparedness, Response, Recovery – Arrangements to be made in the industries / factories and buildings – Mobilization of Emergency Services - Search and Rescue operations – First Aids – Transportation of affected people – Hospital facilities – Fire fighting arrangements – Communication systems – Restoration of Power supply – Getting assistance of neighbors / Other organizations in Recovery and Rebuilding works – Financial commitments – Compensations to be paid – Insurances – Rehabilitation.

LIST OF QUESTIONS

1. **ENVIRONMENTRAL MANAGEMENT**

1. What is the responsibility of an Engineer-in-charge of an Industry with respect to Public Health?
2. Define Environmental Ethic.
3. How Industries play their role in polluting the environment?
4. What is the necessity of pollution control? What are all the different organizations you know, which deal with pollution control?
5. List out the different types of pollutions caused by a Chemical / Textile / Leather / Automobile / Cement factory.
6. What is meant by Hazardous waste?
7. Define Industrial waste management.
8. Differentiate between garbage, rubbish, refuse and trash based on their composition and source.
9. Explain briefly how the quantity of solid waste generated in an industry could be reduced.
10. What are the objectives of treatments of solid wastes before disposal?
11. What are the different methods of disposal of solid wastes?
12. Explain how the principle of recycling could be applied in the process of waste minimization.
13. Define the term 'Environmental Waste Audit'.
14. List and discuss the factors pertinent to the selection of landfill site.
15. Explain the purpose of daily cover in a sanitary landfill and state the minimum desirable depth of daily cover.
16. Describe any two methods of converting waste into energy.
17. What actions, a local body such as a municipality could take when the agency appointed for collecting and disposing the solid wastes fails to do the work continuously for number of days?
18. Write a note on Characteristics of hazardous waste.
19. What is the difference between municipal and industrial effluent ?
20. List few of the undesirable parameters / pollutants anticipated in the effluents from oil refinery industry / thermal power plants / textile industries / woolen mills / dye industries / electroplating industries / cement plants / leather industries (any two may be asked)
21. Explain briefly the process of Equalization and Neutralization of waste water of varying characteristics discharged from an Industry.
22. Explain briefly the Physical treatments "Sedimentation" and "Floatation" processes in the waste water treatment.
23. Explain briefly when and how chemical / biological treatments are given to the waste water.
24. List the four common advanced waste water treatment processes and the pollutants they remove.
25. Describe refractory organics and the method used to remove them from the effluent.
26. Explain biological nitrification and de-nitrification.
27. Describe the basic approaches to land treatment of Industrial Effluent.
28. Describe the locations for the ultimate disposal of sludge and the treatment steps needed prior to ultimate disposal.
29. List any five Industries, which act as the major sources for Hazardous Air Pollutants.
30. List out the names of any three hazardous air pollutants and their effects on human health.

31. Explain the influence of moisture, temperature and sunlight on the severity of air pollution effects on materials.
32. Differentiate between acute and chronic health effects from Air pollution.
33. Define the term Acid rain and explain how it occurs
34. Discuss briefly the causes for global warming and its consequences
35. Suggest suitable Air pollution control devices for a few pollutants and sources.
36. Explain how evaporative emissions and exhaust emissions are commonly controlled.
37. What are the harmful elements present in the automobile smokes? How their presence could be controlled?
38. What is the Advantage of Ozone layer in the atmosphere? State few reasons for its destruction.
39. Explain the mechanism by which hearing damage occurs.
40. List any five effects of noise other than hearing damage.
41. Explain why impulsive noise is more dangerous than steady state noise.
42. Explain briefly the Source – Path – Receiver concept of Noise control.
43. Where silencers or mufflers are used ? Explain how they reduce the noise.
44. Describe two techniques to protect the receiver from hearing loss when design / redress for noise control fail.
45. What are the problems faced by the people residing along the side of a railway track and near to an Airport? What provisions could be made in their houses to reduce the problem?

2. DISASTER MANAGEMENT

1. What is meant by Disaster Management? What are the different stages of Disaster management?
2. Differentiate Natural Disasters and Man made Disasters with examples.
3. Describe the necessity of Risk identification and Assessment Surveys while planning a project.
4. What is Disasters recovery and what does it mean to an Industry?
5. What are the factors to be considered while planning the rebuilding works after a major disaster due to flood / cyclone / earthquake? (Any one may be asked)
6. List out the public emergency services available in the state, which could be approached for help during a natural disaster.
7. Specify the role played by an Engineer in the process of Disaster management.
8. What is the cause for Earthquakes? How they are measured? Which parts of India are more vulnerable for frequent earthquakes?
9. What was the cause for the Tsunami 2004 which inflicted heavy loss to life and property along the coast of Tamilnadu ? Specify its epicenter and magnitude.
10. Specify the Earthquake Hazard Zones in which the following towns of Tamilnadu lie: (a) Chennai (b) Nagapattinam (c) Coimbatore (d) Madurai (e) Salem.
11. Which parts of India are experiencing frequent natural calamities such as (a) heavy rain fall (b) huge losses due to floods (c) severe cyclones
12. Define basic wind speed. What will be the peak wind speed in (a) Very high damage risk zone – A, (b) High damage risk zone, (c) Low damage risk zone.
13. Specify the minimum distance from the Sea shore and minimum height above the mean sea level, desirable for the location of buildings.

14. Explain how the topography of the site plays a role in the disasters caused by floods and cyclones.
15. Explain how the shape and orientation of buildings could reduce the damages due to cyclones.
16. What is a cyclone shelter? When and where it is provided ? What are its requirements?
17. What Precautionary measures have to be taken by the authorities before opening a dam for discharging the excess water into a canal/river ?
18. What are the causes for fire accidents ? Specify the remedial measures to be taken in buildings to avoid fire accidents.
19. What is a fire escape in multistoried buildings ? What are its requirements ?
20. How the imamates of a multistory building are to be evacuated in the event of a fire/Chemical spill/Toxic Air Situation/ Terrorist attack, (any one may be asked).
21. Describe different fire fighting arrangements to be provided in an Industry.
22. Explain the necessity of disaster warning systems in Industries.
23. Explain how rescue operations have to be carried out in the case of collapse of buildings due to earthquake / blast / Cyclone / flood.
24. What are the necessary steps to be taken to avoid dangerous epidemics after a flood disaster?
25. What relief works that have to be carried out to save the lives of workers when the factory area is suddenly affected by a dangerous gas leak / sudden flooding ?
26. What are the difficulties faced by an Industry when there is a sudden power failure? How such a situation could be managed?
27. What are the difficulties faced by the Management when there is a group clash between the workers? How such a situation could be managed?
28. What will be the problems faced by the management of an Industry when a worker dies because of the failure of a mechanical device due to poor maintenance? How to manage such a situation?
29. What precautionary measures have to be taken to avoid accidents to laborers in the Industry in a workshop / during handling of dangerous Chemicals / during construction of buildings / during the building maintenance works.
30. Explain the necessity of medical care facilities in an Industry / Project site.
31. Explain the necessity of proper training to the employees of Industries dealing with hazardous products, to act during disasters.
32. What type of disaster is expected in coal mines, cotton mills, Oil refineries, ship yards and gas plants?
33. What is meant by Emergency Plan Rehearsal? What are the advantages of such Rehearsals?
34. What action you will take when your employees could not reach the factory site because of continuous strike by Public Transport workers?
35. What immediate actions you will initiate when the quarters of your factory workers are suddenly flooded due to the breach in a nearly lake / dam, during heavy rain?
36. What steps you will take to avoid a break down when the workers union of your Industry have given a strike notice?
37. List out few possible crisis in an organization caused by its workers? What could be the part of the middle level officials in managing such crisis?
38. What types of warning systems are available to alert the people in the case of predicted disasters, such as floods, cyclone etc.
39. Explain the necessity of Team work in the crisis management in an Industry / Local body.
40. What factors are to be considered while fixing compensation to the workers in the case of severe accidents causing disability / death to them?

41. Explain the legal / financial problems the management has to face if safely measures taken by them are found to be in adequate.
42. Describe the importance of insurance to men and machinery of an Industry dealing with dangerous jobs.
43. What precautions have to be taken while storing explosives in a match/ fire crackers factory?
44. What are the arrangements required for emergency rescue works in the case of Atomic Power Plants?
45. Why residential quarters are not constructed nearer to Atomic Power Plants?