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A proposal for marine education, training and certification in Nigeria for deck officers on ships engaged in coastal activities

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A PROPOSAL FOR MARITIME EDUCATION, TRAINING AND CERTIFICATION IN NIGERIA FOR DECK OFFICERS ON SHIPS ENGAGED IN COASTAL ACTIVITIES

by

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Nigeria

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I certify that all material in this dissertation which is not my own work has been identified and that no material is included for which a degree has been previously conferred upon me.

The contents of this dissertation reflect my personal views and are not necessarily endorsed by the University.

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DEDICATION

This work is dedicated to the memory of my good friend and colleague Capt.S.Ogundein (R.I.P).

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PREFACE

The duties performed by a deck officer which range from the planning and execution of a navigational passage through supervising cargo operations to the planning and supervision of ship maintenance require from him knowledge of a variety of subjects. Of utmost importance is that he is able to navigate a ship safely from one place to another. Changes in ship type and design, trade patterns and advances in communication technology place more demands on the seafarer of today to acquire more knowledge of more subjects. The conflict that arises in maritime education is how much knowledge of each subject can be imparted within an allocated period of studies. This is more in evidence in developing countries where old technology and methods exist side by side with the new for much longer periods than in the technologically advanced countries.

The subject of ratings training is one that is not often paid much attention to. Countless seminars, symposia and workshops are held regularly in various parts of the world to discuss and find ways to improve the education and training of ship's officers. It is however a recognised fact by seafarers worldwide, that ratings are an important link in the chain for achieving safe and efficient ship operation. They make significant contribution to the safe mooring of a ship, maintenance of ship and equipment and assist with repairs and watchkeeping on the bridge and in the engine room. As ships and equipment get more sophisticated and crew size gets smaller, the need for improved training of ratings becomes more essential.

In the case of 'Trentbank' vs 'Fogo' (1967) Justice Cairns pointed out that "It is on men that safety at sea depends and they cannot make a greater mistake than to suppose that machines can do all their work for them". With this in mind, I have endeavoured in this work to draw up proposals for a system of maritime education and training for deck officers on vessels engaged in coastal activities, that would enable them perform duties expected of competent watchkeeping officers.

The task of drawing up syllabuses, particularly for varying subjects requires experienced educationists and experts on the various subjects. I have however drawn upon my experience at sea as a deck officer and shipmaster calling at virtually all the West African ports, my years of studies at two nautical colleges in the United Kingdom and at the World Maritime University and consultation of various course outlines and syllabi on rating and coastal deck officer education and training, to come up with the syllabi for the various courses proposed.

This dissertation is arranged in six chapters supported by five annexes containing detailed syllabuses.

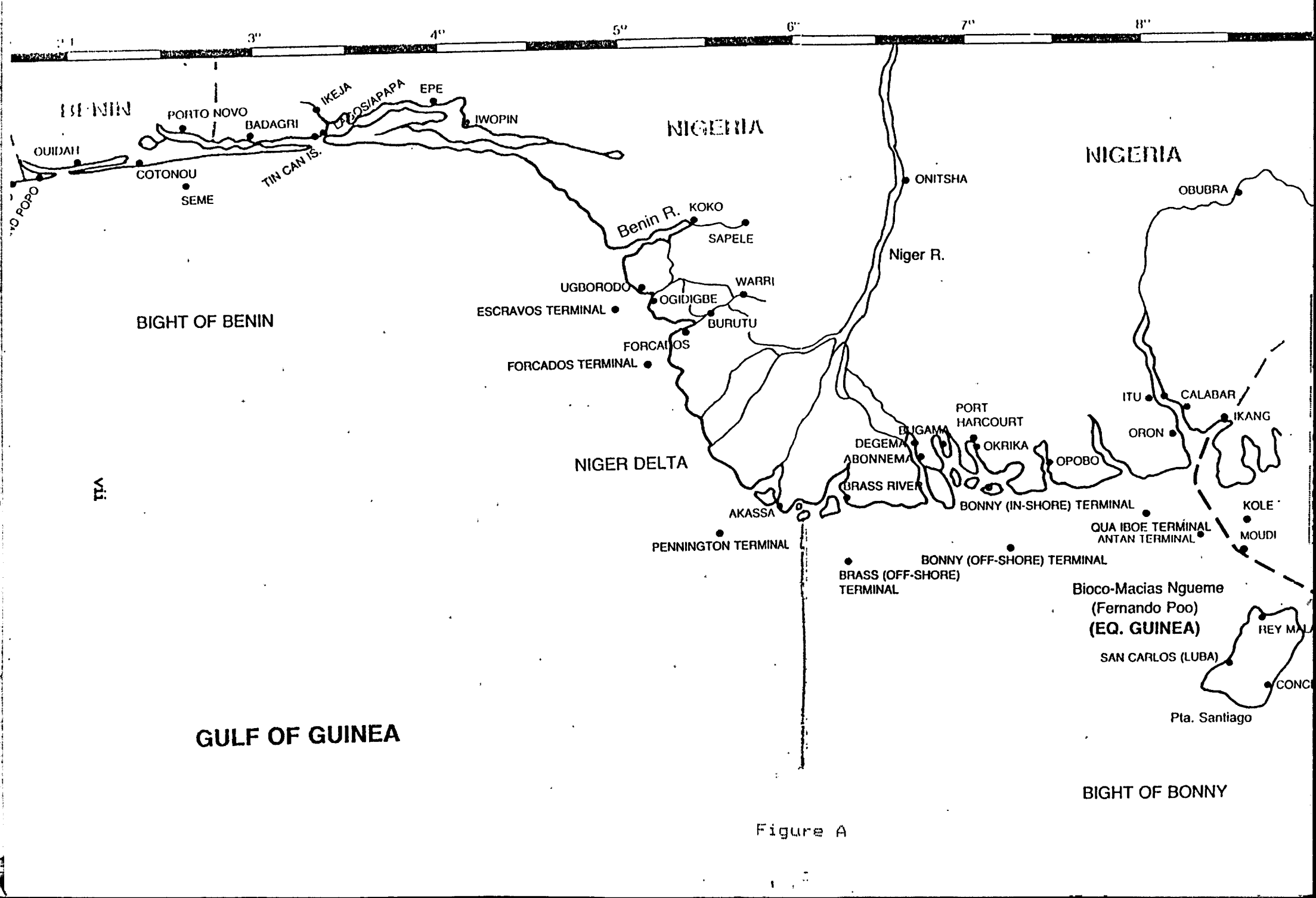
ABBREVIATIONS

AB	Able Bodied
CES	Coast Earth Station
CRS	Coast Radio Station
DR	Dead Reckoning
DSC	Digital Selective Calling
EPIRB	Electronic Position Indicating Radio Beacon
FG	Foreign-going
GIS	Government Inspector of Shipping
GMDSS	Global Maritime Distress and Safety System
GP	General Purpose
GT	Gross Tonnes
HF	High Frequency
HND	Higher National Diploma
HT	Home Trade
IALA	International Association of Lighthouse Authorities
IMLA	International Maritime Lecturers Association
IMO	International Maritime Organisation
ITCZ	Inter Tropical Convergence Zone
JSS	Junior Secondary School
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
MAN	Maritime Academy of Nigeria
MARAD	Maritime Administration
MARPOL	International Convention for the prevention of Marine Pollution
MEA	Marine Engineering Assistant
MET	Maritime Education and Training
MF	Medium Frequency
NCE	National Certificate of Education
NNSL	Nigerian National Shipping Line
NPA	Nigerian Ports Authority

OND	Ordinary National Diploma
OPEC	Organisation of Petroleum Exporting Countries
OS	Offshore
SAR	Search And Rescue
SOLAS	International Convention on Safety Of Life At Sea
SSCE	Senior Secondary Certificate Examination
SSS	Senior Secondary School
STCW	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers
UNDP	United Nations Development Programme
VHF	Very High Frequency

FIGURES

TABLES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NIGERIA
ONITSHA
OBUBRA
Benin R.
KOKO
SAPELE
Niger R.
UGBORODO
WARRI
OGIDIGBE
ESCRAVOS TERMINAL
BURUTU
FORCADOS
FORCADOS TERMINAL
BIGHT OF BENIN
NIGER DELTA
PORT HARCOURT
BUGAMA
DEGEMA
ABONNEMA
OKRIKA
OPOBO
BRASS RIVER
AKASSA
PENNINGTON TERMINAL
BONNY (IN-SHORE) TERMINAL
BONNY (OFF-SHORE) TERMINAL
BRASS (OFF-SHORE) TERMINAL
ITU
CALABAR
IKANG
ORON
KOLE
QUA IBOE TERMINAL
ANTAN TERMINAL
MOUDI
Bioco-Macias Ngueme
(Fernando Poo)
(EQ. GUINEA)
SAN CARLOS (LUBA)
Pta. Santiago
GULF OF GUINEA
BIGHT OF BONNY

Figure A

CHAPTER 1

1 PAST AND PRESENT COASTAL ACTIVITIES, MET AND CERTIFICATION OF HOME TRADE DECK OFFICERS IN NIGERIA

1.1 The Era of Steam Ships and Inland Water Craft

Steamship navigation in Nigerian waters commenced in 1852 with the formation of the African Steamship Company by Macgregor Laird of Liverpool. It culminated in the inauguration of regular steam shipping services to west Africa. Prior to this, there had been Portuguese and British merchants calling, on sailing vessels, at the trading posts along the coast.

In 1854, the Steamship "Pleiad" sailed into the River Niger and explored the River Benue for a distance of over 300 miles. It is noteworthy to point out that the crew of the "Pleiad" for the expeditionary voyage into the River Niger and then Benue consisted of twelve Europeans and fifty-four locals. On requesting assistance from the British Government, Laird was granted a five year contract by the Admiralty to organize annual sailings up the Niger and its tributaries. He then formed the Central African Company for this purpose, and the company began its work in 1857. Trading posts were later set up by this company at Onitsha and Ebo on the banks of the Niger.

Of particular importance to the growth of the maritime industry in what was to become Nigeria, and for a long time afterward, was the contribution of Elder Dempster and Company of Liverpool and the trading firms of John Holt, Miller-Swanzys and Lever Brothers.

1.1.1 The Merchant Firms.

Trade between European merchants and the coastal people of what was to become Nigeria is said to have started in the later half of the 15th century with the arrival of Portuguese merchants. These were later followed by the Dutch, French and British merchants. By 1884 when the 'scramble for Africa' began, the British merchants were well into establishing their supremacy in the Niger delta. At the end of the Berlin Conference the Niger area was accepted as a British sphere of influence.

Towards the end of the 19th century, the British merchants firmly entrenched in trading in the Niger delta area, were The Royal Niger Company headed by Sir George Goldie, The African Association (an amalgam of several small trading firms) headed by John Holt and Miller-Swanzys. These firms established trading posts in places such as Warri, Sapele, Burutu, Forcados, Brass and Bonny. Attempts by the merchants to establish their own shipping lines at the turn of the century were seriously rebuffed by Elder Dempster and Company under the leadership of Alfred Jones. The pattern therefore was that the trading firms provided the goods and Elder Dempster provided the ships for carriage.

Exports consisted of palm oil, palm kernels and later, cocoa, rubber, cotton and timber. Imports consisted mainly of textiles, metal goods, spirits and arms and ammunition. In the absence of built up ports, the merchants provided barges and lighters which were used to move goods from wharves which had warehouses located

nearby on the banks of rivers, to ships anchored mid-stream. Tugs were also made available to push/tow barges up rivers and creeks to either receive cargo for shipment or to discharge. The need to train personnel to man these tugs arose and the Nigerian Marine Department was established. The department catered for the examination and certification of Rivermasters, Quartermasters and Marine Engineering Assistants for the manning of inland water craft. Repair yards were also established to cater for the tugs, barges and lighters. Prominent among these was the repair yard at Burutu which still exists to this day. Some of the wharves owned and operated by the trading firms later developed into ports. Of particular note is Warri port which was owned by John Holt and Company.

In 1910 Lever Brothers entered the West African trade by purchasing Maciver, a small firm that had previously been engaged in trade in the Niger delta, and Cavaller. Rather than export crudely produced palm and palm kernel oil, Lever Brothers built oil mills at Opobo and Apapa. The Niger Company was acquired by Lever Brothers in 1919 and in the same year, the African Association and Miller-Swanzys were amalgamated into the African and Eastern Trade Corporation. In 1929 the United African Company (UAC) was formed, with the Niger Company and the African and Eastern Trade Corporation as equal holding companies. The UAC thus became and still is the biggest trading concern in Nigeria.

1.1.2 The Pioneer Shipping Companies

The one company to have contributed the most to the growth of the Nigerian maritime industry is Elder

Dempster and Company of Liverpool. This company which had started off as shipping agents, gained control of The African Steamship Company and the British and African Steam Navigation company and in 1895, under the leadership of Alfred Jones, established with Woermann Lines of Hamburg the first West African Shipping Conference. Elder Dempster went on to develop services and facilities including the creation of credit and banking structures and the introduction of coastal vessels, to facilitate shipping in Nigeria and West Africa in general.

Other shipping companies that made meaningful contributions are Palm Line (owned by UAC) and the Guinea Gulf Line (owned by John Holt). These companies initially employed local labour to carry out maintenance work on their vessels whilst in port or on a coastal passage. As time went on the locals began to be employed as crew members.

The establishment of the Nigerian National Shipping Line in 1959 was with the assistance of Palm Line and Elder Dempster and Company. The training of personnel to run the vessels and the Marine Division of the Nigerian Ports Authority was undertaken by these two companies. It is noteworthy to point out that most people in senior positions in the maritime industry in Nigeria have at one time or the other been employees of either of these companies.

1.2 The Oil Industry

1.2.1 The Offshore Oil Industry

The commencement of oil exploration and exploitation activities off the Nigerian coast in the early nineteen sixties, brought with it the introduction of specialized vessels ; jack-up barges, drill ships, supply vessels, tugs, rig tender vessels, line boats etc. There are currently oil platforms at Escravos Terminal, Forcados, Penninton, Brass, Bonny and Eket.

The companies mostly involved in offshore oil exploration and exploitation are Shell, Gulf Oil (Chevron), Mobil, Texaco and Agip, operating under license and in partnership with the Nigerian National Petroleum corporation. Services involving the use of the specialized vessels mentioned above are mainly contracted out to companies such as Zapata Marine, Tidex, Ocean Inchcape Limited (OIL) and NICOTES.

1.2.2 The Oil Refineries

Nigeria currently has three main oil refineries located at Kaduna, Warri and Port Harcourt. Of these, only the Warri and Port Harcourt refineries are close to the coast and accessible to sea-going vessels. The Port Harcourt Refinery was commissioned in 1965 and has a refining capacity of 220000 barrels of light crude per day. The Warri Refinery was commissioned in 1978 and has a refining capacity of 125000 barrels of light crude per day. There are also petrochemical plants located close by these refineries which produce carbon black, polypropylene, ethylene, polyethylene and

butane.

An LNG plant is currently under construction at Bonny and is expected to come on stream in 1995. Arrangements, including the purchase of LNG carriers have already been concluded, to transport liquefied natural gas to European markets. It is also anticipated that coastal and home trade vessels will be involved in the transport of LNG to Lagos and other West African ports.

1.3 Legal Framework for Certification of Coastal and Home Trade Deck Officers

1.3.1 The Nigerian Merchant Shipping Act (1962)

It is considered necessary in this paragraph, to state some definitions as given in the Act :

First Schedule ; "Home Trade Limits means the west coast of Africa between Cape Verde in the north and the mouth of the River Congo in the south."

Preliminary ; " 'home trade ship' means a ship which is authorized to ply only within home trade limits."

" 'coastal trade ship' means a ship, other than an inland waters ship, which does not leave Nigeria."

" 'inland waters ship' means a ship which is authorized only to ply within inland waters."

" 'foreign-going ship' means a ship which is neither a home trade ship, a coastal trade ship nor an inland

waters ship ; and 'engaged in the foreign trade' has a corresponding meaning."

Explanatory Note to "Examination for Certificates of Competency (Deck) (Offshore) Regulations 1967", defines offshore as being "within 50 miles out from the coast of Nigeria".

Paragraph (a), subsection (1) of section 7 of the Act provides for the granting of certificates of competency for each of the following grades :

(i) master of a foreign-going ship,
(ii) first mate of a foreign-going ship,
(iii) second mate of a foreign-going ship,
(iv) master of a home trade ship,
(v) mate of a home trade ship,
(vi) tug master (foreign-going),
(vii) yacht master (coastal),
(viii) river master,
(ix) quarter master,
(x) river man,
(xi) able seaman and efficient deck hands,
(xii) lifeboat man.

Sub-section 4 of the same section states inter alia, "For the purpose of this section the certificates referred to in each paragraph of subsection (1) shall be deemed to rank among themselves in the order in which they are mentioned :
Provided that....., nor shall a certificate for a home trade ship entitle the holder thereof to go to sea as master or mate of a foreign-going ship."

The provisions of sections 10, 11 and 13 make it an offence for a master or engaged crew in any of the afore-mentioned capacities, to go to sea or attempt to go to sea in that capacity without being entitled to, and in possession of the required certificate. The burden of guilt is also placed on the employer of any such persons. Besides the possible detention of a ship for improper manning or non production of certificates of competency by master and crew, the fines provided for by the Act appear to be very minimal, particularly in light of inflation and currency devaluation over the years.

Section 14 empowers the Minister to appoint, remove and re-appoint examiners and to regulate the conduct of examinations and the qualifications of applicants, for the purpose of granting certificates of competency.

1.3.2 Subsidiary Legislation

Section 427 states that, "The Minister may make regulations generally for carrying this Act into effect, and in particular and without prejudice to the generality of the foregoing, such regulations may provide for - ..... (c) the qualifications for officers, able seamen and ship's cooks, and the issue of certificates of competency thereof ;..". In accordance with the foregoing several subsidiary legislation have been made since the enactment of the Act. Some of the subsidiary legislation so far made are, the "Examination for Certificates of Competency (Deck) Regulations, 1963", "Merchant Shipping (Manning) Regulations 1963" and the "Examination for Certificate of Competency (Deck) (Offshore) Regulations 1967".

These Regulations deal with manning, examination and certification requirements for the various certificates of competency. None provides for compulsory attendance at a maritime educational institution, although provision is made for exemptions for attendance at such institutions. It is noteworthy to point out that, besides the "Maritime Academy of Nigeria Decree 1988", no regulation has been made, concerning maritime education and training in Nigeria since the entry into force of the STCW Convention.

1.3.3 Examination and Certification requirements for Home Trade and Offshore officers (Deck).

Master (offshore)

i) candidate for examination shall be not less than 22 years of age.

ii) shall hold a mate offshore certificate of competency.

iii) shall have not less than 2 years post mate sea service.

or,

i) shall be not less than 27 years of age.

ii) shall hold a Rivermaster certificate of competency.

iii) shall have not less than 2 years command experience of a vessel over 100 GT.

Mate (offshore)

i) candidate shall be not less than 20 years of age.

ii) shall have not less than 4 years at sea on offshore, coastal or sea-going vessels on deck.

or,

i) shall be not less than 25 years of age.

ii) shall hold a Boatswain's certificate.

iii) shall have not less than 2 years post Boatswain's certificate.

or,

i) shall be not less than 25 years of age.

ii) shall hold a Riverman certificate.

The examination and certification requirements for Home Trade are similar to those for Offshore. The main difference between the two lies in the syllabi. The Regulations also stipulate that officers of the Nigerian Navy are exempt from the mate examinations and may be examined for master (HT and Offshore) certificates without further sea service. It is also stated that chief petty officers of the Navy are entitled to the mate certificate.

Section 3, subsection (2), paragraph (a) of the "Examination for Certificate of Competency (Deck) (Offshore) Regulations 1967" makes provision for the exemption of candidates from Radar qualification if the Government Inspector of Shipping is "satisfied that facilities are not available at the time of the intended examination".

SCHEDULE OF EXAMINATIONS FOR THE HOME TRADE AND OFFSHORE EXAMINATIONS.

SUBJECT	MATE HT		MASTER HT		MATE OFFSH.		MASTER OFFSHORE	
	TIME (H)	PASS MARK	TIM (H)	PASS MARK	TIM (H)	PAS MK	TIME (H)	PASS MARK
CHART WORK	2	70	2	70	2	70	2	70
PRACTICAL NAVIGATION	3	70	2	70	3	70	2	70
SHIP KNOWLEDGE	2	50	-	50	-	-	2	60
ESSAY	1.5	-	-	-	-	-	-	-
STABILITY	-	-	2	-	-	-	-	-
COMPASS DEVIATION	-	-	1.5	-	-	-	-	-
ENGLISH	-	-	1	-	-	-	-	-
ELEM.SHIP KNOWLEDGE	-	-	-	-	2	70	-	-

TABLE 1.1

See Annex 4 for the existing syllabi.

1.4 Present MET and Certification of Home Trade Deck Officers

It is not clear when the examination and certification of Home Trade officers began, but is believed to have started in the early nineteen fifties. Until 1979, there was no institution in Nigeria where intending candidates for the examinations could obtain nautical education and so had to engage in self study. With the establishment of the Ghana Nautical College in 1958, some Nigerians attended this institution to get some tuition before sitting for the examinations, particularly as the failure rate was very high.

To date, there is still no formal education programme for certificates of competency in Nigeria, besides the

programme for foreign-going officers and officers of fishing vessels. However, starting from 1987, the Maritime Academy of Nigeria started a 10-week summer vacation programme to prepare candidates for the Home Trade examinations. The response of coastal vessel operators, Ministry of Transport examiners and candidates to this programme has been very encouraging, although it is felt by all concerned that the arrangement is grossly inadequate.

CHAPTER 2

2 EVALUATION AND FORECAST OF COASTAL SHIPPING AND RELATED MANPOWER IN NIGERIA.

B.Ahamad and M.Blaug in "The Practice of Manpower Forecasting" (1973), make the point that "the purpose of making manpower forecasts is to ensure that supplies of manpower are available when new requirements arise". How far into the future we have to forecast in order to plan for education is however open to question. In the maritime field, the lengthy period of training required, particularly for senior officers, coupled with the uncertainties involved in shipping, compounds the problem of accurately forecasting manpower requirements.

An attempt however has to be made to forecast a practicably accurate manpower requirement for coastal and home trade vessels, as it relates to deck officers. The high cost and specialized nature of maritime education and training, explains to a large extent, the necessity for this. K.Hinchliffe in his paper (1987) titled "Forecasting Manpower Requirements", explains that , "the training periods required for specialized manpower are often of such a length that even if individuals do respond to higher wages by commencing a period of training, by the time they are trained either demand has fallen or so many others have responded in a similar way that excess supply then occurs".

Planning for maritime education without the benefit of a manpower evaluation and forecast gives rise to continual disequilibrium which is costly to the

government, the shipping industry, the maritime training institutes and seafarers. The present situation in which some graduates of the Maritime Academy of Nigeria are finding it difficult to get placement on board foreign-going ships for the required sea service before sitting for their first certificate of competency, is a case in point.

2.1 Evaluation of the number of vessels and crew engaged in coastal activities in Nigeria.

Due to time constraints and for logistical reasons, coupled with an aversion on the part of shipowners/operators and government agencies to part with information, it has not been an easy task to make a comprehensive list of all vessels engaged in coastal activities in Nigeria. What is here represented, however gives a good account of the total number in question. Since schedule of duty and manning levels vary for different ship types and sizes, it is necessary to categorize the maritime industry in order to properly address the issue.

2.1.1 The Offshore Oil Industry

The offshore oil industry is the biggest employer of seafarers in Nigeria. Vessels engaged in the industry are line boats, crew boats, supply vessels, tugs and jack-up barges. The number of vessels engaged at any time, depends on the level of activity in the industry. Virtually all the vessels are owned by multinational corporations and operated by their subsidiaries in Nigeria, the biggest of these being Zapata Marine and Tidex. During periods of low oil production, some of

the vessels are withdrawn from service in Nigerian waters and sent to other parts of the world. The present number of vessels engaged probably represents the highest in the last ten years. This situation is in part attributable to the crisis in the Persian Gulf.

The following, is an assessment of the number of vessels engaged in the offshore oil industry.

OPERATOR	TUGS	LINE BOAT	CREW BOAT	SUPPLY VESSEL	JACK-UP BARGE
ZAPATA MARINE	2	1	1	27	-
TIDEX	1	5	5	8	-
WEST AFRICAN OFFSHORE	-	2	2	-	-
LAND AND MARINE	-	3	2	-	-
O.I.L.	-	5	5	2	-
CARE OFFSHORE	-	-	-	3	-
MANSOOR MARINE	-	-	-	2	-
MONTERREY	-	3	-	3	2
OTIS	-	-	-	-	7
ZUMAX	-	-	2	-	2
TOMAB	-	-	-	2	-
ZUFE MARINE	-	2	-	-	-
LAMAR BAY	-	1	-	-	-
I.I.C.C.	-	-	-	1	-
McDERMOTT	3	-	-	-	-
TOTAL	6	22	17	48	11

NOTE: Most of the supply vessels also double as tugs and some are equipped for fire-fighting on oil rigs and platforms.

Regarding the supply vessels outlined above, six of them are below 200 GT, five are above 500 GT but below 1600 GT and the thirty seven others are above 200 GT but below 500 GT.

2.1.1.1 Supply Vessels

The above table shows that there are 48 supply vessels operating in Nigerian waters. Given that in the post Gulf crisis period, oil production will return to OPEC quota level, which is roughly two thirds of the present production level, it will be fair to say that the number of supply vessels will reduce to about 32.

Apart from a handful, most supply vessels employ foreign nationals (mainly British, American and Italian) as masters and chief engineers. The other positions in the officer category are taken up by Nigerians with Home Trade certificates. All the ratings are also Nigerians.

Manning (deck and engine room) of supply vessels operating in Nigeria consists of the following:

MASTER	1
CHIEF MATE	1
QUARTER MASTER	1
AB SEAMEN	3
CHIEF ENGINEER	1
2ND ENGINEER	1
MAR.ENG.ASST.	1
GREASERS	2
TOTAL	11

The schedule of duty on most coastal vessels, is six months service on board, followed by one month off duty. This means that at least one-sixth of the total number of crew are on leave at any point in time. The adoption of a well structured maritime education, training and certification programme would further require that about ten percent of the crew are on study leave at any time. The minimum number of crew (deck and engine room) required to man all the 32 supply vessels would therefore be: 40 masters, 40 chief engineers, 40 mates, 40 2nd engineers, 40 quartermasters, 40 marine engineering assistants, 120 ABs, 80 Greasers. The total is therefore 440.

2.1.1.2 Line and Crew Boats

Manning (deck and engine room) levels for line and crew boats are as follows :

	MASTER	MATE	QTR.MSTR	A/B	C/E	MEA	GRSR
LINE BOAT	1	1	1	2	1	1	1
CREW BOAT	1	-	1	2	1	1	1

The schedule of duty on line and crew boats are more or less the same as supply vessels, since most of them are owned by the same operators. Line boats are engaged in the oil industry, to aid in the mooring of Crude Oil Tankers while Crew boats ferry workers to and from Oil Rigs and Platforms. Unlike supply vessels, line and crew boats are not taken completely out of service during periods of low oil production. Rather, some of

them are reassigned to perform other duties in inland waters. Following the deductions adduced for supply vessels, the minimum number of deck and engine room crew required to man the 22 line boats and 17 Crew boats will be 49 masters, 27 mates, 49 quarter masters, 99 ABs, 49 chief engineers, 49 MEAs and 49 greasers, the total being 371.

2.1.1.3 Tugs and Jack-Up Barges

Tugs and jack-up barges are employed in the industry as and when the need arises, which is not frequent. Hence, for maximum utilization, the same tugs and jack-ups that operate in Nigerian waters also operate in the offshore oil industry of Gabon and Cabinda (Angola) in the Gulf of Guinea. However, either because the operators/owners and the masters and chief engineers are mainly Americans, or for some other reason,the tendency has been, to employ Nigerian crew. (Nigeria is the only anglophone country in the sub-Region to the east).

The Manning (deck and engine room) levels for tugs and jack-ups are as follows :

	MASTER	MATE	QTR.MTR	C/E	2/E	MEA	A/B	GRSR
TUGS	1	-	1	1	1	-	3	2
JACK-UPs	1	-	1	1	-	1	1	-

Based on the assumption that in the aftermath of the Gulf crisis, oil production levels will fall to or less than the OPEC quota, and considering the nature of

operations of tugs and jack-up barges with respect to location and relocation of oil rigs, it will be safe to evaluate and forecast manpower requirements for half the number of such vessels currently engaged. The minimum number of deck and engine room crew therefore required to man these vessels is, 11 masters, 11 quarter masters, 19 ABs, 11 chief engineers, 5 second engineers, 8 marine engineering assistants and 8 greasers; a total of 73 crew members.

2.1.2 Oil Tankers, Passenger Vessels and Nigerian Ports Authority Vessels.

With the exception of a few vessels, tankers operating from and in Nigerian waters are on charter to companies that have contracts with the Nigerian National Petroleum Corporation to transport refined petroleum products from the refineries at Warri and Port Harcourt, to Lagos, Calabar and other West African ports.

In the course of gathering data for this project, extreme difficulty was experienced as authorities that ought to have the required data, for unexplained reasons were not forthcoming with information. What is therefore represented below was garnered from several different sources and it is believed that it represents a great proportion of the total number of vessels in question.

SHIP'S NAME	SHIP TYPE	GT	HP	PORT OF REG.
SLETREAL	Tanker	5451	3600	Fredrikstad
ASMA	Tanker	2267	3200	Port Kelang
BOS GLORY	Tanker	-	-	-
IMPALA	Tanker	1588	2250	Manila
AZHRA	Tanker	1997	2400	San Lorenzo
OMOLARA	Tanker	-	-	Lagos
REINA NAVIGANTE	Tanker	3818	3900	Panama
DERIN	Tanker	497	1050	Panama
PUCCINI	Tanker	-	-	-
UGHELLI KINGDOM	Tanker	998	1800	Lagos
NIGERIAN STAR	Tanker	1182	1230	San Lorenzo
NORTHERN NAVIGATOR	Tanker	1973	2600	Limassol
AFRICAN PRIDE	Tanker	-	-	-
LIBBY 'G'	Chemical Tanker	5266	6160	Monrovia
SILVA I	Tanker	-	-	-
STRONG HAND	Tanker	198	240	Liverpool
CRYSTAL VICTORY	LPG - Tanker	853	700	Lagos
COWRIE PRINCESS	Tanker	-	-	-
BIRBA I	Tanker	-	-	-
LARNACA	Tanker	22243	16500	Limassol
MAGIC MERCURY	Tanker	13439	10500	Monrovia

BOTANY TRIUMPH	Tanker	2689	3200	Panama
CONQUEROR	Tanker	2501	2850	Lagos
TEXACO MARINER	Tanker	298	565	Lagos
JUMBO	Passenger	–	–	Lagos
SEA LION	Dredger	3981	3880	Lagos
ARGUNGU	Survey	714	1142	Lagos
BODE THOMAS	Buoy	1159	600	Lagos

MANNING LEVELS

	Passngr. V/L	Tankers	Drdgr	Srvy V/L	Buoy V/L
MASTER	1	1	1	1	1
MATE	1	1	1	1	1
2/O	1	1	1	1	1
3/O	1	1	–	–	–
C/E	1	1	1	1	1
2/E	1	1	1	1	1
3/E	1	1	1	1	1
4/E	1	1	–	–	–
JNR/E	1	–	1	2	2
A/B	4	4	6	5	5
GRSRS	3	3	3	3	3
TOTAL	16	15	16	16	16

TABLE 2.1

The number of tankers operating in Nigerian waters at any time depends on several factors. One is the volume of petroleum products transported to storage tanks in Lagos and Calabar ports. A second factor is the number of merchant ships calling at the various ports, requiring bunkers. With the Nigerian economy now

showing signs of recovery, it is anticipated that the number of vessels calling at the ports will increase by at least twenty percent. An increase in demand for bunkers is therefore expected, resulting in an increased demand for tankers. Also, domestic demand for petroleum products is expected to rise by about ten percent in the next ten years.

With stronger economic ties being forged with other African countries, particularly members of the Economic Community of West African States, it is anticipated that the number of coastal vessels will see a significant growth in the next ten years .

The table shows that there are 24 tankers currently (Jan 1991) operating in Nigeria. Given that this number will increase over the next ten years by about fifty percent, the expected number will therefore be 36 tankers. The minimum crew (deck and engine room) required to man these vessels would be 46 each, of master, chief officer, second officer, third officer, chief engineer, second engineer, third engineer and fourth engineer. Deck and engine room ratings required would be 182 deck ratings and 129 greasers. This gives a total of 679 crew members.

With the anticipated increase in the volume of trade between Nigeria and other countries in West Africa, the number of passenger vessels is expected to increase from the present one plying between Nigeria and Ghana, to at least four within the next ten years. The minimum crew (deck and engine room) required to man these vessels would be 6 each of master, mate, second officer, third officer, chief engineer, second

engineer, third engineer, fourth engineer and junior engineer. 20 deck and 15 engine room ratings would also be required. A total of 89 crew members is therefore required.

Regarding the Nigerian Ports Authority vessels, it can safely be assumed that the number will more or less remain constant over the next ten years. The minimum number of crew (deck and engine room) required to man the dredger, survey and buoy vessels would be : 5 each of master, mate, second officer, chief engineer, second engineer and third engineer, 6 junior engineers, 17 deck ratings and 10 greasers; a total of 63 crew members.

2.2 Summary of minimum number of crew required to man coastal vessels operating in Nigeria over the next ten years.

OFFSHORE OIL INDUSTRY		TANKERS, PASSENGER V/LS AND NPA V/LS
MASTER	100	57
CHIEF/OFF	67	57
2ND/OFF	-	57
3RD/OFF	-	57
QTR.MASTER	100	-
SEAMAN	240	219
CHIEF/ENG	100	57
2ND/ENG	45	57
3RD/ENG	-	57
4TH/ENG	-	52
JNR/ENG	-	12
MEA	97	-
GREASERS	138	154
TOTAL	887	836

TABLE 2.2

2.3 Training Needs

In order to maintain a state of equilibrium, in terms of manpower availability for coastal vessels, the supply has to match the demand. To achieve this, a systematic approach has to be evolved. To be taken into account are, the annual rate at which senior officers, particularly masters and chief engineers leave the profession, and the percentage of trainees or deck boys that have a change of heart within a few months of going to sea. It is reckoned that between seven and ten percent of senior officers "swallow the anchor" annually and about ten percent of trainees or deck boys leave the profession rather early. Therefore, an allowance of a minimum of twenty percent in excess of the rate of attrition of senior officers, for new entrants into the profession, has to be made.

For vessels engaged in the offshore oil industry, the number of deck entrants required to be trained annually would be 11 and engine room entrants, also 11. Tankers, Passenger and Nigerian Ports Authority vessels would require 6 new entrants each for deck and engine room departments. These figures however are based on the assumption that the monovalent system of manning currently in existence would remain. The adoption of General Purpose (GP) crewing which is likely in the near future, would appear to mean that a lesser number of new entrants would be required for training. However, the fact that all the vessels are not owned or operated by the same company, means that each company would require its own back-up crew. This is expected to compensate for the reduction in crew arising from the adoption of GP crewing.

It would appear that the manning of vessels engaged in the offshore oil industry in Nigeria does not comply with the provisions of the STCW convention with regards to officers in charge of a navigational watch on ships of 200 GT or more (Regulation II/4). This is because, quartermasters who apparently perform this role are not duly qualified to do so. It is therefore expected that quartermasters will be replaced by duly qualified watchkeeping officers or will have to undergo education and training for the appropriate certification.

CHAPTER 3

3 COST BENEFIT OF IMPROVED MET AND CERTIFICATION

As well as providing knowledge and skills, it is generally recognized that education affects attitudes, motivation and other personal characteristics. The approach to problem solving and general conduct on the job of the educated man is often more analytical and better than that of the uneducated. Improving on an existing educational system can only lead to the achievement of higher productivity and efficiency.

The existing system of Maritime Education and Training in Nigeria for Home Trade can best be described as the "sitting next to Nellie approach". It perpetuates bad habits, misinformation and variable standards. Knowledge acquired by an apprentice or seaman depends on how much knowledge of the subject is possessed by his boss on the job. Where the supposed trainer is not abreast with advances in the industry either because he does not read relevant journals or has not attended an updating course, knowledge handed down is the same outdated knowledge that was handed to him.

Outlining the benefits of improved maritime education, training and certification of deck officers for coastal shipping can form the subject of a book. It would however do, in this work to point out the most obvious.

3.1 Reduction in Marine Casualties

In the foreword to a Report on the Project " Cause Relationships of Collisions and Groundings", published

in December of 1980 by Det norske Veritas, the authors pointed out that " approximately 75% of all marine casualties and losses involving Norwegian ships are due to collision and grounding. The cause in approximately 85% of the cases is given as human error ". The Report goes further to say that there appear to be clear differences in the causal relationships between the tonnage groups 100 - 1599 GT and ships above 1599 GT, the former representing the coastal fleet. A higher incidence of non-compliance associated with watchkeeping on the bridge was found in the casualties involving the coastal fleet. The Report recommends that certification and training in coastal navigation ought to be reviewed. Other recommendations for improving the situation are, training in traffic navigation in coastal waters, procedure for Radar plotting, procedures for vessels passing in restricted fairway, principles for manning of watches, voyage planning and checking qualifications of inexperienced navigators.

The question has to be asked that if a country such as Norway with a well acknowledged seafaring tradition and a long history of maritime education and training, has and recognizes these problems, associated with the coastal fleet, how much so for Nigeria with no formal maritime education and training system for coastal and home trade officers.

Protection and Indemnity (P&I) insurance secure shipowners against injury or death of crew members, passengers or third parties, pilferage or damage to cargo, collision damage, pollution and other matters that cannot be covered in the open insurance market. However, P&I premiums reflect the shipowners claims

record. With a low incidence of casualties the shipowner immediately saves money. This can only be achieved if seafarers are properly trained and are conversant with relevant International Regulations.

Following a marine casualty, a vessel probably has to proceed to a repair yard for repairs and surveys. The loss of earnings to the shipowner or operator during this period of inactivity can be quite enormous. This casualty may have been avoided in the first place if the officer on watch at the time of the incidence or the master was proficient in the performance of his duties.

3.2 Repair and Maintenance Costs.

Repair and maintenance costs represent roughly 15% of operating costs of a well managed and efficiently run ship. This could however increase considerably if shipboard routine maintenance of equipment is not properly carried out. Classification Societies require that ships undergo regular surveys in order to maintain class for insurance and safety purposes. Defects have to be remedied before a certificate of seaworthiness is issued. Lack of a good understanding of the right manner of operating equipment and handling tools would necessitate an increase of defects requiring repairs by shore personnel. Apart from the direct costs involved with increased repairs, trading time is lost, brought about by the additional time spent in port.

Mean Time Between Failure (MTBF) is often given by manufacturers of electronic navigation equipment and IMO recommends that this should be in excess of thirty

days. The performance of equipment to specifications however depends on the proper operating procedures being adhered to. The life span of the components of any electronic equipment is bound to be short if the dos and don'ts are not followed properly. Failure to operate equipment correctly can often be attributed to a lack of adequate knowledge by the operator. The remedy to frequent repairs and replacement of electronic equipment can only come about by an improvement in the training of the operators.

Under the provisions of the SOLAS Convention, Administrations issue, after surveys, certificates in respect of Ship Safety Construction, Ship Safety Equipment and Safety Radio Telephony/Telegraphy. The condition of the ship and its equipment is required to be maintained in conformity with the provisions of the Regulations, the enforcement of which is carried out by surveyors of the Maritime Administration and officials of Port State Control. Often vessels are detained in port until defects in safety equipment have been remedied. In most cases, some of the defects pointed out by surveyors could have been avoided or rectified if the ship's officers had been following a maintenance schedule and were knowledgeable about the provisions of the Regulations. The additional costs incurred by shipowner/operator for remedying avoidable defects and for detention in port can be eliminated or at least reduced by improvement of maritime education and training of ship's officers.

3.3 Reduction of Fuel Consumption

Fuel and diesel oil costs constitute about 90% of voyage costs and roughly 30% of total costs for a Panamax bulk carrier under a European flag. For a coastal vessel trading within West Africa and employing Nigerian crew on relatively low wages, fuel cost is likely to constitute a higher percentage of total costs. Shipowners and operators are continuously developing ways of cutting fuel costs. These range from employing the services of bunker brokers to instructing vessels in their fleet to steam at economic speed. All these efforts can however be nullified by the poor conduct of a navigation passage or the stowage of cargo.

3.3.1 The Effect of Poor Conduct of a Passage

In the conduct of a passage say, from Lagos to Port Harcourt, by a coastal vessel with a Radar antenna height of 21 metres, Radar fixes would normally not be obtained from a distance about 13 miles from the breakwaters until the vessel is off Pennington Oil Terminal (172 miles away from Lagos) or off Brass Oil Terminal (211 miles away from Lagos). In the absence of a Satellite Navigator or GPS receiver on board, as is the case on most coastal vessels operating in Nigerian waters, dead reckoning techniques are often used for this leg of the passage. On the assumption that the ship's speed is 10 knots and compass error has been obtained incorrectly and applied to ship's head, a four degree difference between the course to make good and the course made good, after a period of seventeen hours (somewhere off Pennington) it would be discovered that

the vessel was 12 miles from the DR position. A subsequent alteration of course towards the first waypoint (off Brass Terminal) would result in the total distance steamed being 213.2 miles instead of 211 miles. The difference represents about 1% of the distance and hence, 1% of fuel wasted.

If the amount of fuel so wasted is multiplied by the number of passages conducted by a coastal vessel in a year, it can be seen that a considerable quantity of fuel is being wasted. Again, this wastage can be drastically reduced by improving training and certification of navigating officers.

3.3.2 Cargo and Ballasting Operations

In general, power of engines is proportional to the power to propel the ship through the water. The engine power varies as the displacement and speed and is proportional to the mass of fuel burned. This basic fact is unlikely to be comprehended by the ship's officer whose knowledge of engineering and ship stability is restricted.

In the normal course of ship operation, situations arise when the uninformed ship's officer receives bunkers into or continuously burns fuel from tanks on one side of the ship i.e. from port or starboard. The resulting list is then corrected using ballast water. This has the effect of unduly increasing the ship's displacement. Similarly, improper stowage of cargo, particularly on general cargo ships often results in a list or negative stability, requiring ballasting to correct the list or improve the stability and thereby

increasing the ship's displacement.

3.4 Environmental Considerations

Over the last thirty five years or so, there have been a number of multilateral conventions aimed at preventing and controlling marine pollution. These conventions, apart from specifying constructional standards, define proper operational procedures and steps to be taken to avoid accidental discharge of pollutants into the marine environment. Based on the provisions of the conventions, various Administrations incorporate into their national legislation stiff penalties for non-compliance.

For Rules and Regulations to achieve the purpose for which they are made, it is necessary that the target population are aware of them and the consequences of their violation. It is never the intention of conventions and recommendations to provide a framework for punitive measures to be taken against violators but rather to prevent the occurrence of incidences requiring such measures. However, the judicial process which must take its due course does not absolve a violator who claims ignorance of the law. The moral question to be asked though, is whether a person can be blamed for violation of a Regulation he has not been educated about.

Predicting the biological and toxicological effects substances may pose to the marine environment is considered to be difficult. Tests on marine life obtained from polluted waters have however shown evidence of bioaccumulation, tainting and

biodegradability. It has also been established that garbage thrown into the sea causes harmful effects to the marine environment and in the long term aids in altering the ecological balance. The fact that the inhabitants of coastal areas of Nigeria depend largely on the resources of the sea and adjoining rivers, both for their livelihood and protein intake should bring the point clearly home, for the need to properly educate ship's officers on conventions and regulations dealing with marine pollution and its effects.

CHAPTER 4

4 FACTORS TO CONSIDER IN PLANNING MET CURRICULA AND CERTIFICATION IN NIGERIA FOR COASTAL ACTIVITIES.

In planning a curriculum for education and training of officers for service on near-coastal voyages, several factors have to be taken into consideration. These include:

1) The requirements of the STCW Convention
2) The needs of the shipping industry
3) The availability of navigational marks and electronic systems of position fixing
4) Traffic density in the waters adjacent to the West African coast
5) Coastal features
6) The availability of Search and Rescue service
7) Communication and Information services
8) Weather and Oceanographic systems
9) International Regulations and Recommendations
10) The needs and aspirations of seafarers with regards to suitability for alternative employment.
11) The Provisions of the Nigerian Shipping Laws.

4.1 STCW Convention

Regulation I/3 (Principles governing near-coastal voyages) among other things, states that "...the Party whose flag the ship is entitled to fly shall prescribe training, experience and Certification requirements for

seafarers serving on such ships at least equal to those of the Party off whose coast the ship is engaged, provided that they do not exceed the requirements of the Convention in respect of **SHIPS NOT ENGAGED ON NEAR-COASTAL VOYAGES..**" (emphasis mine). In view of the fact that the Merchant Shipping Act (1962) of Nigeria defines Home Trade Limits as extending from Cape Vert to the mouth of the River Congo, the minimum requirements for vessels trading to areas outside the coastal waters of Nigeria would have to be for "Certification of officers in charge of a navigational watch on ships of 200 GRT or more". This contention is further strengthened by the provisions of Regulation II/3 chapter 1. Chapter 5 of Regulation II/4 states that "**the level of knowledge to be required in the subjects shown in the Appendix shall be sufficient for the officer of the watch to carry out his watchkeeping duties safely**". Also, that "Training to achieve the necessary theoretical knowledge and practical experience shall be based on 'Basic Principles to be observed in keeping a navigational watch' and relevant International Regulations and Recommendations".

Since the Certificate to be issued is for service restricted to the West African coast, theoretical knowledge in the subjects shown in the Appendix need not be extensive. Resolutions 10, 11 and 12 of the Convention deal with training and qualifications of officers and ratings of Oil, Chemical and Liquefied Gas Tankers, and actually recommends in the annexes, syllabi for education and training. Bearing in mind that a great number of vessels presently engaged in coastal activities are oil tankers, and with the

possible introduction of LNG carriers, on completion of the Nigerian LNG project, these subjects would have to be given far more attention than is currently being done.

Assessment of the vessels engaged in coastal activities in Nigeria, shows that there are basically three classes. Those below 200GT which are mainly Line and Crew boats, those between 200GT and 1600GT (supply vessels and tugs) and those above 1600GT (tankers and others).

4.1.1 Minimum Certification Requirements for Ships of 200GT or more.

4.1.1.1 Officers in charge of a Navigational watch (Reg.II/4)

1. Candidate shall hold an appropriate certificate.
2. Candidate shall be not less than 18 years of age.
3. Candidate shall be medically fit particularly regarding eyesight and hearing.
4. Approved sea-going service of 3 years which includes 6 months under the supervision of a qualified officer.
5. Maximum sea service remission of 2 years may be allowed by Administration if satisfied that training is at least equivalent in value to period of sea-going service it replaces.
6. For service on Tankers, a Tanker familiarization course.

7. Satisfy the Administration by passing an appropriate examination that he possesses adequate theoretical and practical knowledge appropriate to his duties.

4.1.1.2 Chief Mate (Reg.II/2)

1. Candidate shall meet the requirements for officers in charge of a Navigational watch, as in 4.1.1.1 above.
2. Minimum of 18 months sea-going service as a watch keeping officer. or,
3. Minimum of 12 months sea-going service if the Administration requires special training which it considers to be equivalent to at least 6 months service as WKO.
4. Shall have passed an appropriate examination to the satisfaction of the Administration.
5. For service on Tankers, a Tanker specialization course.

4.1.1.3 Master (Reg.II/2)

1. Candidate shall meet the requirements for certification as WKO, as in 4.1.1.1 above.
2. Minimum of 36 months sea-going service as WKO. Or,
3. Minimum of 24 months sea-going service as WKO if a minimum of 12 months has been served as chief mate or if the Administration requires special training which it considers to be equivalent to such service.

4. Shall have passed an appropriate examination
5. For service on Tankers, a Tanker specialization course.

4.1.2 Minimum Certification Requirements for ships of less than 200GT

4.1.2.1 Officers in charge of a Navigational watch.(Reg.II/3)

Ships engaged on near-coastal voyages :

1. Candidate shall hold an appropriate certificate.
2. Shall be not less than 18 years of age.
3. Shall be medically fit, particularly regarding eyesight and hearing.
4. Shall have successfully undergone special training, including an adequate sea-going service as required by the Administration; or,
5. Shall have completed approved sea-going service in the deck department of not less than three years.
6. Shall satisfy the Administration that he possesses adequate knowledge appropriate to his duties on the ships concerned.

4.1.2.2 Master (Reg.II/3)

Ships engaged on near-coastal voyages.

1. Shall hold an appropriate certificate

2. Candidate for certification shall be not less than 20 years of age.
3. Have approved sea-going service of not less than 12 months as officer in charge of a navigational watch.
4. Satisfy the Administration that he possesses adequate knowledge appropriate to his duties on the ships concerned.

4.1.3 Minimum Requirements for Ratings forming part of a Navigational Watch on ships of 200GT or more.

1. Shall be not less than 16 years of age.
2. Shall be medically fit particularly regarding eyesight and hearing.
3. Shall have approved sea-going service of not less than 6 months particularly associated with navigational watchkeeping duties. Or,
4. Special training either pre-sea or aboard ship, plus a minimum of 2 months sea service.
5. Experience or training which includes basic principles of fire fighting, first aid, personal survival techniques, health hazards, personal safety etc.
6. For service on Tankers, a Tanker familiarization course.

4.2 The Shipping Industry

Ship owners and operators, in general prefer to have well trained seafarers serving on their vessels. There is however a reluctance on the part of some of them to

invest in training and to pay attractive wages. With changes in ship design and operational methods, the role of ship's officers is slowly changing from that of watchkeeping to that of managers of plants. This is more so in West Africa where shore support services are inadequate. In such an environment, the ship master is expected by the shipowner to be conscious of cost cutting measures without jeopardizing safety, and to be self reliant in carrying out most of the duties involved in loading, securing, caring for and discharging cargoes including the safe navigation and on board management of the ship.

In order to properly address the needs of the shipping industry, with respect to the quality of officers, it will be necessary to categorize the types of ships presently engaged or likely to be engaged in the near future, on near coastal voyages.

4.2.1 Tankers

Generally, Tankers engaged in coastal trade, load petroleum products at the Warri and Port Harcourt Refineries for discharge at Lagos, Calabar and other West African Ports. The master of a ship navigating to the refinery at Warri does not embark a licensed pilot until the ship arrives at Benett Island, some 40 miles from Escravos Bar. He is expected to make the approach, cross the Bar, and proceed to Escravos on his own where he may engage the services of a local pilot for assistance in navigating through the rivers and creeks. This is a task that requires very good shiphandling and precise position fixing skills, particularly during the rainy or harmattan season. Added to this is the fact

that the coast is low-lying, with numerous oil rigs close to the entrance of the river. Also, the buoys marking the approach to the Escravos River and from the breakwaters to Escravos Town, are liable to frequent shifting with some of them having no lights or fog signals.

The approach to Calabar, though better than that of Warri with regard to buoyage, the shipmaster is still required to navigate his ship from seaward into the River Calabar up to Parrot Island (a distance of 30 miles) to embark a pilot. To a lesser degree, other ports on the West African Coast such as Douala, Port Harcourt, Freetown, Conakry and Banjul require that masters navigate vessels through narrow channels to pilot embarkation points.

A Tanker watckeeping officer is expected to be very familiar with safety procedures, cargo calculations, cargo equipment and operations, fire prevention, hazard control and marine pollution prevention besides being able to navigate his ship safely.

Mr.Seigo Suzuki (Chairman of the International Association of Independent Tanker Owners), probably said it all when he expressed the view that, "You can equip a tanker with any number of hulls and electronic gadgetry, but it may still cause pollution due to human error. Here, improved training is the only worthwhile counter".

4.2.2 Off Shore Supply and Rig Tender Vessels

The service functions carried out by supply vessels are presently getting more complex as oil drilling operations become more technologically advanced. The third generation supply vessels carry out service functions such as general supplies, pipe transport, towing, anchor handling, diving support and fire fighting. On these vessels, cargo is mainly carried on the after deck and in deep tanks for liquid cargoes. The chief officer and master serving on such vessels besides having a good knowledge of ship stability, would definitely need to have an in-depth knowledge of problems associated with the carriage of deck cargoes, proper securing procedures and free surface effect in tanks. Officers sailing on these vessels are required to be able to effectively use the various navigational equipment fitted on these vessels. The fitting of two or more thrusters and in some cases twin screw engines on these vessels to make them highly maneuverable, requires from officers, good knowledge of the principles of shiphandling.

Offshore supply and tender vessels operating in Nigerian waters, do so from bases at Warri, Port Harcourt and Eket. Passage to these ports is through rivers and creeks and is mainly restricted to daylight hours as most of the buoys are unlit and without Radar reflectors. For supply and tender vessels however, navigation to and from their operational bases is carried out at anytime of the day or night. A watch keeping officer is therefore required to be proficient in the use of Radar for position fixing and collision avoidance. He is also required to be aware of the

limitations of the equipment.

4.2.3 General Cargo and Passenger Vessels

A small number of vessels are engaged in the carriage of passengers. At present (1991), there is a service from the port of Calabar to Malabo (Equatorial Guinea). Also, services are operated from Lagos to Port Harcourt and Tema (Ghana) with plans by the operators to extend the service to Abidjan, Monrovia and Freetown. There is not much trade involving General Cargo vessels on the Nigerian coast at the present time. There is one vessel engaged on a regular service between Calabar and Port Harcourt transporting cement. A few other vessels are engaged in the carriage of laden containers from Dakar and Abidjan to Port Harcourt and Calabar, and from Escravos Fairway to Warri Port.

Officers serving on these vessels are required to be quite conversant with radio communication procedures, fire prevention and fighting techniques, Passenger Ship Safety Regulations, ship stability and shipboard operations besides being proficient in the use of navigational aids and astronomical navigation.

4.3 Navigational marks and electronic Position Fixing systems on the West African Coast

The West African Coast is perhaps a sea area of the world least covered by electronic position fixing systems. There is no Decca or Loran coverage of the entire area while the comparatively poor accuracy of Omega renders it inadequate for use in coastal navigation. With the Transit Satellite system, the

number of satellite passes per day is lowest at the equator. Hence, the time between two satellite passes on the West African coast (Lat 0 deg to 17 deg N) is often several hours.

On the surface, the Global Positioning system with its high level of accuracy and world coverage, would be the ideal system for use by coastal vessels on the West African coast. Besides the operators of offshore supply vessels, it is however doubtful whether coastal vessel operators would be willing to provide GPS receivers on their vessels if it is not mandatory to do so.

The only marine Radio beacon worthy of note on the coast, is located at Dakar. There are a couple of Aero RCs located in the various countries in the region, which are listed and charted, and are located some distance from the coast but their reliability for marine use is rather questionable. Added to this is the fact that these Aero RCs have short transmission ranges and are far apart, making them unsuitable for position fixing.

From the foregoing, it seems apparent that the watchkeeping officer has to rely very much on the use of the sextant and dead reckoning techniques involving thorough knowledge of the use of echo sounders and allowance for tides, currents, leeway and compass errors.

4.4 Traffic Density.

In general traffic density around the coast of West Africa is light. The only areas of exception are off

the coasts of Guinea, Sierra Leone and the Niger delta where concentrations of fishing vessels are sometimes encountered. Off the coast of Ghana, numerous small fishing crafts are often to be found in or close to the shipping lanes.

4.5 Physical features of the West African Coast.

The West African Coast is in the main, characterized by low-lying sandy beach backed by bush and in some cases mangroves. Between Dakar and Cape Sierra Leone, many indentations exist within the coastline, which normally would make for easy identification on a Radar screen but because navigable waters, except in the approaches to ports, are at a considerable distance (about 30nm) from the coast, echoes of the coastline which is low, do not appear on a Radar screen.

From Cape Sierra Leone to Cape Palmas the coast is low-lying sandy and straight between Sherbro and Cape Mesurado. Cape Mount which is situated between Sherbro and Mesurado and is some distance inland from the coast, presents good radar response. The coast between Cape Mesurado and Cape Palmas has several wooded hills backing sandy beaches. The sea off this area is navigable within a distance of ten miles from the shore and good Radar fixes can be obtained right through the passage, particularly off Bassa, Cestos Point, Baffu Point, Blubbara Point and Cape Palmas.

The coast of Cote D'Ivoire between Sassandra and Abidjan is generally sandy beach backed by low wooded hills, presents good Radar responses and provides possibility of good fixes due to the several

indentations. Between Abidjan and Cape Three Points, the coast is mainly flat, straight sandy beach backed by low bush with hardly any indentations except close to Cape Three Points. However, the sea lane off the Ivorian coast, for vessels not calling at any of her ports, is at its farthest point, a distance of about 100 miles. For a vessel steaming between Cape Palmas and Cape Three Points (about 360 miles), Radar fixes would normally be obtained up to about 15 miles after Cape Palmas and about 20 miles from Cape Three Points (depending on the height of the antenna).

The coast between Cape three Points and Tema, in general provides good Radar responses with low wooded hills, several towns and indentations. Of prominence are Takoradi, Sekondi, Winneba, Tantum Point, Elmina, Accra and Tema. From Tema to Lagos, the coast is mainly flat, straight sandy beach with only Cape St.Paul, Lome and Cotonou providing good Radar ranges and bearings within 12 miles of the coast.

The coast between Lagos and Escravos is characterized by straight sandy beach backed by dark undulating bush for most of the distance. As Escravos is neared, sandy beach gives way to mud backed by mangroves. The coast continues in much the same way up to the River Bonny entrance although with numerous inlets at the Niger delta, prominent among which are, Rivers Forcados, Nun and Brass. River Bonny to River Calabar has a narrow strip of straight sandy beach backed by mangrove swamps.

4.6 Search and Rescue service.

Chapter V, Regulation 15 of the International Convention for the Safety of Life at Sea states among other things, that : "Each Contracting Government undertakes to ensure that any necessary arrangements are made for coast watching and for the rescue of persons in distress at sea round its coasts." It is considered rather unfortunate that to date, no West African State has a credible SAR service. Following several IMO sponsored seminars in various countries of the sub-region, it is anticipated that SAR Organizations will be set up in the respective coastal states in the near future.

Considering the inadequacies referred to above, the onus falls on the shipmaster navigating in this area, to be very safety conscious and to be conversant with SAR procedures. It is expected therefore that the level of knowledge to be imparted to prospective masters with respect to Search and Rescue has to be rather extensive.

4.7 Communication and Information services.

All the major West African ports have Coast and Port Radio stations. These stations are equipped with HF, MF and VHF transmitters and receivers. In most cases, the equipment is either obsolescent or has low transmission power with the result that communication by VHF which is limited in range to about 20nm depending on height of antenna and propagation conditions, is the only reliable form of communication between ships and the Coast Radio Stations. Stations providing HF and MF

services which are worthy of note in West Africa, are those located at Abidjan and Dakar.

Meteorological information service to ships in the region is virtually non-existent. Ship masters calling at most West African ports requiring two or three day's notice of ETA, are often forced by circumstances to route their messages through Coast Radio Stations in Western Europe.

There is as yet no Coast Earth Station in West Africa. Liberia, Gabon and Nigeria are however INMARSAT member countries with investment shares and it is anticipated that one of these countries would have a CES within the next ten years. None of the existing CRS provides Digital Selective Calling alerting service as yet. With the coming into force of the GMDSS on 1st February 1992, it is hoped that this service will be provided by the CRS in the Region.

Ordinarily, for coastal vessels sailing around the West African coast, the area would be classified a GMDSS area A2. However, the provisional carriage requirement defines area A2 as being "within coverage of MF coast radio stations providing continuous availability of DSC alerting". In the absence of DSC service, the area would have to be classified area A3 which would then require coastal vessels to be fitted with Standard-A or C equipment in addition to VHF and MF equipment.

All the supply vessels operating in Nigerian waters are fitted with VHF and MF equipment while some of them have in addition, HF equipment. These vessels communicate directly with their operational bases which

have similar equipment fitted, on obtaining a licence from the Ministry of Communications. Tankers and other coastal vessels, depending on their sizes, are also fitted with similar equipment and communication procedures follow more or less the same pattern as for supply vessels.

It is probable that with the fitting of Standard-A or C equipment on board coastal vessels, similar equipment would be fitted in the offices of the shipowners or operators and ship's officers would be required to communicate with head office, using these equipment. Since most coastal vessels do not carry radio officers, deck officers would need to be trained to operate these equipment in addition to VHF, MF and HF equipment.

It will be appropriate to quote Capt.R.F.Short who in an article "Schooling at Sea", pointed out that: "The role of the watchkeeper is becoming one of surveillance and data handling. Familiarity with the use of computer and telex terminals and with communications by satellite will be a fundamental part of the role. The seafarer of the future will use a keyboard as readily as he uses pen and paper and efficient communication with the office will be routine".

4.8 Weather and Oceanographic Systems

In most of West Africa, the year splits up into dry (September-April) and wet (May-August) seasons, the length of each season depending on the movement of the Inter Tropical Convergence Zone (ITCZ). Near the Equator (south of 5deg N), monsoon rains persist for most of the year. This is mainly due to the fact that

the ITCZ hardly moves farther south of 6 degrees North in the Atlantic. The dry season is characterized mainly by dry NE'ly trade winds, bringing with it dust from the Sahara. This results in haze (off the coast) which sometimes poses navigational problems particularly in late December and early January off the Nigerian coast and for much longer periods off the coasts of Senegal, The Gambia, Guinea Bissau and Guinea. During the wet season, particularly in the Gulf of Guinea, rainfall is persistent for most of the time. Visibility is normally reduced depending on the severity of the rain.

Gales seldom occur off the West African coast and tropical storms are rare events. Line squalls are however sometimes encountered when crossing the ITCZ.

The principal currents off West Africa are the S to SE branch of the south westerly to westerly Canary current (between Senegal and Liberia), the east going Equatorial counter current (Guinea current in the Gulf of Guinea) and the west going northern limit of the South Equatorial current. The strength of these currents are subject to seasonal variations. The Guinea current in particular varies in strength between 1/4 and 1/2 knot in the winter months, to between 2 and 3 knots in summer. Variations in strength and direction also occurs with distance from the coast.

To be able to take advantage of a following current or to reduce the adverse effects of an opposing current, the navigating officer must have a good knowledge of the meteorological conditions existing in the region.

4.9 International Regulations and Recommendations.

International Regulations and Recommendations dealing with marine affairs, are in the main, made to improve maritime safety and to reduce danger to the marine environment. It is recognized that hazards associated with shipping casualties do not affect the seafarers and shipowners alone. A collision between a small coastal vessel and a laden super tanker, say off Bonny Offshore Terminal can wreak untold damage to coastal villages and deprive the inhabitants of their source of livelihood (fishing) for a long time, besides altering the ecological balance of the outlying sea area and adjoining rivers. Similarly, a casualty occurring at the entrance to a port can render that port closed for a long period of time.

It is therefore imperative that watchkeeping officers are familiar with and understand thoroughly, International Regulations dealing with safety of life at sea, prevention of marine pollution, buoyage, search and rescue, load lines and Prevention of Collisions at Sea.

4.10 The Needs and Aspirations of Seafarers.

In a paper delivered at the Sixth IMLA Conference on Maritime Education and Training, Prof.G.Zade of the World Maritime University among other things, pointed out that, "It is today an accepted fact that most seafarers, above all those with an unlimited certificate of competency, look at shipboard service as a temporary employment for some or several years before "swallowing the anchor" and not any more as a calling

and profession until the age of retirement." This statement particularly holds true for Nigerian seafarers who have been moving away in droves from the sea profession, in the last five years either to seek employment ashore or to acquire further education.

The desire to leave a seafaring career often comes when the seafarer is between the age of thirty and forty. This is a period in his life when the excitement of calling at different ports has begun to wear out and a natural change in priorities is beginning to set in. Added to this, is the fact that changes in ship design/types, pattern of trade and reduction in crew, have made social life on board less exciting. The realization also comes, that his colleagues from High School who chose other careers and who, five to ten years earlier were earning far less than him, have now risen to high managerial positions and are doing better.

Most sectors of the Nigerian economy place great emphasis on the possession of a university degree or a diploma and in some cases, the field of specialization is irrelevant. The seafarer is therefore faced with a situation in which he gets a shore job with a good pay initially, but upward mobility within the organisation is restricted. He is therefore disenchanted after a few years ashore.

Due to the restricted nature of training and certification of seafarers in the past, the jobs on offer to seafarers ashore are mainly those of pilotage, mooring masters, marine/cargo surveyors and technical/marine personnel managers. The seafarer of

today looks forward to more than this, wants to be able to change jobs and does not want to be impeded in upward mobility in his organisation, by non-possession of a diploma.

4.11 The Provisions of the Nigerian Shipping Laws.

The review and updating of the Nigerian Merchant Shipping Laws was recently (1988) carried out under an IMO assistance Project, financed by the UNDP. This is yet to be adopted by the Government. It is not known whether sections dealing with certification requirements will seriously be affected, and when the changes will be adopted. However, since the objective of the project was to, "promote the foundation of the effective maritime administration and the implementation of International Conventions", it is anticipated that certification requirements will be affected, particularly in light of the STCW and SOLAS conventions.

CHAPTER 5

5 PROPOSED MET CURRICULA AND CERTIFICATION IN NIGERIA, FOR COASTAL ACTIVITIES.

In fashioning appropriate curricula for MET of deck officers for vessels engaged in coastal and home trade activities, consideration has been taken of the factors outlined in Chapter 4 and the evaluation of vessels and crew of coastal and home trade vessels operating in Nigeria as outlined in Chapter 2. The proposed training scheme also takes into account the established tradition in the coastal vessel industry vis-a-vis manning structure and upward mobility through the ranks i.e. from deck boy to master. This is in contrast to foreign-going shipping where officer training commences with cadetship. Also taken into consideration is the unwillingness of owners of coastal shipping and operators to release officers or trainees for long periods at a time, for training.

Some features of the tried and tested MET systems in the Hanseatic Marine Training School in Cyprus, seamen schools and technical schools and polytechnics of Germany, and the United Kingdom have been incorporated where it was found that these would be in line with the educational system in Nigeria and conducive with the local shipping industry environment. A cursory look was also taken at the programme of training for GP Ratings at the Liberia Marine Training Institute, Marshall.

Considering the amount of sea service remission that can be claimed under the provisions of the STCW Convention, by attendance at a maritime training

institution, it would seem that the periods of sea service here recommended are much more than those required. This has been done in consideration of the facilities available for education and training at maritime training institutions in Nigeria. Also, in realization of the fact that "Work experience is an essential to professional competence" as aptly put by Prof.N.Uka of the University of Nigeria Nsukka in an article published in the West African Journal of Education in February of 1974. As stated by Finn Bergman in "The training of ratings" (1980), "It is worthy to note that in 1625, the Danish King Christian IV gave instructions for the training of ordinary seamen thus '...Every experienced seaman should, if possible, have assigned one or two ordinary seamen who should follow him in all kinds of work. He must instruct them so that they understand - and without cursing and swearing. The boatswains should see to it that this takes place. Likewise the Captain and the Skipper should observe that this is carried out. It is their duty to examine the young sailors and to let them have instructions every day, when the weather is calm..'.". Though this may not seem totally appropriate for today's world, with the advent of training simulators, there is a limit to the amount of physical experience that can be replaced by simulator training.

An area of versatility introduced in this scheme is in the training of ratings. On successful completion of the ratings part of the scheme, a rating would be able to perform his duties on any class of vessel. There is also the possibility for those who due to academic shortcomings are unable to continue with officer

training to branch off into petty officer training, either for sea going vessels or for inland water transport. Furthermore a GP rating would have the choice of either pursuing a career as a deck officer or an engineer officer. He may also be able to gain admission to a university to pursue a course of study unrelated to shipping should he wish to do so, the GP syllabus having been designed to enable candidates pass at credit level the academic subjects. It is important therefore that the course be planned to terminate at the end of the academic year of secondary schools so that candidates who wish to, can re-sit the Senior Secondary Certificate (SSC) examinations.

The inclusion of French as a subject of study in the Class II HT course has been necessitated by the fact that of the nineteen coastal States within the Home Trade limits, Senegal, Guinea, Cote d'Ivoire, Togo, Benin, Cameroon, Gabon, Congo and Zaire are French speaking and only Gambia, Sierra Leone, Liberia and Ghana, besides Nigeria, are anglophones. Of the remaining five, Cape Verde, Guinea Bissau, Sao Tome and Cabinda (Angola) are Portuguese speaking while Equatorial Guinea is Spanish speaking.

To ensure uniformity in the knowledge acquired by trainees, a workbook detailing tasks to be performed is to be provided for each trainee during the sea service period following the pre-sea course. On satisfactory completion of a task, the respective entry would be made in the workbook and initialled by a senior officer. Completion of at least 70% of the tasks outlined in the workbook would form part of the requirements for entry to the GP course.

In a paper (1989) titled "The training of merchant marine officers; what challenges have been and have to be met", Prof.Gunther Zade stated that, "Higher standards are not only the result of an extended and better training and the use of advanced training equipment but also of higher entrance requirements for maritime studies." The provisions of the Nigerian Shipping Laws make it possible for any one with the minimum required sea service and without any educational qualification to sit for Home Trade examinations. One finds it rather strange, how anyone without a basic knowledge of physics and mathematics manages to pass an examination in ship stability, navigation and Radar observation. The point was made in the "Rayner Scrutiny of Marine Examinations and the Certification of Seamen" (1985) in the U.K. that "The Merchant Navy (of the U.K) must be almost unique as a profession in not requiring educational qualifications and course attendance, and compulsory course attendance is likely to serve, if anything, to enhance overall standards." Needless to say that following the publication of the report, the situation in the U.K. has now been changed.

With advances in technology of ship design and equipment, it is obvious that the content of courses on offer will be above the comprehension of those with minimal education. Added to this is the fact that the National Board on Technical Education is unlikely to give accreditation for Ordinary National Diploma courses if the entry qualifications fall short of at least the pre-diploma courses of the Colleges of Technology and Polytechnics.

STRUCTURE OF EDUCATION SYSTEM IN NIGERIA

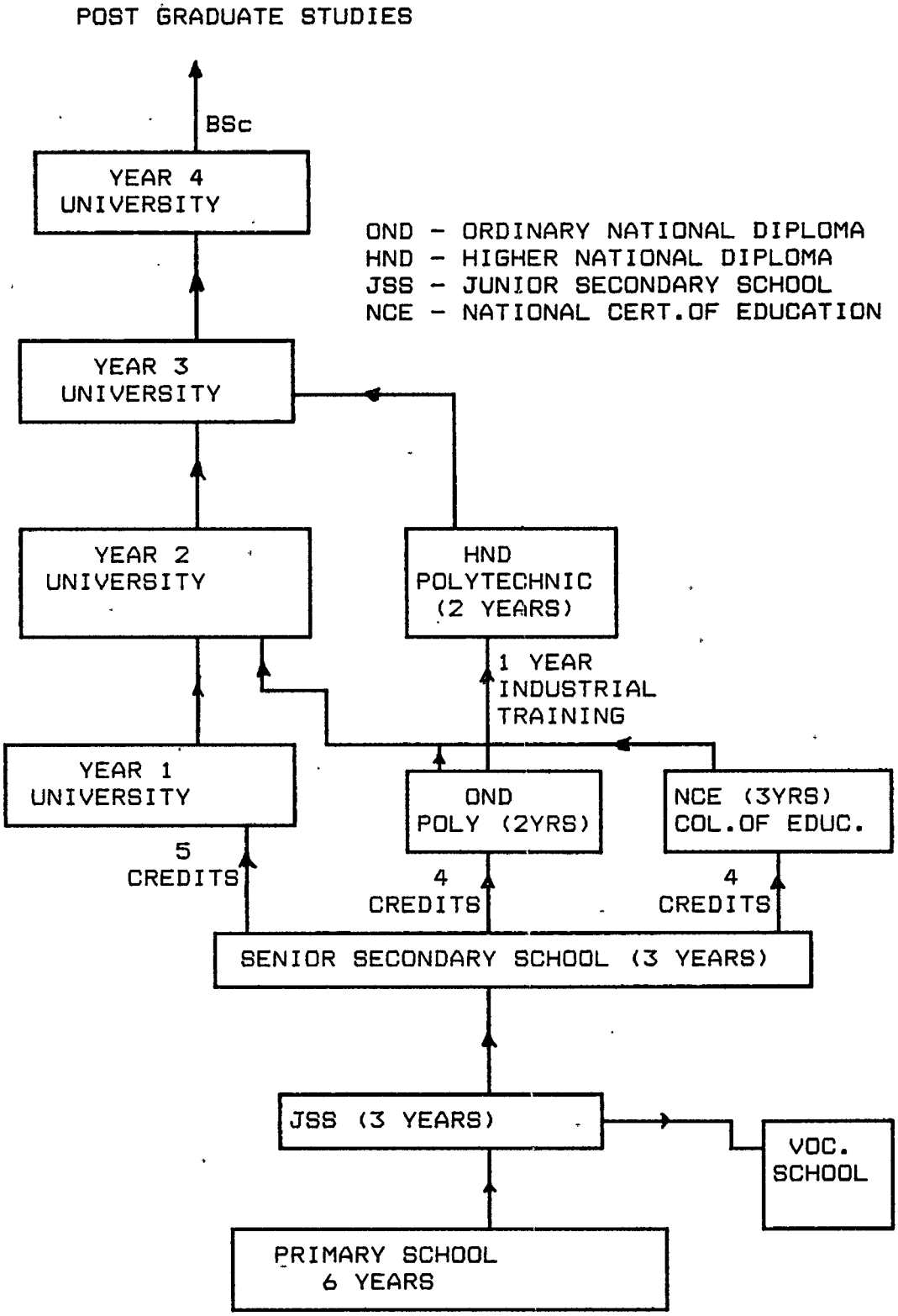


FIGURE 5.1

PROPOSED EDUCATION AND TRAINING SCHEME FOR DECK OFFICERS, ON VESSELS ENGAGED IN COASTAL ACTIVITIES IN NIGERIA.

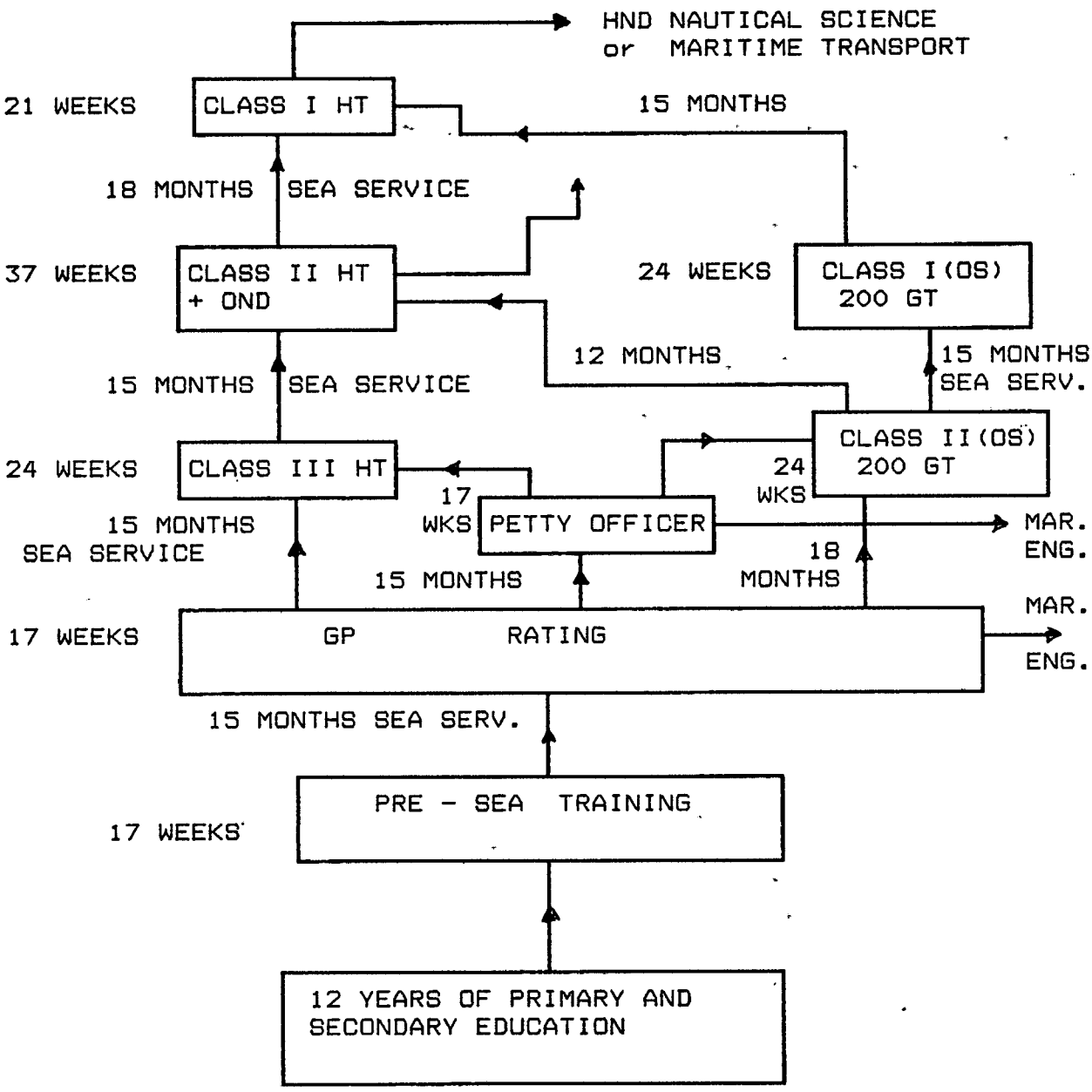
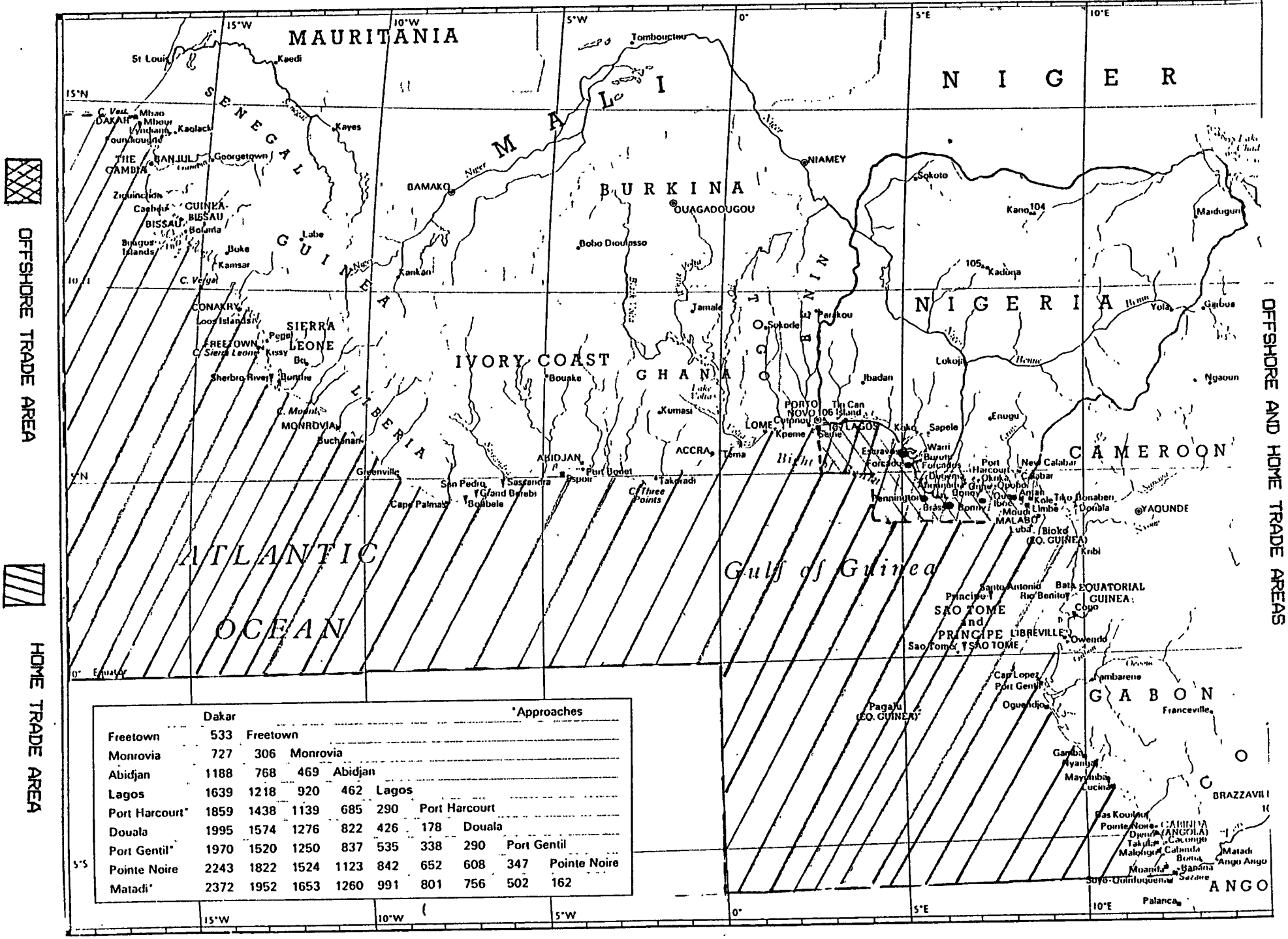


FIGURE 5.2

N.B:

CLASS I (HT)	- MASTER HOME TRADE
CLASS II (HT)	- MATE HOME TRADE
CLASS III (HT)	- 2ND MATE HOME TRADE
CLASS I (OS) 200GT	- MASTER OFFSHORE (LIMITED TO 200GT)
CLASS II (OS) 200GT	- MATE OFFSHORE (LIMITED TO 200GT)



	Dakar								*Approaches
Freetown	533	Freetown							
Monrovia	727	306	Monrovia						
Abidjan	1188	768	469	Abidjan					
Lagos	1639	1218	920	462	Lagos				
Port Harcourt*	1859	1438	1139	685	290	Port Harcourt			
Douala	1995	1574	1276	822	426	178	Douala		
Port Gentil*	1970	1520	1250	837	535	338	290	Port Gentil	
Pointe Noire	2243	1822	1524	1123	842	652	608	347	Pointe Noire
Matadi*	2372	1952	1653	1260	991	801	756	502	162

FIGURE 5.3 OFFSHORE AND HOME TRADE AREAS

PROPOSED MANNING SCHEME FOR DECK OFFICERS ON VESSELS ENGAGED IN COASTAL ACTIVITIES.

SIZE OF VESSEL	OFFSHORE TRADE AREA			HOME TRADE AREA		
	WKO	MATE	MASTER	WKO	MATE	MASTER
LESS THAN 200 GT	II (OS) III HT	-	I (OS) II HT	II (OS) III HT	I (OS) II HT	I HT
200 GT OR MORE	II (OS) III HT	I (OS) II HT	I HT	II (OS) III HT	I (OS) II HT	I HT

TABLE 5.1

N.B :

I HT - MASTER HOME TRADE

II HT - MATE HOME TRADE

III HT - SECOND MATE HOME TRADE

I OS - MASTER OFFSHORE

II OS - MATE OFFSHORE

5.1 OUTLINE OF PROPOSED COURSES

Following the various factors and arguments adduced in the previous chapters, the following courses are hereby proposed:

1.	Pre-sea training	17 weeks (1 semester)
2.	GP Rating Course	17 weeks (1 semester)
3.	Petty Officer Course	17 weeks (1 semester)
4.	Class III (HT)	24 weeks
5.	Class II (HT) + OND	37 weeks
6.	Class I (HT)	21 weeks
7.	Class II (OS) 200 GT	24 weeks
8.	Class I (OS) 200 GT	24 weeks

Comparison of the existing syllabi for Mates and Masters HT and OS with those hereby proposed (see Annexes II and III for the proposed syllabi and Annex IV for the existing syllabi), reveals that the existing Mates and Masters HT certificates would at the most be equivalent to Class II (OS) 200 GT and Class I (OS) 200 GT. It is therefore suggested that this should be made so.

In proposing these courses, account has been taken of the proposals for education and training of foreign-going officers as put forward by K.Bob-Manuel and L.Bereweriso of the Rivers State University of Science and Technology and by Capt.H.Anarah of Nigerian Port Authority. Both proposals call for university level of education and training. It is hoped that the present system which has OND as the terminal academic qualification will be replaced by the proposed scheme.

Successful completion of the Class II HT / OND would enable a candidate be eligible for direct entry (i.e Year 2) into the Bachelor of Science programme. A holder of Class I HT certificate would require a further two semester course of study leading to the award of a Higher National Diploma and then would be eligible for admission to Year 3 of the BSc. programme. These conditions satisfy the requirements for admission to Nigerian universities, as outlined by the Joint Admissions and Matriculation Board.

SYLLABUSES FOR PRE-SEA, GP RATING AND PETTY OFFICER COURSES

SUBJECT	HOURS		
	PRE-SEA	GP	PO
ENGLISH LANGUAGE	36	24	
MATHEMATICS	60	45	
PHYSICS	60	50	
GENERAL SHIP KNOWLEDGE	55	30	
SIGNALS	9	15	
SAFE WORKING PRACTICES	27		
ENGINE DUTIES	42		
DECK DUTIES	72		
CARGO OPERATIONS		18	33
TECHNOLOGY OF WORKING MATERIALS		18	
WORKING TECHNIQUES (METAL)		108	
WATCHKEEPING		20	
MARINE ENGINEERING KNOWLEDGE		36	90
PLANT MAINTENANCE		52	90
PERSONNEL AND WORK MANAGEMENT			48
TECHNICAL DRAWING			60
DAMAGE CONTROL			6
SEAMANSHIP			72
STOREKEEPING			15
NATIONAL AND INTERNATIONAL REGS.			25
PERSONAL SURVIVAL TECHNIQUES	15		
BASIC FIRE FIGHTING	18		
FIRST AID	12		
TANKER FAMILIARIZATION	24		
PROFICIENCY IN SURVIVAL CRAFT		30	
TOTAL	430	446	439

TABLE 5.2

SEE ANNEX 1 FOR DETAILED SYLLABUSES

5.1.1 Pre-Sea Training

Objectives : To be able to ;

- assist with maintenance and repair work on deck and in the engine room.
- diligently perform assigned duties on board.
- have a high level of self discipline.
- react in a correct manner to emergencies and to identify and correct defects, particularly of a minor nature.
- be safety conscious at all times.

Duration : 17 weeks, residential.

Entry qualification :

- 12 years of primary and secondary education.
- candidate must be not less than 17 years of age.
- medical fitness, including eyesight and hearing.

Subjects :

- Basic fire fighting
- Personal survival techniques
- Basic first aid
- Oil Tanker familiarization
- Mathematics
- Physics
- English Language
- General Ship Knowledge
- Signals
- Safe working practices
- Engine Duties

5.1.2 GP Rating Course

Objectives : To be able to ;

- carry out maintenance and repair work without close supervision.
- assist with overhauling of machinery.
- assist in watchkeeping duties in the engine room and on the bridge.
- handle and take proper care of tools.
- apply basic engineering principles in problem solving.
- be safety conscious at all times on board.
- maintain a high level of self discipline while on board ship.
- perform assigned duties in this capacity on any class of vessel.
- sit for and pass at credit level senior secondary certificate examination in Mathematics, Physics, English Language and Metal work.

Duration : 17 weeks, residential.

Entry qualification :

- completion of pre-sea training course.
- minimum of 15 months sea service.
- completion of 70% of tasks outlined in workbook.

Subjects :

- Cargo operations
- Technology of working materials

- Working techniques (metal)
- Watchkeeping
- Signals
- General Ship Knowledge
- Marine Engineering Knowledge
- English Language
- Mathematics
- Physics
- Plant maintenance
- Proficiency in survival craft

5.1.3 Petty Officer Course

Objectives : To be able to ;

- plan and supervise maintenance and repair work of a minor nature.
- plan and supervise overhauling of machinery.
- organize ratings under his supervision for carrying out assigned duties.
- instill proper work ethics and discipline in ratings under his supervision.
- read and interprete ship and machinery plans.
- administer stores and spares in a judicious manner.
- machine parts required to carry out minor repairs.

Duration : 17 weeks, non-residential.

Entry qualification :

- GP rating attendance certificate plus a minimum of 15 months post qualification sea service.
- candidate must not be less than 20 years of age.

Subjects :

- Personnel and Work Management
- Technical Drawing
- Marine Engineering Knowledge
- Damage Control
- Cargo Operations
- Seamanship
- Storekeeping
- National and International Maritime Regulations.
- Plant Maintenance.

SYLLABUSES FOR CLASS III, II AND I (DECK) HT

SUBJECT	HOURS		
	CLASS III	CLASS II	CLASS I
NAVIGATION	120	120	
NAVAL ARCHITECTURE	45	106	
SHIPBOARD OPERATIONS	45	96	
METEOROLOGY	45		
SEAMANSHIP	60	120	
MARITIME GEOGRAPHY	25		
PRINCIPLES OF MANAGEMENT	25		
COMPUTER STUDIES	25	72	
MATHEMATICS	40		
PHYSICS	60		
SHIP'S BUSINESS AND LAW	25	72	60
MARITIME ECONOMICS		48	
SHIP MANAGEMENT		72	
ELECTRONICS		96	
FRENCH		72	
SHIP HANDLING			60
PASSAGE PLANNING			72
COLLISION REGULATIONS			60
BUOYAGE			24
COMPASSES			60
DIRECTION FINDER			24
ECHO SOUNDER			24
ENGINEERING KNOWLEDGE AND CONTROL			60
RADAR OBSERVATION	46		
ELECTRONIC NAV.SYSTEMS / COMPASS	50		
MEDICAL CARE	25		
RADIO TELEPHONY / GMDSS	40		
MEDICAL GUIDE		40	
RADAR SIMULATOR		30	
SEARCH AND RESCUE			27
ARPA SIMULATOR			33
DANGEROUS GOODS			24
TOTAL	676	944	528

TABLE 5.3

SEE ANNEX 2 FOR DETAILED SYLLABUSES

5.1.4 Class III (Deck) HT

Objectives : To be able to ;

- keep a navigational watch as the sole officer of the watch.
- supervise cargo operations.
- monitor the condition of and ensure the maintenance in good order, of all life saving and fire fighting appliances.
- demonstrate a good knowledge of safety regulations and procedures.
- properly organize a team to combat an emergency.
- have a good understanding of basic principles of ship construction and stability.
- understand the need to properly stow, secure, take good care of and discharge cargo.
- operate correctly navigational equipment and instruments.

Duration : 24 weeks, residential.

Entry qualification :
- GP rating certificate with credit passes in at least three subjects.
- plus a minimum of 15 months post qualification sea service.

or
- credits in Mathematics, Physics and English Language at Senior secondary school

certificate examination.

- plus a minimum of 36 months sea service.

or - Petty officer certificate with passes in at least three subjects.

Subjects :
- Navigation
- Naval Architecture
- Shipboard Operations
- Meteorology
- Seamanship
- Maritime Geography
- Principles of Management
- Introduction to computers
- Mathematics
- Physics
- Ship's Business
- Compasses and Electronic navigation systems
- Radio Telephony / GMDSS
- Radar Observation
- Medical Care

5.1.5 Class II (Deck) HT / OND (Nautical Science)

Objectives : To be able to ;

- plan and execute ship maintenance.
- plan and execute cargo loading and discharging operations.
- demonstrate a good knowledge of hazards of the various cargoes carried.
- be provided with a basic foundation for pursuing shoreside opportunities in the marine industry.
- keep a navigational watch without supervision.
- perform the duties of the master in his absence.
- organize and control officers and ratings under his supervision.
- approach problem solving with an analytical mind.
- apply safety and marine pollution prevention measures at all times during ship operation.
- have a thorough understanding of the effect on ship stability, of adding or removing weights, dry docking or grounding.
- prepare a ship for drydocking and surveys.
- gain direct entry admission to a University or Polytechnic and undertake studies leading to the award of a BSc. degree or HND.

Duration : 37 weeks, non-residential.

Entry qualification : - Class III (HT) certificate.

plus - a minimum of 15 months post qualification sea service.

or - Class II (OS) 200 GT certificate.

plus - a minimum of 12 months post qualification sea service.

plus - three credits at GP or SSCE

Subjects :
- Medical Guide
- Radar Simulator
- Navigation
- Naval Architecture
- Shipboard Operations
- Seamanship
- Ship Business and Law
- Maritime Economics
- Ship Management
- Electronics
- Computer Studies
- French

5.1.6 Class I (Deck) HT

Objectives : To be able to ;

- plan and supervise the conduct of a sea passage.
- plan the approach to and navigate a ship in and out of rivers and narrow channels.
- instill in officers and crew, safety consciousness and good marine practices.
- manage a ship's budget regarding stores.
- calculate wages due to crew.
- manage the affairs of a ship with a view to achieving quick turnround in the most economical way and giving due regard to safety considerations.
- organize his crew for the purpose of reacting to and combatting emergencies.
- appreciate the limitations of electronic navigational aids.
- obtain a deviation curve for magnetic compass.
- have a good understanding of the principles and practice of ship handling.

Duration : 21 weeks, non-residential.

Entry qualification :
- Class II HT certificate.

plus
- a minimum of 18 months post qualification sea service.

or
- Class I (OS) 200 GT certificate.
  plus a minimum of 15 months sea service

Subjects :

- Ship Handling
- Passage Planning
- Collision Regulations
- Buoyage
- Ship's Business and Law
- Compasses
- Direction Finder
- Echo sounder
- Engineering knowledge and Control
- Search and Rescue
- ARPA Simulator
- Dangerous Goods

SYLLABUSES FOR CLASS II AND I OFFSHORE 200GT

SUBJECT	HOURS	
	CLASS II	CLASS I
NAVIGATION	120	120
SHIP STABILITY	72	96
SHIPBOARD OPERATIONS	60	
METEOROLOGY	45	
SEAMANSHIP	72	120
SHIP'S BUSINESS AND LAW	45	96
SIGNALS / COMMUNICATION	36	48
PERSONNEL MANAGEMENT	36	
SHIP MANAGEMENT		72
RADAR OBSERVATION	46	
ELECT.NAV.SYS/COMPASSES	50	
MEDICAL CARE	25	
RADIO TELEPHONY / GMDSS	25	
RADAR SIMULATOR		30
SEARCH AND RESCUE		27
TOTAL	632	609

TABLE 5.4

SEE ANNEX 3 FOR DETAILED SYLLABUSES

5.1.7 Class II (Deck) OFFSHORE - 200 GT

Objectives : To be able to ;

- keep a navigational watch within restricted coastal waters.
- plan and supervise cargo operations.
- demonstrate a good knowledge of safety procedures.
- appreciate the stability problems that may arise from loading cargo on deck.
- monitor the condition of and ensure the

maintenance in good condition, of life saving and fire fighting appliances.
- prepare a ship for drydocking and surveys.
- organize crew for combatting emergencies.
- properly use radio communication equipment.
- plan and supervise the execution of ship maintenance.

Duration : 24 weeks, residential.

Entry qualification :
- GP rating certificate.

plus
- a minimum of 18 months post qualification sea service.

or
- Petty officer certificate.

or
- 12 years of primary and secondary school education.

plus
- 36 months sea service.

Subjects :
- Navigation
- Ship Stability
- Shipboard Operations
- Meteorology
- Seamanship
- Ship's Business and Law
- Signals
- Personnel Management
- Radar Observation
- Electronic Navigation Systems / Compasses
- Medical Care
- Tanker Operations
- Radio Telephony / GMDSS

5.1.8 Class I (Deck) OFFSHORE 200 GT

Objectives : To be able to ;

- plan and execute the conduct of a sea passage within coastal waters.
- navigate his ship safely into and out of rivers and creeks.
- have a good understanding of the basic principles and practice of ship handling.
- organize his crew for effective response to emergencies.
- obtain a deviation curve for magnetic compass.
- instill safety consciousness and proper work ethics in his crew.
- appreciate the limitations of aids to navigation.

Duration : 24 weeks, non-residential.

Entry qualification : - Class II (OS) 200 GT certificate.

plus - 15 months post qualification sea service.

Subjects :

- Navigation
- Ship Stability
- Seamanship
- Ship's Business and Law
- Ship Management
- Communication
- Radar Simulator
- Search and Rescue

5.2 EXAMINATION AND CERTIFICATION

In an article published in the West African Journal of Education in February of 1974, Dr.J.A.Banjo (formerly of the Economic Commission for Africa) stated that, "Technical examinations should be based on a selection of parameters, which can be correlated with functional adequacy". He went on further to say that, "The spirit of organizing and conducting technical examinations should be to ensure that any student who is certified as having passed the qualifying examinations should in fact be competent enough to perform the services expected in his occupational category".

The main deductions that can be made from the statements of Dr.Banjo are that one, the examiner must be conversant with the expected roles of the candidate and two, the conduct of the examination must be such that a qualifying candidate with the least grades must be able to perform satisfactorily, his expected duties. It is imperative therefore that competent examiners are placed in charge, to conduct impartial examinations devoid of any malpractices. The calamitous consequences that may arise from poor performance by a navigator makes the point more glaring. The big question is whether examiners of the required caliber are to be found in the Maritime Administration of Nigeria.

The ideal Examiner for a certificate of competency for deck officers, particularly for oral examinations, would have to be a master mariner with further relevant academic qualification that places him on a higher pedestal than the candidate to be examined. He should in addition have undergone some training in examination

procedures. At present (1991), only three people (one master mariner and two chief engineers) meet these requirements in the Marine Inspectorate Division of the Federal Ministry of Transport. There are plans however to recruit master mariners and chief engineers for training as examiners but whether this will be achieved, considering the relatively low wages on offer remains to be seen.

The practice in some European countries and in Egypt and Ghana is that the examinations are conducted by the Maritime Colleges with moderators sometimes present, from the Maritime Administration. One however has to look critically at the reasons for adopting such systems. Most Western European countries have a much more integrated system than Nigeria, treating marine education little differently from other technical disciplines. In other countries with large number of candidates sitting for examinations at a time, the need to cut down on staff at the MARAD gave rise to ceding the right to conduct the examinations to the colleges. It is open to question whether a system whereby the staff of a college are responsible for teaching the agreed syllabi, setting the examination questions and marking the answers would fulfill the stated objective of producing competent officers in Nigeria.

Considering the shortage of qualified examiners at the MARAD, the need for satisfaction of a candidate's competence in the crucial safety related matters and the not too large number of candidates likely to sit for examinations of competence at any one time, it will be appropriate to recommend the following :

a) The establishment of a Merchant Navy Training Board comprising representatives of Marine Inspectorate Division, Nigerian Association of Master Mariners, Nigerian Institute of Marine Engineers, Maritime Academy of Nigeria and the School of Fishery. This Board would among other things set up a committee to run examinations.

b) Supporting subjects and non-safety related subjects should be examined by the Maritime Academy and moderated by Lecturers from a Polytechnic or preferably the Marine Engineering Department of Rivers State University or Lagos State University. These subjects are :
Maritime Geography
Management
Computer Studies
Mathematics
Physics
Electronics
Maritime Economics
English Language
French
Engineering / Technical Drawing

c) For Certificate of Competency examinations, the following subjects are to be examined by the Examination Committee of the MNTB :
Navigation
Naval Architecture

Shipboard Operations
Seamanship
Ship's Business and Law
Engineering Knowledge
Communication / Signals
IMO Mandatory Courses

Certificates of competency should, as has been the practice be issued by the Ministry of Transport to successful candidates in the examinations for GP Ratings, Petty Officers, Class III (Deck) HT, Class II (Deck) OS 200 GT, Class II (Deck) HT, Class I (Deck) OS 200 GT, Class I (Deck) HT and the mandatory courses. The Ordinary National Diploma (OND) is to be issued by the National Board on Technical Education while a certificate of attendance would be issued by the Maritime Academy for the Pre-sea course.

5.3 RELATIONSHIP BETWEEN PROPOSED HOME TRADE AND FOREIGN-GOING MARITIME EDUCATION AND TRAINING

5.3.1 Provisions of the "Examination for Certificates of Competency (Deck) Regulations, 1963" of Nigeria.

Regulation 27-(1): Qualifying sea service, except as hereinafter provided, must be performed in the deck department.

Regulation 31-(1): The equivalent rates for service in the home or coasting trades for admission to examinations for certificates of competency (foreign-going) are as follows -

(a) service in home trade vessels of 1600 tons gross and over shall count in full.
(b) service in vessels of 500 tons gross and over, but less than 1600 tons gross, shall count in full where the most distant ports visited are at least 500 miles apart. Where the most distant ports are less than 500 miles apart, service will count at two thirds rate.
(c) service in vessels of less than 500 tons gross in the home trade shall count at two thirds rate.
(d) service in a capacity lower than first watch-keeping officer on regular runs between neighbouring ports which take less than two watches will not be accepted for foreign-going certificates.
(2) Candidates for certificates of competency as first mate (foreign-going) or master (foreign-going) must have actual foreign-going experience as provided for in regulations 22 and 23(i).
(3) Such service as is indicated in (1) (a) to (d) above shall count at full rate for home trade certificates.

5.3.2 Conduct of maritime education and training in Nigeria for foreign-going officers.

At the inception of the Nautical College of Nigeria in 1978, the programme of MET adopted for deck officers was for a period of four and half years of academic study and practical training leading to the award of a national diploma and second mate certificate of competency. This was at a time when some Nigerian polytechnics decided to replace the OND and HND programmes with a three-year national diploma. This programme was shortlived as the said polytechnics all reverted to the old programme within a few years. The

Nautical College of Nigeria followed suit and reverted to the two-year OND programme to be followed by a two-year HND with a period of sea service in between.

With the arrival of Egyptian experts in 1980 to administer the college, under an arrangement between the Nigerian government, IMO and the Egyptian government it was decided that only the pre-sea OND course be undertaken in the Nautical College. Mandatory courses and examinations for certificates of competency were to be done at the Arab Maritime Transport Academy (AMTA) in Alexandria, Egypt. And so it is that to date, only the pre-sea/OND course is done at the Nautical College (now called the Maritime Academy of Nigeria).

With the promulgation of the "Maritime Academy of Nigeria Decree 1988", the Academy was formally established. Its board of governors was set up in February 1991 and indications are that a five-year programme leading to the award of an HND and second mate foreign-going certificate of competency will be adopted.

There have been proposals for the introduction of degree programmes for maritime education and training for foreign-going in Nigeria, over the last few years. The options for the implementation of these proposals would seem to be one, the upgrading of the Maritime Academy of Nigeria to the status of a degree awarding institution, two, making the Maritime Academy a school of one of the federal universities (ideally, the University of Calabar since it is the closest federal university), three, the setting up of a maritime studies department in one of the federal universities

and four, the expansion of the existing marine engineering departments of Lagos and Rivers State universities. Admission and employment policies coupled with the problem of finance of state universities would seem to rule a national proposal out. The most feasible option would be the second one mentioned above.

EXISTING MET SYSTEM IN NIGERIA FOR FOREIGN-GOING

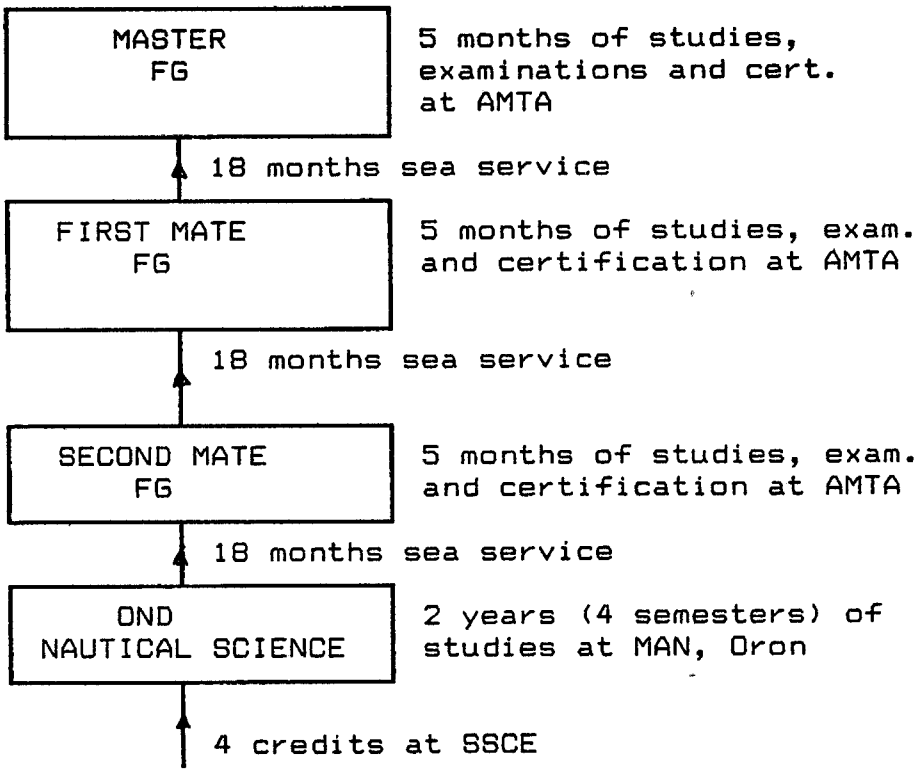


FIGURE 5.4

SYLLABUSES FOR OND (FG) AND PROPOSED OND (HT)

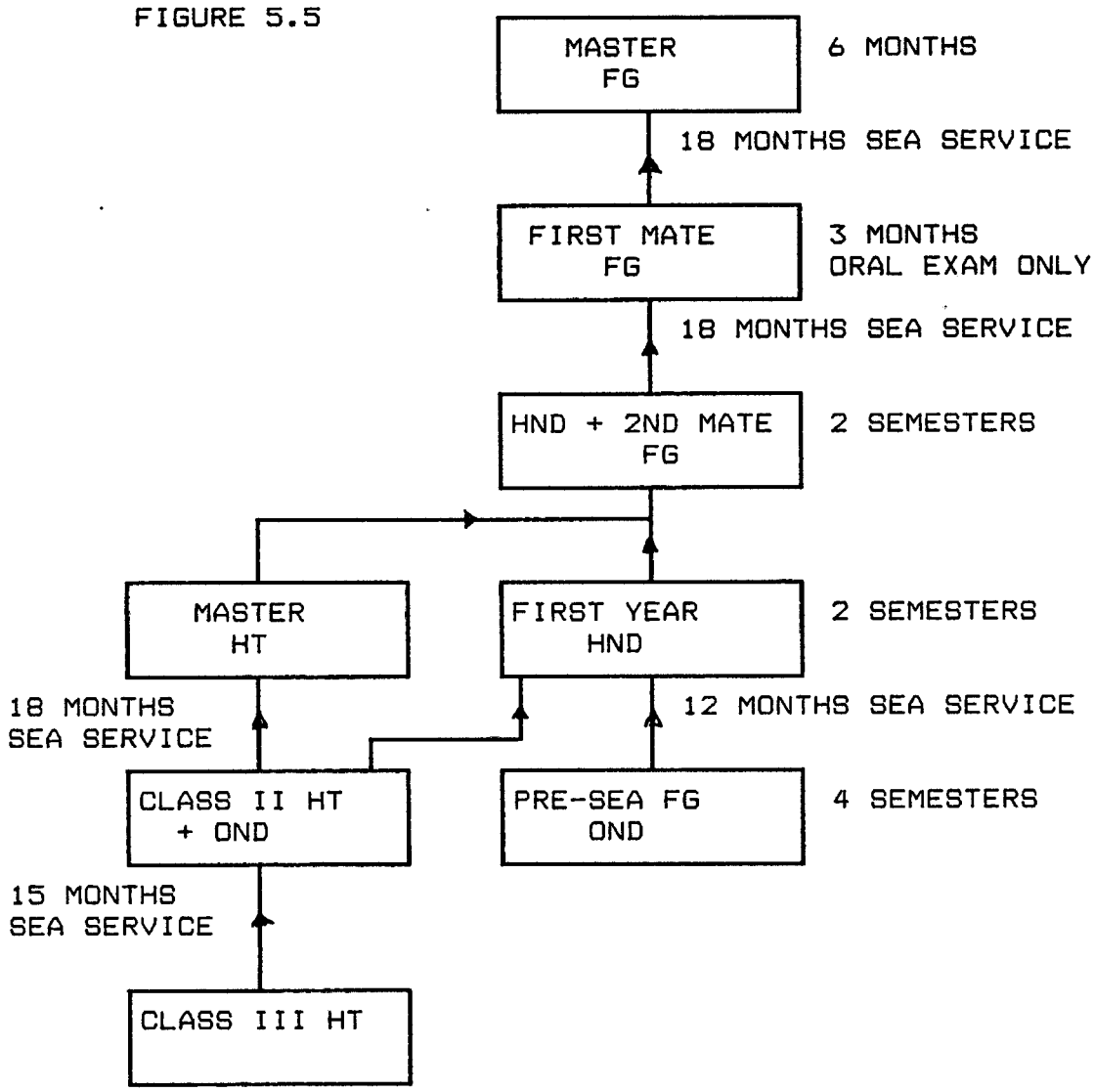
SUBJECT	OND (FG)	OND (HT)
	HOURS	HOURS
NAVIGATION	340	240
NAVAL ARCHITECTURE	68	151
SHIPBOARD OPERATIONS	-	141
METEOROLOGY	85	45
SEAMANSHIP	255	180
MARITIME GEOGRAPHY	34	23
MANAGEMENT	-	92
COMPUTERS	-	94
MATHEMATICS	204	50
PHYSICS	170	60
NAVAIDS AND INSTRUMENTS	170	50
BUSINESS AND LAW	34	97
ELECTRONICS	51	96
CARGO WORK	68	-
ENGLISH	153	-
FRENCH	-	72
MARITIME TRANS/ECONS	34	48
MARINE ENGINEERING	34	-
TOTAL	1700	1439

TABLE 5.5

SEE ANNEXES 2 AND 5 FOR DETAILED SYLLABUSES

5.3.3 Proposed relationship between home trade and foreign-going certification

FIGURE 5.5



Considering that holders of Class II and Master (HT) certificates would have covered the syllabus for second mate certificate of competency (FG) and obtained certificates for the mandatory courses, it is proposed that exemption be granted from the qualifying examinations. Only courses leading to the award of an

HND would therefore be taken by them. As pointed out in Regulation 31 (2) above, actual service on foreign-going vessels will need to be performed by holders of home trade certificates in order to be admitted to examinations for first mates and master foreign-going.

CHAPTER 6

6 IMPLEMENTATION AND CONCLUSION

6.1 Facilities

Presently, there are two maritime training institutions worthy of some note in Nigeria. One is the School of Fishery temporarily located on the premises of the Institute of Oceanography on Victoria Island, Lagos and the other, the Maritime Academy of Nigeria Oron. Bachelor of Science degree courses in marine engineering are however run at Rivers and Lagos State Universities. The Sea School located on Snake Island Lagos is a leadership training school for young aspiring seafarers.

The proposed courses, after careful pre-planning can be run by any of the first two institutions mentioned above. However, considering available facilities and ties with the Federal Ministry of Transport and with IMO, the Maritime Academy of Nigeria can be considered to be the more suitable of the two.

Paragraph 3(g), section 1 of the "Maritime Academy of Nigeria Decree 1988", makes provision for a "specialized seamen training centre". It is evident that the proposed Pre-sea, GP Rating and Petty Officer courses will form the core of the centre. It is however suggested that until such a centre is established and fully functional, the above mentioned courses and the HT officer courses be run by the Nautical Department.

6.1.1 Infrastructure

Work is currently going on at the permanent site of MAN Oron and it is expected that the main block, cadets' hostel, survival pool and fire fighting exercise tank will be completed by the end of 1991.

There is provision in the main block of the permanent site for 19 classrooms, 4 workshops, 4 laboratories, 8 storerooms, 1 lecture theatre, 1 drawing room, 1 chartroom, 1 library, 50 lecturers' offices and 1 ship manoeuvering tank room. The cadets' hostel has accommodation for 200 students. It is anticipated that the permanent site will be ready for use by early 1992. With the movement of the foreign-going cadets to the new site, the old site (which is actually located on the same premises) will be available for other uses. It is therefore suggested that the old site be used to accommodate the proposed courses. On the old site are, 6 classrooms, 1 chartroom, 1 drawing room, 1 workshop, 1 library, 1 lecture hall and 5 lecturers' offices. Added to this is the administrative block which will also be vacated, making available at least 5 classrooms. The hostel has accommodation for 100 students.

6.1.2 Training Facilities

The Maritime Academy of Nigeria has a training vessel "ORION" which is equipped with 2 Radar sets, 1 gyro compass with a repeater, 1 VHF set, 1 echo sounder, 1 MFDF and 2 twelve-man liferafts. Most of the equipment are however not functioning due to prolonged disuse. Also at the boat yard are, 1 pleasure craft "POLARIS",

6 sailboats, 2 lifeboats and 1 six-man liferaft. Survival training equipment on order, with IMO assistance are, 1 liferaft complete with equipment and recharging unit, survival craft radio, EPIRB, lifejackets and survival suits. Also on order are training equipment for navigation, fire fighting and marine engineering equipment. Other equipment which have been at the Academy since 1986 but not installed include Radar sets, Decca Navigator, compass binnacle and workshop machinery. It is hoped that these will be installed when the movement to the new site takes place.

Of particular importance to the success of running the proposed courses is the availability of teaching and learning aids. Considerable time can be saved or lost, depending on the teaching or learning aids available. In a paper presented at an IMLA Workshop on "The Integrated Training of Deck and Marine Engineer Officers", Capt.S.J.Cross of the World Maritime University pointed out that, "The teacher who still scribbles a blackboard full of notes and expects the students to copy those as 'lecture notes', belongs in a museum...". Unfortunately, this and dictation are the most widely used methods of giving notes to students at MAN Oron. IMO has plans to supply two overhead projectors but this still is grossly inadequate. It is also necessary for more printers and photo copiers besides video cassette recorders and TV monitors to be made available to lecturers.

A very essential facility in a maritime training institution is a maritime library with staff conversant with maritime literature and sources of information.

This is more so in Nigeria where maritime text books are not easy to come by. It is therefore very necessary both for the sake of the lecturers and students that the library is well stocked with books, video tapes, films, slides, computer software and journals. Both the library and bookshop service at MAN Oron require considerable improvement in this regard.

To avoid disruptions and considering the remoteness of Oron, with regards to availability of repair and maintenance facilities, it will be necessary to have a Radio/Electronic maintenance engineer as a permanent staff of the Academy. His principal duty will be to maintain all communication and electronic navigation equipment. He may also be required to take part in lectures, particularly on radio communication.

6.1.3 Teaching Staff

It is generally acknowledged that a good lecture requires good teaching equipment. However, good teaching equipment requires an even better teacher.

The key to the success of any system of education is the quality of teachers and as pointed out by Dr.J.A.Banjo, "Any system of Technical Education will fail or succeed depending on the quality of the teachers. Technical Education being a 'performance oriented' undertaking should be carried out primarily by teachers who can perform in 'the roles they are trying to teach to others". It is also clear that a teacher needs to have sufficient knowledge of how to teach - what is sometimes referred to as pedagogical knowledge. With respect to the Maritime Academy, the

conflicts that have to be resolved are threefold. One, is to ensure that well qualified lecturers are available to teach purely academic or supporting subjects; two is to make it possible for lecturers required to teach subjects I would term semi-professional (electronic navigational aids principles, meteorology, naval architecture etc.) to gain some hands-on experience in the shipping industry where they previously do not have such experience, and the third is to employ persons with sea-going background who would have to undertake some programme in education. Regarding the first suggestion, this should not pose any problem considering the fact that there are thousands of unemployed university graduates in Nigeria. If progress is to be made, the freeze on employment imposed on the civil service should not apply to the Academy until saturation point is reached. The first attempt to provide lecturers with some sea service were made in 1990 and it is hoped that this exercise will continue. Considering the third suggestion, it has been said in some quarters that seafarers are reluctant to take up teaching appointments at the Academy because of the relatively low salaries on offer. The question to be asked is whether any concerted efforts have been made to employ persons with seafaring background. There are presently a large number of Nigerians in the United Kingdom and the U.S.A with a combination of university degrees and certificates of competency, some of whom would obviously like to take up lectureship, given the right conditions of service. An effort however has to be made to reach them. For those seafarers without prior teaching experience, it may be necessary to work out an arrangement with the University of Calabar or the Cross

River State University for them to undertake diploma courses in Education, or arrange for fellowships at the World Maritime University.

Of particular importance to teacher motivation are: supporting varied opportunities for professional growth and establishing mechanisms for teachers to want to remain in the profession. The teaching profession in Nigeria is not one that is seen to be attractive and it is only proper that those who choose to commit themselves to it should be given all the encouragement that is possible. In light of the foregoing it will be necessary for the Maritime Academy to provide a framework whereby lecturers are given scholarships on a rotational basis to pursue further academic qualifications.

At the initial stage of implementation i.e. with the pre-sea and GP Rating courses being run in conjunction with the pre-sea cadets' first and second year programmes, the Nautical Studies department would require a minimum of 8 lecturers and 2 instructors. (Instructors are essentially persons possessing approved technical certificates such as OND, HND or second mate certificate of competency with years of experience, who are required to give performance oriented instruction to students). These figures have been arrived at, by considering that for a minimum of four classes with twenty-seven lecture hours per week per class, and at fifteen lecture hours per week per lecturer results in over seven lecturers. At the later stage of implementation with all the proposed courses and the cadets' courses being run, the required number would be nineteen lecturers and three or four

instructors. However since some of the subjects are common also to the marine engineering course, this number will be reduced by a small margin.

In consideration of what has been said in the foregoing paragraphs, subjects to be taken at the initial stage of implementation can be allocated as follows :

1. (a) Shipboard Operations
   (b) Maritime Law
2. (a) Naval Architecture
   (b) General Ship Knowledge
3. (a) Terrestrial Navigation
   (b) Meteorology
4. (a) Seamanship
   (b) Communication
5. (a) Economic Geography
   (b) Maritime Transport
6. (a) Electronics
   (b) Physics
   (c) Mathematics
7. (a) Celestial Navigation
   (b) Navigational Aids and Instruments

Practical seamanship, fire fighting and personal survival are to be given by Instructors. The Nautical Studies Department already has three highly qualified lecturers, two of them graduates of the World Maritime University (however, with no sea-going background) to take three of the above mentioned subject combinations. With the author taking one of the four other subject combinations, three more lecturers with a minimum of Class II (Deck) foreign-going certificate will be required at the initial stage of implementation.

6.2 Costs

In line with the educational policies of the Federal Government of Nigeria, tuition fees are not paid by students of the Maritime Academy. Students are only required to pay for accommodation, feeding and such other things as medical, library service, deposit for breakages, uniforms etc. This amounts to about 3250 naira in the first semester and about 3000 naira for each of the remaining semesters. These amounts are likely to increase annually with inflation. The fees charged are quite within the reach of families of students undergoing officer training even where sponsorship is not available, as they are comparable to what is charged in polytechnics and universities, but for those wishing to undertake pre-sea training for employment as ratings, it is obvious that the students would in all probability be from relatively poor families who can hardly afford the fees.

Compared to other courses, it is generally recognized that maritime education is very expensive. However, there can hardly be any acceptable half measures with regard to the education and training of sea-going personnel. Since there is a limit to the amount of funding the Federal Government can provide, funds have to be solicited from elsewhere, particularly to subsidize the ratings training programme. As is the practice in Indonesia, I would suggest that a small percentage of the tax paid by shipping companies, ship operators, shipping agencies and other operators in the marine industry , be earmarked for maritime education. It would also be necessary for the Maritime Academy to

undertake fund raising drives to augment its subvention from Government.

6.3 The Role of the Maritime Industry

The maritime industry, being the end users of the products of legislation and guidelines on examination and certification by government and the provision of education and training by maritime training institutions, has the most crucial role to play in the improvement of MET. It has the greatest to gain and lose from the improvement or otherwise of MET. In most parts of the world the maritime industry plays a significant role in defining the content and conduct of MET courses. This has not been the case in Nigeria. The industry must accept responsibility and seek to play a leading role in improving standards of maritime education, training and certification in Nigeria. It would have to work closely with the Maritime Academy, the marine engineering departments of Lagos and Rivers State universities, Seamen's unions and the Ministry of Transport in order to achieve the stated objective.

Ways in which the maritime industry can help in the improvement of MET include, providing financial support in the organisation of seminars and workshops, providing financial and material assistance to the Academy and other MET institutions in the acquisition of training equipment, books and journals, providing places on ships for trainees to acquire on-the-job training (Zapata Marine has been doing this in the last few years) and funding of research projects.

6.4 The Role of the Maritime Academy of Nigeria

One of the functions of the Maritime Academy of Nigeria, as stated in the "Maritime Academy of Nigeria Decree 1988", is "to admit and train the various levels of personnel required for running and operating ships of the merchant navy.". Up to now, only education and training of foreign going officers is being undertaken by the Academy, and even then, only at the pre-sea level. A framework has to be worked out by the Academy under which its functions will be fully met. It is my contention that the establishment of the "specialized seamen training centre" should be carried out as soon as the old site becomes available i.e. when the foreign-going cadets move to the permanent site, hopefully in 1992.

As the scope of this work has been limited to the education and training of ratings and deck officers for coastal and home trade vessels, it will be necessary for MAN to carry out a manpower evaluation of vessels engaged in inland water transport, so as to ascertain the training needs of this vital sector of the transportation industry.

Within the last two years, a new generation of ferry boats have been acquired by the federal government and some states, particularly the coastal states of Bendel, Rivers, Ondo and Lagos under the "mass transit" programme. On a visit to two of such as yet to be in service boats in January of 1991 at Warri, I observed that they were equipped with radar sets and modern radio communication and navigation equipment. Questions raised by me at the offices of the ferry operators as

to the level of education and training of the would be crew of the newly acquired boats, were not satisfactorily answered. Being the only institution in the country, specifically tasked with the responsibility of training personnel for merchant ships, it is in areas such as this that MAN has to take the initiative. It does not have to wait for the ferry operators to come knocking on its doors, before taking steps to design appropriate courses.

The Academy was set up principally to meet the training needs of the maritime industry. As such, it cannot hope to achieve its aims by working in isolation. It is distressing to note that much is not known about the Academy nationwide and even within the maritime industry outside the confines of the Nigerian National Shipping Line and the Nigerian Ports Authority. It must seek to work closely with shipowners, operators, shipping agencies, freight forwarders, oil companies, ports, ship repair yards, dry docks, organizations such as the Nigerian Maritime Authority, Shippers' Council, Nigerian Association of Master Mariners, Institute of Marine Engineers, Merchant Navy Officers' Association, the Shipping Federation and Seamen's Union, and the marine engineering departments of Lagos and Rivers State Universities. One way to achieve this will be to take the leading role in the organisation of seminars and workshops to be attended by participants from these establishments.

On the issue of running short courses for Mates, Masters and the 3rd Class Engineering home trade certificates of competency, the "Report of the Ministerial Committee on Conduct of Maritime Education

Training and Certification at the Maritime Academy of Nigeria", had this to say, "It is recommended that a proper training programme should be formulated by the Academy and submitted to the Government Inspector of Shipping in the Maritime Inspectorate Division of the Federal Ministry of Transport for his consideration and approval. This will enable the Academy conduct the courses effectively and efficiently.". To the best of my knowledge, this recommendation made in 1988 has not been implemented. It is therefore hoped that the recommended courses outlined in chapter 5 of this work will meet with the requirements of the said committee and the satisfaction of the Government Inspector of Shipping (GIS).

In explaining the philosophy of the educational programmes of the Maritime College of State University of New York to a group of WMU students, Jose Femenia of the Marine Engineering Department stated that "students have to be given an education they can sell". This is a philosophy that must be adopted by MAN. All courses must be designed so as to provide graduates not only with certificates of competency, but also, recognized academic qualifications or the opportunity to be able to undertake further studies not necessarily related with shipping. It is for this reason that it is recommended that arrangements be put in place for students of the GP Ratings course who do not possess enough credit passes for admission to universities and polytechnics, to resit the Senior School Certificate examinations. Students are short changed when they are given an education that restricts them for the rest of their lives to ships.

Some of the reasons often cited by highly qualified potential lecturers for their reluctance to take up lectureship at MAN Oron is the absence of very good primary schools for their children and accommodation on the campus of the Academy. This is a problem not particular to MAN but to all institutions of higher learning located in rural areas in Nigeria. The solution to this will be the establishment of a staff school as has been done by most universities and polytechnics in the country and the building of more staff quarters on campus.

6.5 Conclusion

A promotional film on COSPAS-SARSAT begins with the statement, "The sea shows no compassion for those who challenge its power unprepared". The loss of the M.V. River Gurara together with 22 members of crew including the master who incidentally had been cleared for admission to undertake studies in maritime education and training at the World Maritime University, brought home to many Nigerians, the dangers involved in seafaring. Although no linkage has been made between proficiency in survival equipment handling and techniques to the great loss of life, one wonders if an established training programme for ratings and survival techniques updating courses for all members of crew could have in any way helped to reduce the loss of lives on that occasion.

As pointed out by Capt.Coluciello of the United States National Transportation Safety Board, "when nations ratify international conventions and regulations, they make a commitment to implement their provisions". In

the same vein, Thomas Mensah (formerly of IMO) pointed out that, "...a State is entirely free to ratify or not to ratify a treaty. The decision to ratify is a sovereign right of each State". Nigeria has acceded to such conventions as SOLAS, STCW and COLREG. The provisions of these conventions require that seafarers are properly educated and trained so as to safely operate ships and reduce the incidence of marine pollution and casualties at sea. In this regard the government must place great emphasis on the improvement of MET, and as such, continue to provide financial support and the legal framework for achieving this objective.

For Nigeria, the STCW 1978 Convention came into force on 13th February 1985, the instrument of accession having been deposited on 13th November 1984. Paragraph (2) of Article VII of the Convention states that "After the entry into force of the Convention for a Party, its Administration may continue to issue certificates of competency in accordance with its previous practices for a period not exceeding five years. Such certificates shall be recognized as valid for the purpose of the Convention...". In effect, starting from 13th February 1990, the provisions of the Convention have to be fully met for certificates of competency issued to be considered valid. This means, among other things, that the provision for exemption from Radar qualification if the Government Inspector of Shipping is "satisfied that facilities are not available at the time of the intended examination", no longer holds. A comparison of the existing syllabi for HT and Offshore mates and masters with the minimum knowledge required, as contained in the appendixes to various sections of

the Convention, reveals that the existing syllabi do not comply with its provisions. It is to be assumed in light of the foregoing that the practice of issuing certificates of competency under the provisions of the Merchant Shipping Act 1962 and its various subsidiary legislation has been discontinued. The urgency therefore arises for the implementation of a new programme of MET and certification for ratings and officers required to serve on coastal and home trade vessels. Arrangements also have to be put in place to meet the "mandatory minimum requirements to ensure the continued proficiency and updating of knowledge for masters and deck officers".

Subsidiary legislation or amendments to existing legislation will need to be made, to provide for the education and training of GP ratings and for modifications to the process of examination and certification at all levels.

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ANNEXES

PROPOSED SYLLABI

The syllabi proposed here are by no means meant to be static. They are open for continuous review as occasion demands, particularly with respect to changes in technology and National and International Regulations, Conventions and Recommendations.

ANNEX 1

5.1.1 PRE - SEA COURSE DURATION 17 WEEKS

5.1.1.1 BASIC FIRE FIGHTING 18 hours

Objectives : To be able to ;

- react in a correct manner in the event of an outbreak of fire.
- take appropriate measures for the safety of personnel and of the ship.
- state and demonstrate that he has acquired knowledge and skills which in some instances, will enable him to identify and correct defects and thus prevent fire from occurring.

Subject Area

.1	Introduction, safety and principles	1.0hrs
.2	Theory of fire	1.5
.3	Fire prevention	1.5
.4	Fire detection	1.0
.5	Fixed fire extinguishing systems	2.0
.6	Miscellaneous fire fighting equipment	1.5
.7	Ship fire fighting organization	0.5
.8	Fire fighting methods	1.5
.9	Fire fighting drills	4.5
.10	Review and final assessment	3.0

Recommended books:

1. IMO Model Course No. 1.20 - IMO
2. Fire Aboard - F.Rushbrook
3. Fire on board (Video) - Videotel

5.1.1.2 PERSONAL SURVIVAL TECHNIQUES 15 hours

Objectives : To be able to ;

- react in a correct manner during emergency situations.
- take measures appropriate to his own survival and to the survival of others.
- use survival equipment correctly.
- acquire knowledge which in some instances will enable him to identify and correct defects and thereby prevent emergencies.

Subject Area

.1	Introduction, safety and survival	0.5hrs
.2	Emergency situations	1.5
.3	Evacuation	0.5
.4	Survival craft and rescue boats	2.5
.5	Personal life-saving appliances	1.0
.6	Personal life-saving appliances (Demonstration)	4.0
.7	Survival at sea	1.0
.8	Helicopter assistance	1.0
.9	Emergency radio equipment	1.5
.10	Review and final assessment	1.5

Recommended books :

1. IMO Model Course No. 1.19 - IMO
2. Survival at Sea : The Lifeboat and Liferaft - C.H.Wright
3. Launching Lifeboats (Video) - Videotel

5.1.1.3 BASIC FIRST AID — 12 hours

Objectives : To be able to;

- provide immediate basic medical care at the scene of an accident or other medical emergency until the arrival of a person with first aid skills or the person in charge of medical care aboard.

Subject Area

.1	General principles	0.5hrs
.2	Body structure and functions	1.0
.3	Positioning of casualty	1.0
.4	The unconscious casualty	1.5
.5	Resuscitation	2.0
.6	Bleeding	1.5
.7	Management of shock	1.0
.8	Burns and scalds, and accidents caused by electricity	1.0
.9	Rescue and transport of casualty	1.5
.10	Other topics	1.0

Recommended books :

1. IMO Model Course No. 1.13 - IMO
2. First Aid Manual - St.John Ambulance

5.1.1.4 OIL TANKER FAMILIARIZATION — 24 hours

Objectives : To be able to ;

- comprehend operational procedures while handling liquid cargoes.
- identify the various types of ships used in the transport of oil cargoes.

- recognize the need for safety and the avoidance of marine pollution.

Subject Area

.1	The oil tanker	2.0hrs
.2	Petroleum properties and hazards	4.0
.3	Oil cargo containment and handling	3.0
.4	Oil tanker operations	3.0
.5	Marine pollution	2.5
.6	Safety	6.5
.7	Review and final assessment	3.0

Recommended books:

1. Tanker Operations - S.Martong
2. IMO Model Course 1.01 - IMO

5.1.1.5 MATHEMATICS 60 hours

Objectives : To be able to ;

- demonstrate the use of mathematical tables.
- demonstrate a knowledge of mathematical concepts and their maritime application.
- develop the ability to be accurate to a degree relevant to the problem at hand.
- instill the need for precise, logical and abstract thinking.

Subject Area

.1	Interpolation	6.0 hrs
.2	Indices	6.0

.3	Logarithms	10.0
.4	Simple equations	9.0
.5	Simultaneous equations	11.0
.6	Plane trigonometry	18.0

Recommended books :

1. Munro's Mathematics for Deck Officers - Earl and Robinson
2. Norie's Nautical Tables - A.G.Blance

5.1.1.6 PHYSICS 60 hours

Objectives : To be able to ;

- acquire proper understanding of basic principles and marine applications of physics.
- develop basic scientific skills and attitudes.

Subject Area

.1	Density, Relative density	6.0 hrs
.2	Archimedes' principle	1.5
.3	Flotation	3.0
.4	Force	6.0
.5	Pressure	6.0
.6	Resolution of forces	6.0
.7	Moments, centre of gravity	9.0
.8	Movement of masses	3.0
.9	Couples	3.0
.10	Nature of heat	1.5
.11	Heat as energy	3.0
.12	Thermometry	2.0
.13	Laboratory practice	10.0

Recommended books :

1. Applied Physics for Nautical Students - J.H.Clough-Smith

2. Ordinary Level Physics - Abbot

5.1.1.7 ENGLISH LANGUAGE 36 hours

Objectives : To be able to ;

- acquire basic skills of communication in English.
- demonstrate knowledge of maritime terminology.
- identify salient points in communicated text.

Subject Area

.1	Reading comprehension	9.0 hrs
.2	Grammar	9.0
.3	Applied terminology	12.0
.4	Guided writing	6.0

Recommended books :

1. English for Maritime Studies - Blakey
2. Dictionary of Nautical Words and Terms - C.W.T.Layton

5.1.1.8 GENERAL SHIP KNOWLEDGE 55 hours

Objectives : To be able to ;

- identify various ship types.
- develop a knowledge of the roles and functions of the various departments and members of crew.
- comprehend the use of various ship's plans.
- demonstrate basic knowledge of parts of a ship.

Subject Area

.1	Merchant ship types	16.5 hrs
.2	Main features of Hull and Machinery	16.5
.3	Principal dimensions	11.0
.4	Ship's Plans	5.5
.5	Organizational structure of ship's crew	2.5
.6	Responsibilities of various crew members	3.0

Recommended books :

1. Merchant Ship Types - R.Munro-Smith
2. Careers at Sea - A.S.Watts
3. Dictionary of Marine Technology - D.A.Taylor

5.1.1.9 SIGNALS 9 hours

Objectives : To be able to ;

- identify the most commonly used flag symbols.
- comprehend the significance of the most commonly used flag symbols.
- identify the constituent morse characters of alphabets and numerals.
- comprehend the different modes of communication in use aboard ships.

Subject Area

.1	Morse alphabets and numerals	3.0hrs
.2	Modes of communication	0.5
.3	International Code of Signals	5.5

Recommended books :

1. International Code of Signals 1969 - U.K. Dept. of Transport
2. Morsemaster Cassette 1 - Morse Code Tutor

5.1.1.10 SAFE WORKING PRACTICES 27 hours

Objectives : To be able to ;

- comprehend relevant safety regulations covering all aspects of work and behaviour on board.
- appreciate the consequences for careless handling.
- observe faults and to take the right measures to prevent accidents.
- handle tools in a safe manner
- take precautionary measures before entering enclosed spaces
- safely handle moving ropes and wires.
- observe proper safety procedures when working in holds and tanks, particularly with regard to ventilation and lighting.

Subject Area

.1	Accident preventing regulations	3.0hrs
.2	Precautions in machinery spaces	6.0
.3	Precautions above and below decks	9.0
.4	Working in holds and tanks	6.0
.5	Handling of moving ropes and wires	3.0

Recommended books :

1. Code of Safe Working Practices for Merchant Seamen - U.K. Dept. of Transport

5.1.1.11 ENGINE DUTIES 42 hours

Objectives : To be able to ;

- demonstrate a basic knowledge of

cooling system, lubricating system and greasing system.

- have an insight into the general construction and effect of main and auxiliary engines.
- have a knowledge of practical maintenance.
- develop basic skills in providing assistance in maintenance and repair.
- read and handle instruments.
- develop skill in handling tools.
- have a basic knowledge of tools.

Subject Area

.1	Basic theory of diesel engines	3.0hrs
.2	Practical maintenance	11.0
.3	Indicating instruments	3.0
.4	Tools	5.5
.5	Operating of engines and auxiliaries	5.5
.6	Theory and function of working engines	3.0
.7	Pipes and pipe fitting	11.0

Recommended books :

1. Care and Repair of Marine Petrol Engines - Loris Goring
2. Trouble shooting and Maintenance of Boat Engines - P.Bowyer
3. Introduction to Marine Engineering - D.A.Taylor

5.1.1.12 DECK DUTIES **72 hours**

Objectives : To be able to ;

- properly lash and secure cargo in holds and on deck.
- appreciate the need for caring for

cargo during sea passage.

- demonstrate a knowledge of preparation of cargo spaces for different types of cargo.
- have a knowledge of rigging and components of different cargo gear.
- describe different types of cargo handling gear.
- understand helm orders and commands.
- read compasses (magnetic and gyro).
- comprehend the difference between helm and rudder indicators.
- demonstrate a knowledge of the operation of anchor and mooring gear.
- demonstrate a knowledge of common knots, bends and hitches and their utilization on board.
- acquire skill to belay ropes and wires on bitts and to cleats.
- demonstrate a knowledge of rope and wire splicing.
- understand the proper procedures for care and maintenance of ropes.
- keep a bridge lookout

Subject Area

.1	Cargo care	3.0hrs
.2	Cargo handling	6.0
.3	Rope work	30.0
.4	Watch keeping	9.0
.5	Maintenance	24.0

Recommended books :

1. Efficient Deck Hand - C.H.Wright
2. Modern Rope Seamanship - C.Jarman and B.Beavis

5.1.2 GENERAL PURPOSE RATING COURSE DURATION 17 WEEKS

5.1.2.1 PROFICIENCY IN SURVIVAL CRAFT 30 hours

Objectives : To be able to ;

- identify and know the significance of markings on survival craft.
- launch and operate survival craft.
- start and operate lifeboat engine.
- demonstrate knowledge of survival techniques in survival craft.
- demonstrate a good knowledge of distress signals and pyrotechnics carried in survival craft.
- have knowledge of survival craft equipment.

Subject Area

.1	Markings on survival craft	0.5hrs
.2	Row, steer and manage a boat under oars and sail	3.0
.3	Use of signalling equipment	1.5
.4	Use of portable radio equipment	1.5
.5	Principles of survival	5.5
.6	Survival craft equipment	3.0
.7	Handling survival craft in rough weather	1.5
.8	EPIRBS	0.5
.9	Starting and operating lifeboat engine	5.5
.10	Beaching a survival craft	1.5
.11	Examination	6.0

Recommended books :

1. Marine Survival and Rescue Systems - D.J.House
2. Proficiency in Survival Craft Certificate - C.H.Wright

5.1.2.2 CARGO OPERATIONS 18 hours

Objectives : To be able to ;

- have an understanding of the different methods of handling cargo of different variety.
- demonstrate knowledge of different cargo handling gear.
- undertake preparation of holds and properly secure cargo.
- appreciate the need for safety in work areas and before entering tanks.
- operate cranes and derricks.

Subject Area

.1	Principles of cargo handling	1.0 hr
.2	Deadweight	1.0
.3	Cubic capacity	1.0
.4	Cargo spaces	1.0
.5	Cargo handling gear	4.0
.6	Safe working practice	1.0
.7	Hold cleaning and inspection	1.0
.8	Tank cleaning	1.0
.9	Securing of cargo	3.0
.10	Safety precautions to be taken during the loading and discharge of bulk oil, chemicals and other dangerous commodities	4.0

Recommended books :

1. Marine Cargo Operations - C.L.Sauerbier
2. Kandy : Notes on Cargo Work - Kemp and Young

5.1.2.3 TECHNOLOGY OF WORKING MATERIALS 18 hours

Objectives : To be able to ;

- demonstrate knowledge of technological properties of steel in marine engineering.
- have knowledge of technological properties of alloys and its usability in marine engineering.
- acquire knowledge of range of application of aluminium and its alloys.
- have knowledge of corrosion and ways to prevent or guard against it.
- have a general knowledge of the main properties of synthetic materials and their utilization.

Subject Area

.1	Technological properties of steel	8 hrs
.2	Technological properties of alloys	6
.3	Technological properties of selected materials	4

5.1.2.4 WORKING TECHNIQUES (METAL) 108 hours

Objectives : To be able to ;

- correctly use measuring instruments appreciate the need for accuracy.
- acquire skill in transferring drawing measurements to workpiece.
- undertake tasks involving the use of files, vice, chisels, clamps, saws,

drills and shears.

- sharpen tools, bend shapes, solder, braze and weld.

Subject Area

.1	Measuring	6 hrs
.2	Marking and scribing	6
.3	Filing	9
.4	Chiselling	6
.5	Sawing	3
.6	Cutting and shearing	9
.7	Drilling and countersinking by machine	18
.8	Sharpening and deburring	3
.9	Bending	6
.10	Soldering and brazing	10
.11	Welding	30
.12	Workshop safety	5

Recommended book :

1. Workshop Technology for Technicians - M.H.A.Kempster

5.1.2.5 WATCHKEEPING **20 hours**

Objectives : To be able to ;

- demonstrate a general knowledge of navigation equipment commonly found on board ships.
- read off indicating instruments for course, speed, depth and time.
- describe controllable and uncontrollable effects on the steering qualities of a ship.
- acquire skill to operate anchor and

mooring gear.

- identify marine buoys and marks.
- identify lights and shapes displayed by sea-going vessels.

Subject Area

.1	Navigational equipment	1.5hrs
.2	Meteorological instruments	1.5
.3	Ship handling (maneuvering)	3.0
.4	Anchor and mooring work	3.0
.5	Sea markers	3.0
.6	Collision Regulations (introduction)	8.0

Recommended books :

1. Maritime Buoyage System - IALA
2. Brown's Rule of the Road Manual - H.H.Brown

5.1.2.6 SIGNALS **15 hours**

Objectives : To be able to ;

- send and receive morse by light at four words a minute.
- identify and know the meaning of single flag hoists.
- comprehend the use of the International Code of Signals book.
- familiar with standard marine vocabulary.

Subject Area

.1	Morse signalling	7.0hrs
.2	International Code of Signals	3.0
.3	Standard marine vocabulary	2.0

.4 Radio communication procedures 3.0

Recommended books :

1. International Code of Signals 1969 - U.K. Dept. of Transport
2. Radio Handbook for Operators - British Telecom International
3. Morsemaster Cassette 2 - Morse Code Tutor
4. Seaspeak Training Manual - F.Weeks et al

5.1.2.7 GENERAL SHIP KNOWLEDGE 30 hours

Objectives : To be able to ;

- demonstrate a basic knowledge of ship types and construction.
- have a knowledge of the methods for testing welds.
- read Ship Plans and locate compartments or items as per plan.
- comprehend the general principles of ship stability.

Subject Area

.1	Stresses on a ship	3.0hrs
.2	Riveted and welded connections	1.5
.3	Components and types of cellular bottoms	2.0
.4	Bulkheads, deeptanks, shellplating, stem and stern	4.0
.5	Rudder types	1.5
.6	Construction of different ship types	3.0
.7	Basic principles of ship stability	12.0
.8	Reading and handling of ship plans and mechanical drawings	3.0

Recommended book :

1. Know Your Own Ship - T.Walton and B.Baxter

5.1.2.8 MARINE ENGINEERING KNOWLEDGE 36 hours

Objectives : To be able to ;

- have an insight into general construction and effect of working engines.
- understand colour codes for piping and trace piping.
- have knowledge of the preparation and operation of boilers and other pressure vessels.
- be familiar with safe operating procedures.
- assist in maintaining pumping and piping installations.

Subject Area

.1	Main and auxiliary prime movers	9.0hrs
.2	Boilers and pressure vessels	9.0
.3	Pumping and piping systems	7.5
.4	Automatic and remote control systems	1.5
.5	Use of tools	3.0

Recommended book :

1. Introduction to Marine Engineering - D.A.Taylor

5.1.2.9 ENGLISH LANGUAGE — 24 hours

Objectives : To be able to ;

- write effectively, given any audience.
- improve on linguistic ability.
- properly punctuate and spell.
- read and comprehend technical manuals.

Subject Area

.1	Reading comprehension	4.0hrs
.2	Grammar	6.0
.3	Punctuation	4.0
.4	Essay	4.0
.5	Report writing	6.0

5.1.2.10 MATHEMATICS — 45 hours

Objectives : To be able to ;

- understand mathematical concepts and their marine application.
- correctly use nautical tables.
- recognise problems and solve them with related mathematical knowledge.
- accurate to a degree relevant to the problem at hand.

Subject Area

.1	Quadratic equations	5.0hrs
.2	Graphs	5.0
.3	Spherical trigonometry	20.0
.4	Matrices	6.0
.5	Vectors	9.0

Recommended books :

1. Mathematics for Technology 1 - J.Dobinson
2. Munro's Mathematics for Deck Officers - Earl and Robinson
3. Norie's Nautical Tables - A.G.Blance

5.1.2.11 PHYSICS 50 hours

Objectives : To be able to ;

- identify the forces acting on a body immersed in a liquid.
- demonstrate a good knowledge of the concepts of position, motion and time.
- have a good understanding of conservation principles.

Subject Area

.1	Hydrometers	0.5 hr
.2	Loadlines, FWA and TPC	2.0
.3	Pressure, centre of pressure	2.0
.4	Boyle's Law	1.5
.5	Simple hydraulic appliances	3.0
.6	Velocity, acceleration, momentum	5.0
.7	Energy, work, power, mechanical advantage	6.0
.8	Velocity ratio, simple machines	2.0
.9	Units of heat	0.5
.10	Specific heat capacity	0.5
.11	Transfer of heat	0.5
.12	Heat and mechanical energy	4.0
.13	Elementary thermodynamics	2.0
.14	Thermal expansion	2.0
.15	Change of state	1.5

.16 Laboratory practice 15.0

Recommended books :

1. Applied Physics for Nautical students - J.H.Clough-Smith
2. Ordinary Level Physics - A.F.Abbot

5.1.2.12 PLANT MAINTENANCE 52 hours

Objectives : To be able to ;

- assist with maintenance and repair work on main and auxiliary engines.
- have basic knowledge on tending and maintaining electrical motors.
- repair / renew leakages and corroded piping.
- find simple electrical faults.
- carry out simple repairs.
- put engines and auxiliaries into and out of operation.
- recognize breakdown of machinery.

Subject Area

.1	Diesel engines	24.0hrs
.2	Pumps	6.0
.3	Air compressors	9.0
.4	Valves, Pipes, Fittings	6.0
.5	Engine Room safety	4.0
.6	Electrical devices	3.0

Recommended book :

1. The Running and Maintenance of Marine Machinery - Inst of Mar. Engineers

5.1.3 PETTY OFFICER COURSE DURATION 17 WEEKS

5.1.3.1 PERSONNEL AND WORK MANAGEMENT 48 hours

Objectives : To be able to ;

- understand one's behaviour as a superior.
- understand one's colleagues and their behaviour.
- understand the factors of stress on personnel in a working community.
- have a basic knowledge of management methods and effectiveness.

Subject Area

.1	Fundamentals in psychology, sociology and ergonomics	10.0hrs
.2	Industrial sociology	18.0
.3	Management	20.0

Recommended books :

1. Discipline at Sea - G.J.Sadler
2. Essentials of Management - Joseph L.Massie
3. Personnel Management in Merchant Ships - D.H.Moreby

5.1.3.2 TECHNICAL DRAWING 60 hours

Objectives : To be able to ;

- visualize and understand graphical information and ideas.
- select and use appropriate graphical methods.
- arrange ideas and information systematically and accurately.

- design, by way of analytical thinking, progressive reasoning and creativity.

Subject Area

.1	Title block study	4.0hrs
.2	Rounding off decimals	3.0
.3	Alphabet of lines	4.0
.4	One view drawings	9.0
.5	Multi-view drawings	11.0
.6	Section views	11.0
.7	Auxiliary views	6.0
.8	Threads and fasteners	6.0
.9	Kinds of drawings	6.0

Recommended books :

1. Reed's Engineering Drawing - H.Beck
2. Basic Blueprint Reading - John A.Nelson
3. Engineering Drawing - K.R.Hart

5.1.3.3 MARINE ENGINEERING KNOWLEDGE 90 hours

Objectives : To be able to ;

- have a thorough knowledge of practical maintenance of main and auxiliary engines.
- demonstrate a good knowledge of safe working practices in machinery spaces.
- understand the working principles and constructional details of marine diesel engines.
- know the properties of fuel and lubricating oils used in diesel engines.
- demonstrate knowledge of starting and

reversing operations.

- take ullages.
- read gauges and meters and fill in engine room log book.
- properly manage engine room consumable stores.

Subject Area

.1	Knowledge of the working of internal combustion engines	36.0hrs
.2	Watchkeeping duties and procedures	12.0
.3	Starting, stopping and reversing arrangements	12.0
.4	Knowledge of the use of valves, pipe connections and safety devices required for the operation of engines	12.0
.5	Precautions to be taken against fire or explosion	6.0
.6	Keeping engine room logs	6.0
.7	Tally and measurement of stores and fuel	6.0

Recommended books :

1. General Engineering Knowledge - H.D.McGeorge
2. Diesel Engines Q & A - A.J.Wharton

5.1.3.4 DAMAGE CONTROL **6 hours**

Objectives : To be able to ;

- comprehend the danger and risks to the ship, of different types of damage.
- have a knowledge of materials found on board ship that may be used for damage

control and different possibilities of plugging a leak.

Subject Area

.1	Types of damage	1.0hr
.2	Methods of leakage control	3.0
.3	Material in use for damage control	2.0

Recommended books :

1. Theory and Practice of Seamanship - G.L.Danton

5.1.3.5 CARGO OPERATIONS 33 hours

Objectives : To be able to ;

- identify cargo documents and appreciate the need to pass on documents requiring to be signed, to the appropriate quarters.
- understand the need for and the proper methods to ventilate cargo.
- appreciate the hazards associated with Dangerous Goods and liquid oil cargoes
- acquire skill to operate hazard control systems.
- have knowledge of physical properties of oil and dry bulk cargoes.
- understand the function and operation of safety equipment.

Subject Area

.1	Cargo documentation	1.0hr
.2	Ventilation	1.5
.3	Forms of cargo containment	1.0

.4	Use of dunnage	1.0
.5	General cargoes	7.5
.6	Dangerous goods	6.0
.7	Bulk cargoes	6.0
.8	Liquid cargoes	9.0

Recommended books :

1. Marine Cargo Operations - C.L.Sauerbier
2. International Safety Guide (for Oil Tankers and Terminals) - ICS

5.1.3.6 SEAMANSHIP **72 hours**

Objectives : To be able to ;

- effect ship maintenance as planned.
- acquire knowledge of material and construction of ropes and wires.
- prepare ropes and wires for use.
- have knowledge of methods of preservation and protection of ropes and wires.
- splice mooring ropes and wires.
- carry out maintenance work on mooring winches and windlass.
- maintain life saving and fire fighting appliances.

Subject Area

.1	Ship maintenance	36.0hrs
.2	Safe working practices	9.0
.3	Anchor work	9.0
.4	Care of life saving and fire fighting appliances	12.0
.5	Care of ropes	6.0

Recommended books :

1. Theory and Practice of Seamanship - G.L.Danton
2. Merchant Shipping Notices (Consolidated) - U.K. Dept. of Trans 3. Code of Safe Working Practices for Merchant Seamen - U.K. Dept. of Transport

5.1.3.7 STOREKEEPING **15 hours**

Objectives : To be able to ;

- tally stores.
- check received stores against specifications.
- properly arrange stores in storerooms.
- properly take stock.
- prepare stores requisition forms.
- realize the implications of signing suppliers' invoices.

Subject Area

.1	Receiving ship's stores	5.0hrs
.2	Stocktaking	5.0
.3	Preparing stores indent	5.0

Recommended book :

1. Ship Stores Catalogue - Int. Ship Suppliers Assoc.

5.1.3.8 NATIONAL AND INTERNATIONAL REGULATIONS **25 hours**

Objectives : To be able to ;

- be familiar with proper operational safety and anti-pollution procedures for loading and discharging of cargoes and residues.

- have a general understanding of life saving and fire fighting appliances required to be carried by various classes of ships.

Subject Area

.1	General knowledge of the contents of SOLAS, particularly regulations dealing with LSA, fire protection, detection and extinction and carriage of dangerous goods	10.0hrs
.2	General knowledge of MARPOL Annexes I, II and V, particularly aspects of operational pollution	15.0

Recommended books :

1. International Convention for Safety of Life at Sea - IMO
2. International Convention for the Prevention of Marine Pollution - IMO

5.1.3.9 PLANT MAINTENANCE **90 hours**

Objectives : To be able to ;

- strip and overhaul main and auxiliary engines.
- carry out pipe connections.
- strip and overhaul pumps and valves.
- carry out simple electrical repairs.
- diagnose engine fault.
- handle tools skillfully.
- be familiar with safe working practices in machinery space.

Subject Area

.1	Diesel engines	40.0hrs
.2	Pumps	10.0
.3	Air compressors	18.0
.4	Valves, pipes and fittings	10.0
.5	Engine room safety	6.0
.6	Electric devices	6.0

Recommended books :

1. The Running and Maintenance of Marine Machinery - Institute of Marine Engineers
2. Marine Auxiliary Machinery - E.Souchette and Smith

ANNEX 2

5.1.4 CLASS III (DECK) HT DURATION 24 WEEKS

5.1.4.1 NAVIGATION 120 hours

Objectives : To be able to ;

- have a good knowledge of Poles, equator, meridians, parallels of latitude, difference of latitude, difference of longitude and departure.
- understand the simple properties of mercator charts.
- determine the hour angle and declination of the sun and planets.
- calculate the time of meridian altitude of the sun.
- apply altitude correction of the sun.
- calculate and plot position line from a sextant observation of the sun.
- identify stars by means of a star chart.
- solve practical problems on plane and Mercator sailing.
- effectively use traverse tables.
- obtain compass errors from celestial observations or by transit bearings.
- demonstrate a knowledge of the use of chart atlases, chart index and chart folios.
- fix the ship's position on a chart by various methods, allowing for disturbances.
- identify nautical publications

required to be carried on a ship and demonstrate a knowledge of their use.

- find the time of high and low water using Nigerian Tide Tables and Admiralty Tide Tables.
- have an elementary knowledge of the planning and execution of a coastal passage.
- judge the likely accuracy of a position line and thus the accuracy of the ship's position obtained from the intersection of two or more of those position lines.

Subject Area

.1	Principles of navigation	10 hrs
.2	Practical navigation	40
.3	Coastal navigation	40
.4	Nautical publications	6
.5	Passage planning	9
.6	Tides	10
.7	Navigational errors	5

Recommended books :

1. Watchofficers' Guide - Lee Brown
2. The Principles and Practice of Navigation - A.Frost
3. Chartwork and Marine Navigation - G.A.Motte
4. Marine Chartwork - D.A.Moore

5.1.4.2 NAVAL ARCHITECTURE 45 hours

Objectives : To be able to ;

- name principal parts of a ship.

- have a general idea on ship construction and on plans available on a ship.
- show practical acquaintance with framing, beams, bulkheads, shell, deck plating, hatchways and closing appliances, tanks, sounding and air pipes, rudders, steering gear, propellers and propeller shafts and general pumping arrangements.
- recall the meaning of the terms, block coefficient, displacement and deadweight.
- determine mass and position of cargo to be loaded, discharged or moved, to reach required draughts.
- use a deadweight scale to determine freeboard and additional cargo which may be loaded when in a fresh water berth.
- determine change of draughts when loading and discharging cargo.
- explain the importance of freeboard and reserve buoyancy.
- draw and use a curve of statical stability.
- calculate the movement of centre of gravity under varying conditions.
- use hydrostatic curves or data to find the height of the metacentre.
- describe the effect on the behaviour of a ship of large and small metacentric heights.

- explain how GM can be verified using the results of a rolling test.
- explain the reasons why a ship might take on a list as well as how to determine the cause of the list and how to correct the list.
- explain why stability changes during a voyage.
- describe the principles of loading to avoid excessive distortion of the structure.

Subject Area

.1	General ideas on ship construction and on plans available on board ship	3.0 hrs
.2	Definition of main dimensions	3.0
.3	Knowledge of construction of the main parts of a ship	9.0
.4	Bilges, sounding and air pipes	1.5
.5	Pumping arrangement	3.0
.6	The meaning of the terms: block co-efficient, displacement and deadweight	1.5
.7	Use of displacement and TPC scales to determine weight of cargo or ballast from draughts or freeboard	3.0
.8	Load-line marks	1.5
.9	Effect of density of water on draught and freeboard	1.5
.10	Buoyancy, reserve buoyancy	1.5
.11	Transverse statical stability	9.0
.12	Longitudinal statical stability	3.0
.13	The use of stability and hydro-static data	3.0

.14 The effect of free surface 1.5

Recommended books :

1. Merchant Ship Construction for the Merchant Navy - H.J.Pursey
2. Ship Construction for Marine Students - E.A.Stokoe
3. Principles and Practice of Ship Stability - L.G.Taylor

5.1.4.3 SHIPBOARD OPERATIONS 45 hours

Objectives : To be able to ;

- prepare life saving and fire fighting appliances for survey and to ensure their maintenance in good condition at all times.
- prepare muster and emergency station lists.
- supervise loading and discharging of cargo.
- determine when cargo gear are not safe for use.
- understand piping arrangement and cargo operations on Tankers.

Subject Area

.1	Fire fighting plans	1.5hrs
.2	Care of life saving and fire fighting appliances	5.0
.3	Emergency station lists	0.5
.4	General principles of the stowage and handling of cargoes	9.0
.5	Cargo gear calculation	5.0
.6	Calculations relating to stowage	6.0
.7	Tank cleaning and gas freeing	6.0

.8 Piping arrangements in tankers 6.0

.9 Preparation for surveys 6.0

Recommended books :

1. Shipboard Operations - H.I.Lavery
2. Notes on Cargo Work - Kemp and Young
3. Tanker Operations - S.Martong

5.1.4.4 METEOROLOGY **45 hours**

Objectives : To be able to ;

- define meteorological terms and explain the occurrence of different meteorological conditions prevailing in West Africa.
- understand the principles of the thermometer and barometer and their use aboard ship.
- have a general knowledge of mean pressure distribution; daily and seasonal changes in atmospheric pressure, prevailing winds, land and sea breezes and monsoons.
- analyse the causes of tropical storms, fog, haze, precipitation, mist and dew.
- understand the nature of the ITCZ and the weather associated with its passage.
- use barometric observations at a single station in conjunction with weather signs.
- predict the onset of fog.

Subject Area

.1	Meteorological terms and definitions	4.0hrs
.2	Meteorological instruments	6.0
.3	The principles of general circulation of the atmosphere	6.0
.4	Winds, cyclonic and anticyclonic pressure systems	11.0
.5	Tropical storms, fog, haze, ITCZ etc	15.0
.6	Practical use of weather information	3.0

Recommended books :

1. Meteorology for Mariners - Meteorological Office (U.K)
2. Course in Elementary Meteorology - Meteorological Office (U.K)
3. Mariners' Handbook - Hydrographic Dept (U.K)

5.1.4.5 SEAMANSHIP **60 hours**

Objectives : To be able to ;

- properly and effectively keep a bridge and deck watch.
- identify "System A" buoys and floating marks and know the safe side on which to pass them.
- have a working knowledge of the Collision Regulations and be able to take action to avoid collision or the development of close quarter situation with other vessels or structures.
- have an understanding of Search and Rescue operations and the on-board preparations to be made when searching for survivors.

- prepare an anchor for letting go and heave in an anchor.
- operate deck machinery.
- supervise cargo loading or discharging operations.
- carry out cursory inspection of lifting gear and be able to determine when they are no longer safe to use.
- operate and maintain life saving and fire fighting appliances.
- identify and operate Distress Signals.
- be familiar with Regulations concerning the prevention of oil pollution.
- be conversant with the use of Merchant Shipping Notices and Notices to Mariners.
- prepare a muster list and organize boat and fire drills.
- understand basic principles of ship manoeuvering.

Subject Area

.1	Watchkeeping duties	3.0hrs
.2	Buoyage	9.0
.3	Collision Regulations	18.0
.4	Search and Rescue operations	1.0
.5	Anchor work	3.0
.6	Lifting gear	1.0
.7	Life saving appliances	6.0
.8	Fire fighting appliances	3.0
.9	Cargo work	4.5
.10	Distress	1.0

.11	Oil pollution	1.0
.12	Merchant Shipping Notices	0.5
.13	Notices to Mariners	0.5
.14	Drills and musters	0.5
.15	The sextant	2.0
.16	Duties prior to proceeding to sea	3.0
.17	Basic principles of ship handling	3.0

Recommended books :

1. Admiralty Manual of Seamanship Vol 1 - HMSO
2. Theory and Practice of Seamanship - G.L.Danton
3. Annual Summary of Admiralty Notices to Mariners - Hydrographic Department (U.K)
4. Merchant Shipping Notices (Consolidated) - U.K.Dept of Trans.

5.1.4.6 MARITIME GEOGRAPHY **23 hours**

Objectives : To be able to ;

- appreciate the significant role played by ships and shipping in international trade.
- understand the factors that influence the location of industries.
- recall the sources and destination of main raw materials, particularly in West Africa.
- understand why one mode of transport may be preferred to another in a given circumstance.
- have a knowledge of ocean resources to be found off the coast of West Africa.
- recall the main features of the major

West African ports and the principal cargoes handled in them.

- have a knowledge of navigable inland rivers in Nigeria, and the major commodities transported by river craft.

Subject Area

.1	Ocean trade	3.0hrs
.2	Areas of industry	2.0
.3	Sources and destination of main raw materials	3.0
.4	The choice of transport modes	2.0
.5	Economic resources of the oceans	6.0
.6	West African ports and their principal trades	3.0
.7	Nigerian inland waterways	4.0

Recommended books :

1. The Times Atlas and Encyclopaedia of the Sea - A.Couper

5.1.4.7 PRINCIPLES OF MANAGEMENT 20 hours

Objectives : To be able to ;

- relate well with subordinates, colleagues and superiors.
- have positive and effective influence on colleagues by adequate management.
- understand the factors of stress on personnel in a working community, especially on board ship.
- better understand the social organization ashore and on board especially the informal organization.

- recognize the social consequences of innovations in shipping.
- understand the concept of human motivation.
- have knowledge of the process, components and barriers in communicating.

Subject Area

.1	Fundamentals in Psychology, Sociology and Ergonomics	3.0hrs
.2	Industrial sociology	4.0
.3	The concept of management	3.0
.4	Organizations	3.0
.5	Information in organizations	3.0
.6	Objectives and creativity	3.0
.7	Communication in management	1.0

Recommended books :

1. Discipline at Sea - G.J.Sadler
2. Essentials of Management - Joseph L.Massie

5.1.4.8 INTRODUCTION TO COMPUTERS 22 hours

Objectives : To be able to ;

- have a general understanding of what a computer is and how it operates.
- identify the constituents of Hardware and know what is referred to as computer Software.
- identify a Personal Computer.
- explain the functions performed by the disk operating system.

- run word processing programs on a computer.

Subject Area

.1	Brief history of computers	1.0hrs
.2	The parts of a computer	1.0
.3	How a CPU works	1.0
.4	The personal computer	1.0
.5	The disk operating system	6.0
.6	Word processors	12.0

Recommended books :

1. Understanding Computers - R.Stevens
2. Hands On - Metzelaar and Fox
3. Introducing Computers - P.Bishop

5.1.4.9 MATHEMATICS **50 hours**

Objectives : To be able to ;

- develop mathematical approach and skills to problem solving.
- develop background knowledge for further studies in scientific or engineering field.
- develop formulae, transpose and evaluate.
- construct and read statistical graphs and diagrams.
- use Nautical Tables to solve navigational problems.

Subject Area

.1	Exponential equations	1.5hrs
.2	Algebraic revision	1.5
.3	Arithmetic and geometric progressions and series	1.5
.4	Trigonometric identities	4.0
.5	Mensuration	1.5
.6	Solution of equations by tabulation and graphical methods	6.0
.7	Limits	1.5
.8	Derivatives of algebraic functions	6.0
.9	Functions	1.5
.10	Analytic geometry	4.5
.11	Integration	4.5
.12	Statistics	6.0
.13	Spherical trigonometry	10.0

Recommended books :

1. Ordinary National Certificate Mathematics Vol 1 & 2 - H.A.Horner
2. Spherical Trigonometry - J.H.Clough-Smith

5.1.4.10 PHYSICS **60 hours**

Objectives : To be able to ;

- demonstrate understanding and appreciation of physical principles, and their practical applications.
- develop background knowledge for further studies in nautical / engineering related disciplines.

Subject Area

.1	Mechanics and properties of matter	15.0hrs
.2	Heat	6.0
.3	Electricity	12.0
.4	Geometrical optics	6.0
.5	Magnetism	6.0
.6	Laboratory practice	15.0

Recommended books :

1. Advanced Level Physics - Nelkon and Parker
2. Applied Physics for Nautical Students - J.H.Clough-Smith

5.1.4.11 SHIP'S BUSINESS AND LAW 25 hours

Objectives : To be able to ;

- appreciate the role of the master and understand the relationship between master and crew.
- have an understanding of the provisions of the Articles of Agreement with respect to Accommodation, Provisions, Water, Health and Hygiene.
- be familiar with the main provisions of Safety regulations and understand what constitutes seaworthiness.
- demonstrate knowledge of the operational procedures for the prevention of oil pollution.
- know what the oil record book is and the entries required to be made in it.
- understand the provisions of Safety at Work regulations particularly as they

relate to work on board ships and in harbour areas.

- have a general understanding of the provisions of the Law of the Sea.

Subject Area

.1	Master and crew relationship	6.0hrs
.2	Accommodation, provisions and water	3.0
.3	Health and hygiene	3.0
.4	Safety, seaworthiness and public welfare	3.0
.5	Oil pollution prevention	1.0
.6	Law of the Sea	3.0
.7	Maritime labour conventions and recommendations	6.0

Recommended books :

1. Business and Law for the Shipmaster - L.Hopkins
2. Nigerian Shipping Laws - L.Mbanefo

5.1.4.12 COMPASSES AND ELECTRONIC NAVIGATION SYSTEMS 50hrs

Objectives : To be able to ;

- identify the main components of a magnetic compass.
- have a knowledge of the magnetic and non-magnetic factors contributing to a ship's compass deviation.
- understand the basic principle of the gyroscope, and its directional properties.
- have a knowledge of the errors and limitations of a gyro compass.

- understand the principle of operation of an echo sounder and depth log.
- have a knowledge of the main components of an echo sounder and speed log.
- operate an echo sounder.
- be aware of the errors of and corrections to be applied to depth soundings.
- understand the principle of operation of a Radio Direction Finder.
- operate an RDF, obtain and apply corrections to a bearing obtained from an RDF.
- know the principal errors of an RDF and the accuracy of position lines obtained from it.
- be aware of other applications of an RDF.
- understand the principles of Transit and Stationary orbital Satellite Navigation systems.
- operate a satellite navigation receiver.
- recall the advantages and disadvantages of Transit and GPS navigation systems.
- understand satellite orbits and passes.
- recall the accuracy of position fixes obtained from Transit and GPS systems.
- recall the principle of operation of hyperbolic navigation systems.

- have a knowledge of the errors and accuracy of the principal hyperbolic navigation systems.

Subject Area

.1	Magnetic compass	11.0hrs
.2	Gyro compass	6.0
.3	Echo sounder	11.0
.4	Radio Direction Finder	9.0
.5	Satellite navigation	7.0
.6	Hyperbolic navigation systems	6.0

Recommended books :

1. All about Marine Compasses and their Adjustment - A.Pickles
2. Marine Electronic Navigation - S.F.Appleyard
3. Marine Gyro Compasses for Ship's Officers - A.Frost

5.1.4.13 RADIO TELEPHONY / GMDSS **40 hours**

Objectives : To be able to ;

- operate ship board radio telephony equipment.
- operate survival boat radio.
- have a thorough knowledge of communication procedures by radiotelephony.
- care for and maintain batteries.
- operate INMARSAT Standard-C equipment.
- prepare, transmit and receive messages, including distress messages, using Standard-C equipment.

- understand the use of and be able to operate an Emergency Position Indicating Radio Beacon (EPIRB).

Subject Area

.1	Operation of shipborne Radio-telephone and communication equipment	9.0hrs
.2	Operation of survival craft radio	3.0
.3	Communication procedures	6.0
.4	Battery maintenance	1.0
.5	Requirements of radio regulations	2.0
.6	Radiotelephone ship station documents	2.5
.7	GMDSS radio communication equipment	3.0
.8	GMDSS procedures, distress and safety communication	6.0
.9	Operational procedures of SATCOM, DSC and Telex	6.0
.10	EPIRBs	1.5

Recommended books :

1. Handbook for Radio Operators - British Telecom International
2. Global Maritime Distress and Safety System - IMO

5.1.4.14 RADAR OBSERVATION **45.5 hours**

Objectives : To be able to ;

- recognize when radar should be in use.

- select a suitable mode and range setting for the circumstances.
- set the controls for optimal performance.
- aware of the limitations of the equipment in detecting targets and in terms of accuracy.
- when within range of the coast, compare the radar display with the chart, select suitable conspicuous land targets and use these targets to fix his position.
- aware of the need to maintain a continuing plot of ship targets which may pose a potential threat of collision.
- derive from the plot the necessary information about other ship's courses, speeds and nearest approaches to enable action to be taken in ample time in accordance with COLREG 1972, to prevent close-quarters situation arising.

Subject Area

.1	Fundamental theory	11.5hrs
.2	Setting up and maintaining displays	8.0
.3	Marine Radar performance specifications	1.0
.4	Plotting	11.0
.5	The use of Radar in navigation	5.0
.6	Radar and COLREG 1972	6.0

.7 Review and final assessment 3.0

Recommended books :

1. IMO Model Course No. 1.07 - IMO
2. The use of Radar at Sea - F.J.Wylie
3. Radar Observer's Handbook - W.Burger

5.1.4.15 MEDICAL CARE **25 hours**

Objectives : To be able to ;

- dress and bandage wounds.
- give first aid treatment of fractures, bruises, sprains and dislocations.
- treat burns and scalds.
- provide first aid treatment of bodily malfunctions.
- take a patient's pulse and temperature.
- use the "Ship Captain's Medical Guide".
- sterilize medical instruments before and after putting them to use.
- take inventory of the ship's medical locker and check the contents, using the appropriate medical scale.
- recall the proper procedure for obtaining medical advice by radio.

Subject Area

.1	Basic immediate action	1.0 hr
.2	First aid kit	1.5
.3	Body structure and function	5.5
.4	Toxicological hazards on board	5.0

.5	Examination of patient	2.0
.6	Spinal injuries	1.0
.7	Burns, scalds, effects of heat and cold	2.0
.8	Fractures, dislocations and muscular injuries	2.0
.9	Medical care of rescued persons, including distress, hypothermia and cold exposure	2.0
.10	Radio medical advice	0.5
.11	Pharmacology	1.0
.12	Sterilization	0.5
.13	Cardiac arrest, drowning and asphyxia	1.0

Recommended books :

1. International Medical Guide for Ships - WHO
2. Medical First Aid Guide - IMO MFAG

5.1.5 CLASS II (DECK) HT DURATION 37 WEEKS

5.1.5.1 MEDICAL GUIDE 40 hours

Objectives : To be able to ;

- participate effectively in co-ordinated schemes for medical assistance on board ship at sea.
- effectively make use of the Ship Captain's Medical Guide to provide medical care.
- write properly and fairly accurately, accident reports.
- properly manage a ship's medical chest and hospital or sick bay.

Subject Area

.1	First Aid	5.0hrs
.2	Care of Casualty	7.0
.3	Aspects of nursing	2.0
.4	Diseases	4.0
.5	Alcohol and drug abuse	2.0
.6	Dental care	2.0
.7	Gynaecology, pregnancy and childbirth	2.0
.8	Medical care of rescued persons including distress, hypothermia and cold exposure	2.0
.9	Death at sea	1.0
.10	External assistance	2.0
.11	Environmental control on board ship	2.0
.12	Disease prevention	2.0

.13	Keeping of records, regulations	2.0
.14	Medicines and medical equipment	2.0
.15	Surgical equipment, instruments and supplies	3.0

Recommended books :

1. International Medical Guide for Ships - WHO
2. Positive Health at sea - Norman Brown

5.1.5.2 RADAR SIMULATOR **30 hours**

Objectives : To be able to ;

- make efficient and effective use of radar as a navigational aid in congested, confined waters.
- recognize potential threats and make valid navigational and collision-avoidance decisions.
- be aware of the time needed to appreciate that a dangerous situation is developing.
- realize that excessive speed in poor visibility reduces the time available to assess a threat and to take appropriate action.

Subject Area

.1	Familiarization with the Simulator's "own ship" characteristics and controls	2.0hrs
.2	Review of Basic Radar and plotting	6.0
.3	Open water exercises in the application of COLREG 1972	6.0
.4	Exercise in navigation and colli-	10.0

sion avoidance in contained and congested waters

.5 Exercises in and near Traffic Separation Schemes. 6.0

Recommended books :

1. IMO Model Course No. 1.09 - IMO
2. Radar and ARPA Manual - A.G.Bole and W.O.Dinely
3. The use of Radar at Sea - F.J.Wylie

5.1.5.3 NAVIGATION **120 hours**

Objectives : To be able to ;

- use and know the limitations of sight reduction tables.
- obtain the position of the ship by a combination of transferred position line and from an observation at time of meridian passage of the sun.
- obtain a position fix from stellar observations.
- determine the intercept terminal point or intersection of two position lines by calculation.
- plan, execute and monitor a coastal navigation passage, making effective use of Sailing Directions.
- calculate distances and courses between two positions.
- correct navigational charts and relevant nautical publications based on information contained in Notices to Mariners.
- understand the theory behind tides and tidal streams, and meteorological

effects on tides.

- calculate the height of tide at a given time in a given place, using Nigerian Tide tables or Admiralty Tide Tables.
- calculate the appropriate time to pass over a shoal, given the draught of a ship.

Subject Area

.1	Celestial navigation	22.0hrs
.2	Position line equation	6.0
.3	Practical navigation	24.0
.4	Coastal navigation	36.0
.5	Passage planning	12.0
.6	Navigational safety	6.0
.7	Tide calculations	12.0
.8	Nautical publications	2.0

Recommended books :

1. Admiralty Manual of Navigation Vol 1 - HMSO
2. Watch Officer's Guide - L.Brown
3. Modern Chartwork - W.H.Squair
4. Mariners' Handbook - U.K. Hydrographic Department
5. Bridge Procedures Guide - ICS

5.1.5.4 NAVAL ARCHITECTURE **106 hours**

Objectives : To be able to ;

- understand the functions, construction and stiffening of watertight bulkheads, hatchways, superstructures, tank openings, watertight and hull doors.

- make sketches of closing arrangements of hatchways, superstructures, tank openings, watertight and hull doors.
- calculate areas, volumes, centroids, moments and displacement.
- determine the position of the centre of gravity of a ship for different conditions of loading and ballasting.
- have a working knowledge of the effect of free surface, and changes in displacement during a voyage, on stability.
- determine change of trim and draught due to loading, discharging, shifting weights and change in density.
- calculate ship stability and trim when dry docking or when grounded.
- use stability, hydrostatic and stress data supplied to ships.
- recall minimum stability criteria as set out in Load Line Rules.
- describe ship's hull form.
- describe in general, the process of ship building, from plate preparation stage to launching.

Subject Area

.1	Strength and structure of ships	18.0hrs
.2	Calculation of areas, volumes, moments, displacement	12.0
.3	Calculation of second moment	3.0
.4	Common uses of calculations	3.0
.5	Transverse statical stability	12.0

.6	Trim, longitudinal stability	8.0
.7	Watertight subdivision	3.0
.8	Load Line rules	6.0
.9	Damaged stability	4.5
.10	Drydocking and grounding	4.5
.11	Describing ship's hull form	6.0
.12	Ship construction process	6.0
.13	Angle of heel when turning: effect on stability	3.0
.14	Stability at large angles of heel	6.0
.15	Angle of loll	2.0
.16	Simplified stability information	9.0

Recommended books :

1. Ship Stability for Masters and Mates - D.R.Derret
2. Ship Design and Construction - R.Taggert

5.1.5.5 SHIPBOARD OPERATIONS **96 hours**

Objectives : To be able to ;

- distinguish the role of a safety officer, safety representative and safety committee on board ships.
- recall the methods of improving and maintaining safety awareness of the crew.
- identify the effects of corrosion and the methods for protection against corrosion.
- plan a maintenance schedule of ship and equipment.
- understand oil Tanker cargo and routine operations.
- understand the nature of cargoes which are intrinsically unsafe and those

which are liable to shift.

- prepare cargo gear for survey and certification.
- calculate the forces acting on the different parts of lifting gear.
- tell when wires or ropes need replacing.
- prepare a ship for dry-docking.
- properly use the IMDG code.
- organizing a crew for containing the adverse effects of damage to ship's structure.

Subject Area

.1	Safety	9.0 hrs
.2	Ship maintenance	18.0
.3	Oil tanker operations	18.0
.4	Dangerous cargoes	6.0
.5	Dangerous goods	12.0
.6	Certificates and surveys	12.0
.7	Safe carriage of goods	9.0
.8	Dry-docking routine	6.0
.9	Load Line rules	3.0
.10	Damage control	3.0

Recommended books :

1. Shipboard Maintenance - B.E.M.Thomas
2. International Safety Guide (for Tankers and Terminals) - ICS
3. Shipboard Operations - H.I.Lavery
4. Merchant Shipping Notices (Consolidated) - U.K.Dept of Transp.
5. The Stowage and Properties of Cargoes - R.E.Thomas

5.1.5.6 SEAMANSHIP 120 hours

Objectives : To be able to ;

- safely moor a ship.
- safely manoeuver a ship in rivers, creeks and harbours.
- take action to avoid collision or close quarters with other vessels, in accordance with the provisions of COLREG.
- have a thorough knowledge of the procedure for sending distress messages and action to take on receiving a distress message.
- have a thorough knowledge of actions to take on stranding, beaching and in other emergency situations.
- carry out a ship swing and obtain a deviation table or curve for magnetic compass.
- identify buoys and floating marks and determine the safe side to pass them on.
- prepare a ship for anchoring.
- hang off an anchor and break and slip anchor cables.
- anchor a ship in a tideway and in confined waters.
- have a thorough knowledge of search and rescue procedures.

Subject Area

.1	Collision Regulations	24.0hrs
.2	Principles of ship handling	12.0
.3	Practical ship handling	18.0
.4	Life saving and distress	9.0
.5	Stranding and beaching	6.0
.6	Safety of navigation	12.0
.7	Emergencies	6.0
.8	Magnetic compass	12.0
.9	Fire Prevention / Fighting	9.0
.10	Anchors and anchoring	12.0

Recommended books :

1. A Guide to the Collision Avoidance Rules - A.N.Cockroft
2. Theory and Practice of Seamanship - G.L.Danton
3. IMO Search and Rescue Manual - IMO
4. Collisions and their Causes - R.A.Cahill

5.1.5.7 SHIP'S BUSINESS AND LAW **72 hours**

Objectives : To be able to ;

- have a thorough knowledge of the entries required to be made in the official log book.
- ensure the making of accurate entries in the Deck log book.
- have an understanding of the occasions on which protests are to be noted and the procedures for noting protest.
- have a thorough knowledge of the provisions of the Articles of Agreement and in particular, the relationship between master and crew.

- understand the meaning of maritime liens, mortgages and arbitration.
- have a working knowledge of the action to be taken on assuming command.
- have a working knowledge of documentation of cargo, including mate's receipts, bills of lading, dangerous goods lists, cargo manifest and plans.
- carry out laytime and portage bill calculations.
- understand the penalty for and implications of marine pollution.
- understand the role of classification societies.

Subject Area

.1	Log books, Protests etc	3.0hrs
.2	Liens, contracts, arbitration, agency	4.0
.3	Master and crew	6.0
.4	Arrival and departure procedures	6.0
.5	Wreck and salvage	3.0
.6	Safety, seaworthiness	9.0
.7	Carriage of goods by sea	9.0
.8	Marine Insurance	9.0
.9	Lighterage, towage, pilotage	6.0
.10	Portage Bills	3.0
.11	Time Sheets	3.0
.12	Oil pollution	6.0
.13	Tonnage	2.0
.14	Classification Societies	3.0

Recommended books :

1. Business and Law for the Shipmaster - L.Hopkins
2. Nigerian Shipping Laws - L.Mbanefo

5.1.5.8 MARITIME ECONOMICS **48 hours**

Objectives : To be able to ;

- understand the factors that influence the design of ships.
- understand the factors that influence demand and supply of shipping services
- have a knowledge of the influence of ports, canals and waterways on sea transport.
- have a knowledge of the organizational structure of a shipping company.
- have a general understanding of the factors that contribute to the determination of freight rates.
- recall various measures taken by governments to protect national shipping.

Subject Area

.1	The Economics of ships and ship designs	12.0hrs
.2	Demand and supply of shipping services	9.0
.3	Influence of ports, ship canals and waterways	9.0
.4	Organizational structure of a shipping company	6.0
.5	Freight market	6.0

.6 Political aspects of shipping 6.0

Recommended books :

1. An Introduction to Shipping Economics - I.Chrzanowski
2. Sea Transport Operation and Economics - P.Alderton
3. Dictionary of Shipping Terms - P.R.Brodie

5.1.5.9 SHIP MANAGEMENT 72 hours

Objectives : To be able to ;

- better understand personal behaviour as a superior.
- recognize social changes and their consequences on ship management.
- comprehend the meaning of Management and its application.
- understand the role of managers in the work place and the skills needed by managers at different levels.
- recall the different types of plans and appreciate the importance and impact of planning.
- have a good knowledge of planning tools and techniques.
- improve on decision making skills.
- understand the process of organizing.
- organize on board training for Safety, for crew and trainees.
- demonstrate a knowledge of what constitutes shipping costs.
- understand the procedures for registration and classification of ships and the need for ships to maintain class.

- have a knowledge of the factors considered by ship managers when deciding on a choice of bunkering port.

Subject Area

.1	Human Relations	6.0hrs
.2	Communications	9.0
.3	Group Management	6.0
.4	Man Management	6.0
.5	Crew Welfare	9.0
.6	Training on board ships	6.0
.7	Shipping Costs	12.0
.8	Registration and Classification	12.0
.9	Bunkering	6.0

Recommended books :

1. Managing Ships - J.M.Downard
2. Operating Offshore and Supply Vessels - K.Appleby

5.1.5.10 ELECTRONICS **96 hours**

Objectives : To be able to ;

- have a theoretical base for the understanding of the principles of operation of navigation and communication systems.
- develop background knowledge for further studies in nautical and engineering related fields.

Subject Area

.1	Atomic structure	9.0hrs
.2	Electron emission	6.0
.3	Diodes	6.0
.4	Triodes	6.0
.5	Valves	6.0
.6	Transistors and semi-conductors	12.0
.7	Amplifiers	6.0
.8	Oscillators	6.0
.9	Modulation and detection	9.0
.10	Power supplies	9.0
.11	Radio communication	21.0

Recommended books :

1. Modern Electronics and Communication - D.E.Phillips

5.1.5.11 COMPUTER STUDIES 72 hours

Objectives : To be able to ;

- load computer software.
- access menu features.
- create, save and edit files.
- retrieve saved files.
- produce graphs.
- write simple programs in BASIC.
- have a knowledge of computer applications in shipping and in particular, on board ship.

Subject Area

.1	Introduction to Data Base	12.0hrs
.2	Introduction to Spreadsheet	12.0
.3	Introduction to programming	9.0

.4	Programming in BASIC	30.0
.5	Computer Application on Ships	9.0

Recommended books :

1. Hands On - L.Metzelaar and M.Fox
2. Computer Programming in BASIC the easy way - D.Downing
3. Introducing Computers - P.Bishop

5.1.5.12 FRENCH **72 hours**

5.1.6 CLASS I (DECK) HT — DURATION 17 WEEKS

5.1.6.1 SHIP HANDLING — 60 hours

Objectives : To be able to ;

- manoeuvre a ship to a pilot vessel or station to embark or disembark a pilot, having due regard for weather, tide, headreach and stopping distance.
- handle a ship in rivers, estuaries etc having due regard to the effects of current, wind and restricted water on the response to the helm.
- berth and unberth a ship under various conditions of wind and tide and with or without tugs.
- approach an anchorage, drop anchor, pick up an anchor and clear an anchorage.
- manage and handle a ship in heavy weather.
- determine manoeuvring and engine characteristics of major types of ships, with special reference to stopping distances and turning circles at various draughts and speeds.
- plan ahead and execute a manoeuver.
- turn a ship short round in a narrow channel.

Subject Area

.1	Manoeuvring characteristics	4.5hrs
.2	Handling ships in narrow waters	6.0
.3	Handling ships in heavy weather	4.0
.4	Mooring	3.0
.5	Towing	3.0
.6	Use of tugs	1.5
.7	Approaching the berth	1.5
.8	Docking	3.0
.9	Undocking	4.0
.10	Departure	1.5
.11	Anchoring	3.0
.12	Special manoeuvres	4.0
.13	Vessel operations	6.0
.14	Master / Pilot relationship	3.0
.15	Propulsion and steering of ships	12.0

Recommended books :

1. Basic Shiphandling for Masters, Mates and Pilots - P.Willerton
2. Theory and Practice of Seamanship - G.L.Danton
3. Seamanship Techniques Vol 2 - D.J.House

5.1.6.2 PASSAGE PLANNING 72 hours

Objectives : To be able to ;

- write clearly and concisely, and appreciate the significance of Bridge and Standing orders.
- make a full appraisal of all information required, before the commencement of a passage.
- make full use of Sailing Directions, nautical publications and Port Entry

Guide when planning a passage.

- recognise when the need for tugs' assistance arises.
- have a working knowledge of safe distances from dangers, from which to plan ground tracks, taking into consideration the position fixing systems in use.
- have a working knowledge of information to be exchanged with pilots, and the responsibility of the master when pilot is on board.
- take into consideration, navigational and meteorological information when planning a passage.
- oversee the safe execution and monitor the safe conduct of a passage.
- calculate the optimum course and speed for two ships wishing to rendezvous.

Subject Area

.1	Bridge order book	1.5hrs
.2	Standing orders	3.0
.3	Navigation safety	12.0
.4	Bridge check lists	3.0
.5	Sailing Directions	4.5
.6	Use of tugs	3.0
.7	Clearing distances	3.0
.8	Approaching the coast	6.0
.9	Approaching and entering harbour	3.0
.10	Navigation in pilotage waters	12.0
.11	The effect of systematic and random errors in position	12.0

fixing

.12 The use of navigational and meteorological information 9.0

Recommended books :

1. Bridge Procedures Guide - ICS
2. A Guide to the Planning and Conduct of Sea Passages - U.K. Dept. of Transport
3. Admiralty Manual of Navigation Vol 1 - U.K.Dept of Transp.
4. Africa Pilot Vol 1 - U.K. Hydrographic Department
5. Strandings and their Causes - R.A.Cahill

5.1.6.3 COLLISION REGULATIONS 60 hours

Objectives : To be able to ;

- have a thorough knowledge of the Collision Regulations and be able to take action to avoid collision or close quarters situation, in accordance with its provisions.
- recall the actions to be taken in the event of a collision.
- have a thorough knowledge of the limitations of the use of Radar equipment for collision avoidance.
- make use of information provided regarding the manoeuvering characteristics of a ship.

Subject Area

.1 Thorough understanding of the contents of the Collision Avoidance Rules 24.0hrs

.2	Master's responsibility in the event of a collision	6.0
.3	History of the Collision regulations	1.5
.4	Precautions required by good seamanship or special circumstances	2.5
.5	Duty to depart from the Rules if necessary	2.5
.6	Proper use of Radar	2.5
.7	Basic principles to be observed in keeping a navigational watch	6.0
.8	Manoeuvering information	6.0
.9	Positioning and technical details of lights and shapes	9.0

Recommended books :

1. A Guide to the Collision Avoidance Rules - A.N.Cockroft
2. Collisions and their Causes - R.Cahill
3. Collision Cases: Judgements and Diagrams - H.M.C.Holdert

5.1.6.4 BUOYAGE **24 hours**

Objectives : To be able to ;

- identify all buoys and floating marks in use in Region 'A' and know the safe side on which to pass them.
- appreciate the danger involved in passing too close to a buoy.
- be aware of the unreliable nature of a fix obtained from bearings and / or ranges of a buoy or other floating marks.

Subject Area

.1	Historical background	0.5 hrs
.2	General principles of the IALA maritime buoyage system	1.5
.3	Rules of the system	3.0
.4	Thorough understanding of buoys and marks used in Region "A"	15.0
.5	The danger of fixing position with floating marks	4.0

Recommended books :

1. Maritime Buoyage System - IALA
2. Strandings and their Causes - R.A.Cahill

5.1.6.5 SHIP'S BUSINESS AND LAW 60 hours

Objectives : To be able to ;

- have a thorough knowledge of the contents of the ship's Articles of Agreement and in particular, the relationship between master and crew.
- recall the certificates and other documents or publications required to be carried aboard ship; their use, how they are obtained, and (if appropriate) the period of validity.
- have a working knowledge of the procedures for engaging and discharge of crew.
- understand the procedure for registration of ships and the legal significance of the certificate of registry.

- know the procedure for entering a ship inwards and clearing outwards.
- understand the relationship between master and ship's agent, and the function of ship's agents.
- have a thorough knowledge of the Official Log Book and the law relating to entries.
- calculate wages due to crew and prepare a portage bill.
- recall the various types of charters in which a ship may be engaged and have a good knowledge of the master's responsibility under each.
- know the conditions under which a protest may be noted and the procedure of noting protest.
- have a good knowledge of the master's obligation in respect of distress.
- have a general understanding of the provisions of the Carriage of Goods by Sea Act 1962 and the Marine Insurance Act 1961.
- treat disciplinary offences on board ship.
- have a working knowledge of load line marks, and the entries and reports required to be made in respect of freeboard, draught and allowances.
- know the actions to be taken and the obligations of a master in the event of a collision, salvage, stranding, beaching or towage.

- have a working knowledge of the provisions of MARPOL, SOLAS and other international maritime regulations.

Subject Area

.1	Master and crew relationship	6.0hrs
.2	Articles of Agreement	1.5
.3	Documents and certificates	6.0
.4	Arrival and departure procedures	1.5
.5	Accounting	6.0
.6	Charter Parties	6.0
.7	Noting Protest	1.5
.8	Official Log Book	1.5
.9	Master - Agent relationship	1.5
.10	Accommodation Rules	1.5
.11	Wreck, assistance and salvage	3.0
.12	Towage and pilotage	1.5
.13	Marine Insurance	6.0
.14	Carriage of goods by sea	6.0
.15	Collision	4.5
.16	Safety	6.0

Recommended books :

1. Business and Law for the Shipmaster - L.Hopkins
2. Nigerian Shipping Laws - L.Mbanefo
3. Handy Book for Shipmasters and Owners - H.Holman

5.1.6.6 COMPASSES **60 hours**

Objectives : To be able to ;

- adjust a ship's magnetic compass.
- have a good knowledge of the performance standards for magnetic compasses.

- appreciate the importance of keeping a record of observed deviations.
- explain the principle of operation of a gyro compass.
- know the principal parts of a gyro compass.
- have a thorough understanding of the errors associated with the gyro compass, including latitude, course and speed error and correction.
- have an understanding of the fundamental differences in the construction and operation of the better known gyro compasses.
- have a knowledge of the principle, operation and use of automatic pilot and rate of turn indicators.

Subject Area

.1	Marine compasses and equipment	3.0hrs
.2	The ship's magnetism	4.5
.3	Forces causing deviation with ship upright	4.5
.4	Heeling error	3.0
.5	Practical compass adjustment	12.0
.6	Gyroscopic compass theory	11.0
.7	Operational errors of the gyro	5.0
.8	Sperry Gyro	3.0
.9	Anschutz Gyro	3.0
.10	Robertson Gyro	3.0
.11	Arma Brown Gyro	3.0
.12	Rate of turn indicator	2.0
.13	The Auto Pilot	3.0

Recommended books :

1. The Ship's Compass - Grant and Klinkert
2. Notes on Compass Work - Kemp and Young
3. Marine Gyro Compasses for Ship's Officers - A.Frost

5.1.6.7 DIRECTION FINDER **24 hours**

Objectives : To be able to ;

- have a more detailed knowledge of the principle of radio direction finders.
- describe the potential error sources.
- have a working knowledge of the limitations of the system and its accuracy.
- explain the advantage of the system and its use for search and rescue purposes.
- carry out a full calibration of an RDF and prepare a correction curve and table.

Subject Area

.1	General knowledge of the various types of RDF equipment and systems	3.0hrs
.2	Rotating loop and Goniometer systems	3.0
.3	Maximum and minimum signals. Sense	3.0
.4	Quadrantal error. Calibration	9.0
.5	Sunset and sunrise effects. Land effect	1.5
.6	General knowledge of shore-based RDF systems	1.5
.7	Use of RDF equipment for Search and Rescue purpose	3.0

Recommended book :

Radar and Electronic Navigation - G.I.Sonnenberg

5.1.6.8 ECHO SOUNDER **24 hours**

Objectives : To be able to ;

- have a better knowledge of the principle and practical application of echo sounding devices, logs and speed indicators.
- carry out periodic checks on an echo sounder.
- be able to identify false readings.
- use a line of sounding as a means of checking the principal position fixing system.

Subject Area

.1	General principles of Echo sounder	9.0hrs
.2	Functions of Echo sounding equipment	9.0
.3	Reliability of the depth information provided	3.0
.4	Danger of exclusive reliance on depth information from Echo sounders	3.0

Recommended books :

1. Radar and Electronic Navigation - G.I.Sonnenberg
2. Mariners' Handbook - U.K. Hydrographic Department

5.1.6.9 SEARCH AND RESCUE 27 hours

Objectives : To be able to ;

- describe in general terms, a typical SAR organization and the responsibilities of coordinators.
- explain the coordination of SAR operations.
- demonstrate a knowledge of the contents of the MERSAR manual.
- describe the means of communication available for distress purposes.
- be aware of the need for the proper recording of reports, events and actions.
- have a good knowledge of how a proper lookout should be conducted in an SAR operation.
- have a knowledge of the equipment which may be used to rescue survivors.
- understand the procedure for assisting an aircraft to ditch.
- interrogate survivors and communicate information to the RCC.
- have a knowledge of the types of resources which may be used in a SAR operation at sea.
- have a knowledge of supplies and survival equipment that may be dropped by aircraft.
- combine current and leeway to derive a total drift vector.
- recognize the importance of accuracy of navigation of search craft.

- use a plotting chart.
- establish search area location.
- determine search areas.
- choose a search strategy.
- have a good knowledge of various search patterns.

Subject Area :

.1	Administration	2.0hrs
.2	International Provisions	1.0
.3	Communications	1.0
.4	Operating procedures	5.0
.5	SAR Resources	2.0
.6	Navigation	3.0
.7	Search Areas	7.0
.8	Search Patterns	3.0
.9	Review and final assessment	3.0

Recommended books :

1. IMO Search and Rescue Manual - IMO
2. Practice of Ocean Rescue - R.E.Sanders

5.1.6.10 ARPA SIMULATOR 33 hours

Objectives : To be able to ;

- choose an appropriate mode of display.
- select plotting and graphics controls suitable to the circumstances.
- make appropriate use of operational alarms.
- acquire and track those targets which present a potential threat of collision.

- extract the information needed on course, speed and nearest approach to enable early action to be taken to avoid a close quarters situation.
- be aware of the dangers of over-reliance on the automatic acquisition and tracking of targets and on operational alarms.
- be aware of IMO performance standards, and factors which may affect the accuracy of derived information.
- realize the need to check the accuracy of inputs and the correct functioning of the ARPA.

Subject Area

.1	Review of plotting techniques	6.0hrs
.2	Principal ARPA systems	0.5
.3	IMO performance standards for ARPA	0.5
.4	Acquisition of targets	0.75
.5	Tracking capabilities and limitations	0.75
.6	Processing delays	1.5
.7	Setting up and maintaining displays	1.0
.8	Representation of target information	1.0
.9	Errors of interpretation	1.0
.10	Errors in displayed data	2.5
.11	System operational tests	1.5
.12	Risk of over-reliance on ARPA	2.0
.13	Obtaining information from ARPA displays. Applications of COLREG 1972	14.0

Recommended books :

1. IMO Model Course No. 1.08 - IMO
2. Automatic Radar Plotting Aids Manual - A.G.Bole and K.D.Jones

5.1.6.11 ENGINEERING KNOWLEDGE AND CONTROL 60 hours

Objectives : To be able to ;

- know the meaning of marine engineering terms in common use.
- have a general knowledge of diesel and turbine machinery, marine boilers, generators, pumps, condensers and evaporators, transmission of main engine power, steering systems, and manoeuvering procedures.
- have a working knowledge of fuel consumption and economic speeds; relationship between power, speed, displacement and consumption; estimated consumption to complete a passage and problems involving pitch and slip.
- understand marine applications of the properties of gases.
- have a general understanding of control systems and their ship board applications.
- have an understanding of the general principles and applications of, distillation and fresh water plants, oily water separators, incinerators, deck machinery and hydraulic systems.

Subject Area

.1	Drawing and sketching	6.0hrs
.2	Marine boilers	3.0
.3	Diesel engines	6.0
.4	Turbines	4.5
.5	Propeller and propeller shaft	4.5
.6	Pumps and auxiliaries	3.0
.7	Refrigeration, air conditioning and ventilation	3.0
.8	Steering gears	4.5
.9	Control fundamentals, types	6.0
.10	Controlled systems	6.0
.11	Distillation and fresh water systems	1.5
.12	Sewage treatment plants	1.5
.13	Oily water separators	1.5
.14	Incinerators	1.0
.15	Deck machinery	3.0
.16	Hydraulic systems	3.0
.17	Fuel consumption	2.0

Recommended book :

Reed's Engineering Knowledge, Instruments and Control Systems for Deck Officers - W.Embleton and T.D.Morton

5.1.6.12 DANGEROUS GOODS 24 hours

Objectives : To be able to ;

- have an understanding of the classification of dangerous substances.
- make proper use of the IMDG code.

- identify the markings and labels of packaged dangerous substances.
- have a good knowledge of the documents required to accompany shipment of dangerous goods.
- have an understanding of the use of the Medical First Aid Guide in respect of injuries sustained from dangerous substances.
- be conversant with the procedures to be followed before, during and after loading dangerous goods, including signals to be displayed.

Subject Area

.1	Classification of dangerous goods	4.0hrs
.2	Stowage and segregation of dangerous goods	4.0
.3	Emergency response relating to dangerous goods	3.0
.4	The IMDG Code	4.0
.5	Documentation of dangerous goods	3.0
.6	Bulk transport of dangerous substances	6.0

Recommended books :

1. The Stowage and Properties of Cargoes - R.E.Thomas
2. Dangerous Goods - W.Dobson
3. IMDG Code - IMO

ANNEX 3

5.1.7 CLASS II (DECK) OS - 200 GT DURATION 24 WEEKS

5.1.7.1 RADAR OBSERVATION 45.5 hours

Syllabus is same as for Class III (Deck) HT

5.1.7.2 COMPASSES AND ELECTRONIC NAVIGATION SYSTEMS 50hrs

The syllabus is the same as for Class III (Deck) HT

5.1.7.3 MEDICAL CARE 25 hours

Syllabus is same as for Class III (Deck) HT

5.1.7.4 RADIO TELEPHONY / GMDSS 25 hours

Syllabus is same as for Class III (Deck) HT

5.1.7.5 NAVIGATION 120 hours

Objectives : To be able to ;

- define latitude, longitude, departure, dlat, dlong and distance.
- recall the principle of the Mercator projection and distinguish it from Gnomonic projection.
- convert true course or bearing into compass course or bearing and vice versa, given variation or gyro error.
- find compass course to steer between two positions given current and wind direction and speed.

- find course made good given course steered, speed of the ship and direction and rate of the current.
- fix a position on the chart by bearings and / or ranges.
- find time and height of high and low water using Nigerian tide tables.
- interprete information given on charts.
- correct charts, given Notices to Mariners.
- calculate courses and distances between two positions by Parallel and Plane Sailing.
- use traverse tables to obtain position of the ship, given courses, variation, deviation and run, allowing for the effects of wind and current.
- find compass error by observation of heavenly bodies.
- locate charts necessary for the conduct of a sea passage.
- obtain intercept and plot a position line from a sextant observation of the sun.

Subject Area

.1	Direction and coordinates	6.0hrs
.2	Projection and the nautical chart	3.0
.3	Plotting, dead reckoning and position	21.0
.4	Obtaining a position line	12.0
.5	Fixing the position	12.0

.6	Tide calculations	12.0
.7	Parallel and plane sailing	15.0
.8	The sextant and altitudes	18.0
.9	Nautical tables	9.0
.10	Chart catalogue, folio and index	3.0
.11	Chart corrections	3.0
.12	Chart symbols	6.0

Recommended books :

1. The Principles and Practice of Navigation - A.Frost
2. Marine Chartwork - D.A.Moore

5.1.7.6 SHIP STABILITY **72 hours**

Objectives : To be able to ;

- calculate waterplane area, volume and centre of gravity of box-shaped vessels.
- have a general understanding of centre of gravity, centre of buoyancy, metacentric height, righting lever and righting moment.
- use deadweight moment diagram and displacement and TPC scale to determine displacement of vessel.
- understand the danger of slack tanks and the effect of adding and removing weights.
- calculate Fresh Water and Dock Water Allowance.
- understand the significance of load line marks.
- use a hydrometer to obtain density.

Subject Area

.1	Areas, volumes and centroids	6.0hrs
.2	Effect of density on draft and displacement	6.0
.3	Transverse statical stability	12.0
.4	Free surface effect	3.0
.5	Use of displacement and TPC scales	6.0
.6	Trim	6.0
.7	Moments of statical stability	12.0
.8	Stability and hydrostatic curves	3.0
.9	Buoyancy and reserve buoyancy	3.0
.10	Deck cargoes	6.0
.11	Deadweight moment diagrams	9.0

Recommended books :

1. Principles and Practice of Ship Stability - L.G.Taylor
2. Ship Stability for Masters and Mates - D.R.Derret

5.1.7.7 SHIPBOARD OPERATIONS 60 hours

Objectives : To be able to ;

- carry out inspection of a ship and its equipment with the aim of determining necessary repairs.
- recall the various methods of protecting surfaces against corrosion or rot in the case of wood.
- prepare a repair and requisition list and prior to drydocking.
- be familiar with safety and operational procedures when loading or discharging oil cargoes.

- organize a crew for combatting of emergencies.
- draw up a maintenance schedule for life saving and fire fighting appliances.
- prepare a ship for survey.

Subject Area

.1	Inspection and maintenance of ship and her equipment	12.0hrs
.2	Repairs	6.0
.3	Drydocking routine	6.0
.4	Protective coating	11.0
.5	Piping arrangement in Tankers	6.0
.6	Tank cleaning and gas freeing	3.0
.7	Surveys and certification	6.0
.8	Fire fighting Plans	3.0
.9	Care of life saving and fire fighting appliances	6.0
.10	Emergency station lists	1.0

Recommended books :

1. Shipboard Operations - H.I.Lavery
2. Shipboard Maintenance - B.E.M.Thomas

5.1.7.8 METEOROLOGY 45 hours

Objectives : To be able to ;

- read and understand the barometer and the wet and dry bulb thermometers.
- use barometric observations in conjunction with weather signs.
- estimate wind direction and force of wind and sea using the Beaufort wind

scale.

- contrast land and sea breeze.
- have a knowledge of the weather associated with the SW monsoon, the NE Trade winds and the passage of the ITCZ.
- understand cloud formation, evaporation, condensation, precipitation etc.
- recall the circulation of ocean currents in the Gulf of Guinea.
- predict the onset of fog.

Subject Area

.1	Principles of pressure measurement	4.0hrs
.2	Principles of the thermometer	3.0
.3	Pressure distribution and winds	6.0
.4	The Beaufort wind scale	0.5
.5	Estimating direction and force of wind	1.0
.6	Air masses and their properties	6.0
.7	Water vapour in the atmosphere	3.0
.8	Evaporation, condensation and precipitation	5.0
.9	Fog, mist, dew and haze	6.0
.10	Predicting fog	1.5
.11	Ocean currents (Atlantic)	9.0

Recommended books :

1. Course in Elementary Meteorology - U.K. Meteorological Office
2. Kandy:Notes on Meteorology - Kemp and Young

5.1.7.9 SEAMANSHIP 72.0 hours

Objectives : To be able to ;

- take action to avoid collision or close quarters situation with other vessels or structures.
- identify buoys and marks and know on which side to pass them.
- understand the basic principles of ship handling.
- recall the minimum requirements in respect of the number and type of life saving and fire fighting appliances for vessels up to 200 GT.
- recall the number and type of distress signals required to be carried on sea going vessels and how to use them.
- appreciate the dangers associated with loading cargoes on deck.
- safely carry out a bridge and deck watch keeping duties.
- prepare a muster and emergency station list.
- use a sextant for taking an observation of the sun.
- properly make entries in the deck log book.
- be familiar with operational procedures for preventing pollution particularly when taking or transferring bunkers.
- supervise the letting go and heaving of anchors.

- recall the correct methods for rigging pilot and accommodation ladders and their care and maintenance.

Subject Area

.1	Collision Regulations	24.0hrs
.2	Buoyage	9.0
.3	Shiphandling	6.0
.4	Towage	6.0
.5	Life saving appliances	3.0
.6	Fire fighting / prevention	3.0
.7	Signals and distress	1.5
.8	Deck cargoes	4.0
.9	Watchkeeping duties	3.0
.10	Search and Rescue	1.5
.11	Drills and musters	0.5
.12	Anchor work	3.0
.13	The sextant	3.0
.14	Oil pollution prevention	3.0
.15	Deck log book	0.5
.16	Pilot / Accommodation ladders	1.0

Recommended books :

1. A Guide to the Collision Avoidance Rules - A.N.Cockroft
2. Kandy : Seamanship Notes - Kemp and Young
3. Shipboard Operations - H.I.Lavery

5.1.7.10 SHIP'S BUSINESS AND LAW **45 Hours**

Objectives : To be able to ;

- recall the entries that are required to be made in the official log book.
- understand the basic provisions of the ship's Articles of Agreement.

- have a general understanding of the provisions of MARPOL, SOLAS and Safety at Work Regulations particularly as they relate to vessels of up to 200 GT.

Subject Area

.1	The official log book	3.0hrs
.2	Master and crew relationship	5.0
.3	Accommodation Rules	3.0
.4	Statutory certificates	5.0
.5	Crew Agreement	3.0
.6	Discharge of seamen	2.0
.7	International maritime conventions	15.0
.8	Safety	9.0

Recommended books :

1. Kandy : Business Notes for Shipmasters - Kemp and Young
2. Nigerian Shipping Laws - L.Mbanefo

5.1.7.11 SIGNALS **36 hours**

Objectives : To be able to ;

- send and receive morse signalling by flashing at six words a minute.
- understand the meaning of single flag hoists and the use of International Code of Signals book.
- use a VHF set and understand the proper procedures for transmitting and receiving messages.

Subject Area

.1	Morse signalling	15.0 hrs
.2	International Code of Signals	9.0
.3	Basic principles of VHF radio communication	3.0
.4	VHF procedures	6.0
.5	VHF standard phrases and messages	3.0

Recommended books :

1. International Code of Signals 1969 - U.K. Dept of Transport
2. Morsemaster Cassette 2 - Morse Code Tutor
3. Handbook for Radio Operators - British Telecom International
4. Seaspeak Training Manual - F.Weeks et al

5.1.7.12 PERSONNEL MANAGEMENT 36 hours

Objectives : To be able to ;

- effectively utilize manpower and material for carrying out designated jobs.
- understand the factors of stress on personnel in a working community.
- demonstrate knowledge of ways and means to win the confidence of subordinates.

Subject Area

.1	Concept of management	3.0 hrs
.2	Functions of management	4.5
.3	Manpower planning	4.5
.4	Factors affecting manpower	4.5

	environment	
.5	Job diagnosis and description	4.5
.6	Leadership	4.5
.7	Motivation	3.0
.8	Strikes and the causes of strikes	3.0
.9	Formation of unions	1.5
.10	Merchant Shipping Act on strikes	3.0

Recommended books :

1. Discipline at Sea - G.J.Sadler
2. Essentials of Management - Joseph L.Massie
3. Personnel Management in Merchant Ships - D.H.Moreby

5.1.8 CLASS I (DECK) OS 200 GT DURATION 24 WEEKS

5.1.8.1 NAVIGATION 120 hours

Objectives : To be able to ;

- plan and supervise the execution of a navigation passage between two ports located within restricted trading area, taking into account, the effect of current, tides, leeway and manoeuvering characteristics.
- use nautical publications in the planning and execution of coastal passages.
- correct charts, based on information provided in Notices to Mariners or provided by harbour authorities.
- instill in watch keeping officers, proper watchkeeping procedures.

Subject Area

.1	Planning and executing a coastal passage	36.0hrs
.2	Approaching the coast	9.0
.3	Approaching and entering harbour	9.0
.4	Navigation in pilotage waters	12.0
.5	Navigation procedures when approaching offshore installations	6.0
.6	Bridge procedures at sea, in harbour and whilst mooring	9.0
.7	Practical navigation	24.0
.8	Tides	15.0

Recommended books :

1. Admiralty Manual of Navigation Vol 1 - U.K. Ministry of Defence (HMSO)
2. Bridge Procedures Guide - ICS
3. Principles and Practice of Navigation - A.Frost
4. Strandings and their causes - R.A.Cahill

5.1.8.2 SHIP STABILITY **96 hours**

Objectives : To be able to ;

- understand the effect of bilging and flooding on ship stability.
- understand the factors affecting the shape of a curve of statical stability and the significance of the area under the curve.
- have a thorough knowledge of the dangers associated with the carriage of cargo on deck, including its effect on stability.
- use hydrostatic data and curves supplied to vessels to ascertain ship stability.
- determine loss of stability due to grounding or drydocking.
- calculate change of draft and trim due to loading or discharge of cargo.

Subject Area

.1	Effect of bilging and flooding	12.0hrs
.2	Stability at large angles of heel	12.0
.3	Effect of beam and freeboard	6.0

	on stability	
.4	Deck cargoes	12.0
.5	Knowledge of hydrostatic and stability data supplied to ships	15.0
.6	Effect on stability of angle of heel when turning	6.0
.7	Drydocking and grounding	9.0
.8	Angle of loll	6.0
.9	Simplified stability information	18.0

Recommended books :

1. Ship Stability for Masters and Mates - D.R.Derret
2. Merchant Ship stability - A.R.Lester

5.1.8.3 SEAMANSHIP **120 hours**

Objectives : To be able to ;

- take avoiding action or the development of close quarters situation in accordance with COLREG.
- identify buoys and floating marks and determine the safe side on which to pass them.
- appreciate the danger associated with fixing the ship's position with floating marks.
- manoeuver a ship up to 200 GT, at sea and in confined waters.
- determine and draw a compass deviation curve or table.
- check the accuracy of a Direction Finder correction curve.
- have a good understanding of actions to take in the event of a grounding, collision or stranding.

- recall the provisions of aspects regulations dealing with the prevention of marine pollution.
- have a good knowledge of statutory surveys required of a ship up to 200 GT and prepare a ship for such surveys.

Subject Area

.1	Collision Regulations	33.0hrs
.2	Buoyage	12.0
.3	Shiphandling	24.0
.4	Towage	9.0
.5	Stranding and beaching	6.0
.6	Magnetic compass	12.0
.7	Drydocking	6.0
.8	Surveys	6.0
.9	Oil pollution prevention	6.0
.10	Emergencies	6.0

Recommended books :

1. Guide to the Collision avoidance Rules - A.N.Cockroft
2. Theory and Practice of Seamanship - G.L.Danton
3. Kandy : Notes on Compass Work - Kemp and Young

5.1.8.4 SHIP'S BUSINESS AND LAW **96 hours**

Objectives : To be able to ;

- have a working knowledge of the official log book and entries required to be made therein.
- handle disciplinary matters involving members of crew in a just and fair manner.

- recognise the importance of the Articles of Agreement and be familiar with its contents and the procedures for opening and closing an Article of Agreement.
- enter inwards and clear outwards, a ship at Customs within Home Trade limits.
- recall the procedures for arranging for surveys and the validity of the various certificates required to be carried by vessels up to 200 GT.
- carry out Portage Bill calculations.

Subject Area

.1	Official log book	6.0hrs
.2	Complaints procedure	3.0
.3	Noting protest	6.0
.4	Master and crew relationship	12.0
.5	Articles of Agreement	6.0
.6	Entering and clearing ship at Customs	6.0
.7	Certificates required to be carried on an Home Trade ship	12.0
.8	Wreck, assistance and salvage	6.0
.9	Accommodation Rules	4.5
.10	Provisions and water	4.5
.11	Safety and seaworthiness	12.0
.12	Collision	9.0
.13	Pollution	9.0

Recommended books :

1. Business and Law for the Shipmaster - L.Hopkins
2. Nigerian Shipping Laws - L.Mbanefo

3. Handybook for Shipmasters and Owners - H.Holman

5.1.8.5 SHIP MANAGEMENT **72 hours**

Objectives : To be able to ;

- understand the procedure and the reasons for registration and classification of a ship.
- have a knowledge of items which constitute fixed costs, daily operating costs and voyage costs, and measures which can be taken aboard ships to reduce operating costs.
- understand shipboard methods of checking the quality of bunkers.
- have an understanding of how the marine insurance market operates.
- recognise the importance of keeping proper and accurate records of events particularly during cargo work or in the event of an accident.
- carry out lay time calculations.
- have a working knowledge of documents used in association with the shipment of cargo.

Subject Area

.1	Registration and Classification	12.0hrs
.2	Shipping costs	15.0
.3	Bunkering	9.0
.4	Marine insurance	24.0
.5	Accounting	12.0

Recommended books :

1. Managing Ships - J.M.Packard
2. Operating Offshore and Supply Vessels - K.Appleby

5.1.8.6 COMMUNICATION **48 hours**

Objectives : To be able to ;

- present ideas and opinions logically, in written form.
- achieve a considerably high level of accuracy in technical vocabulary.
- demonstrate proficiency in the communication procedures required for Distress, Urgency and Safety.
- understand the use of modern communication systems such as Satellite communication and electronic data interchange via computer networks.

Subject Area

.1	Report writing	12.0hrs
.2	Distress, Urgency and Safety procedures on RT	24.0
.3	Knowledge of modern communication systems	12.0

Recommended books :

1. English for Maritime Studies - Blakey
2. Annual Summary of Admiralty Notices to Mariners - U.K. Hydrographic Department
3. Handbook for Radio Operators - British Telecom International

5.1.8.7 RADAR SIMULATOR 30 hours

Subject Area

The Syllabus is the same as for Class II (Deck) HT

5.1.8.8 SEARCH AND RESCUE 27 hours

Subject Area

The Syllabus is the same as for Class I (Deck) HT

ANNEX 4

EXISTING SYLLABUSES FOR MATE AND MASTER, (HT) AND (OFFSHORE), AS PROVIDED FOR IN THE MERCHANT SHIPPING ACT.

MATE (HT)

Chartwork and Pilotage

(a) Given the variation and a table of Deviations to convert True Courses into Magnetic and Compass Courses and vice versa. To find the compass course and distance between two positions. The effect of current on speed. allowance for leeway. To find the compass course to steer allowing for a current. Given compass course steered, the speed of the ship and the direction and rate of the current, to find the true course made good.

(b) To fix the ship's position on chart by simultaneous cross bearings, bearing and range or by wireless cross bearings, applying the necessary corrections. To fix the ship's position by bearings of one or more objects with the run between, allowing for a current and to find the distance at which the ship will pass a given point. The construction of a line of sounding. The use of a single position line approaching the coast.

(c) The use of clearing marks and horizontal and vertical danger angles.

(d) To find the time and height of high and low water at a Standard Port (Admiralty Tide Tables). the use of tables or diagram to find the height of tide at any given time and thence the approximate correction to sounding or to the

charted heights of shore objects.

(e) candidates will be examined orally on the information given on a chart or plan, particularly about buoys, lights, depths and nature of bottom, contour lines, tides and tidal streams. Recognition of the coast. The intelligent use of Sailing Directions. Chart correction.

Practical Navigation

(a) To find the True Bearing of the Sun, and the deviation of the compass for the direction of the ship's head.

(b) To find the latitude by Meridian Altitude of the Sun.

(c) From an observation of the Sun near the meridian, to find the position line and the latitude through which it passes corresponding to a given longitude.

(d) To determine the position line and a position through which it passes from an observation of the Sun out of the meridian.

Elementary Ship Knowledge

(a) Elementary ideas on ship construction. The candidate will be expected to show his practical acquaintance with framing, shell plating, decks, watertight bulkhead, sounding pipes and air pipes.

(b) The meaning of the terms Displacement and Deadweight. Use of Displacement and Tonnes per inch scales to determine weights of cargo, etc., from draughts. Effect of density of water on draught. Fresh Water Allowance.

(c) A general understanding of Centre of Gravity and Centre of Buoyancy and the effect of adding or removing weights. The danger of slack ballast tanks.

(d) A knowledge of the Factory Act in so far as it applies to ship's requirements.

English Essay

This paper will be designed to test the candidate's ability to write clear and grammatical English with due attention to spelling, legibility and neatness. It will in no sense be a test of technical knowledge.

Oral

1-(a) A full knowledge of the content and application of the Regulations for Preventing Collisions at Sea. (Candidates will not be placed in the position of handling a sailing ship, but will be expected to recognize a sailing ship's lights and to have a knowledge of her possible maneuvers according to the direction of the wind.)
(b) Distress and pilot signals; penalties for misuse.
(c) British uniform system of buoyage.
(d) The use of the rocket apparatus.
(e) A knowledge of the U.K. Ministry's Book of Merchant Shipping Notices and the use of Admiralty Notices to Mariners.

2.(a) Marking of ordinary lead line and taking a cast.
(b) The use and upkeep of sounding appliances and logs.
(c) Use and care of engine room telegraphs.

(d) Coming to anchor, the use of two anchors. Mooring to buoys. Coming alongside and leaving a wharf. Entering and leaving a dock.

(e) Keeping an anchor watch. Dragging anchor.

(f) Care, maintenance and use of the life-saving appliances and fire appliances carried by a home trade ship.

(g) Management of boats under oars or sail and in heavy weather. Beaching or landing. Coming alongside.

3. The strength of ropes, including wire ropes. Power gained by purchases.

4. An elementary knowledge of cargo work, as given in the syllabus for First Mate.

5.-(a) To read and understand a barometer, thermometer and a hydrometer.

(b) To use a sextant for taking vertical and horizontal angles and to find the index error.

Signals

To send and receive signals in :

(a) British Semaphore up to eight words per minute.

(b) Morse code by flash lamp up to six words per minute.

(c) International Code of Signals

MASTER (HOME TRADE)

Chart Work and Pilotage

In addition to the syllabus for Mate (Home Trade), questions on the following may be asked either in the written or oral parts of this paper.

(a) Distance of sighting lights. distance of a point of land of known height.

(b) The use of bearings obtained by ship's Wireless Direction Finder and bearings given from a Shore Station. The use of Wireless Beacons.

(c) Candidates will be examined orally on the selection of suitable points for bearings, approaching an anchorage and entering narrow waters. The reliability of charts. The use of Lattice Charts.

Practical Navigation

This paper may include questions in the syllabus for Mate (Home Trade).

(a) To find the true bearing of any heavenly body and the deviation for the direction of the ship's head.

(b) To find the approximate time (to the nearest minute) of the meridian passage of a star. To find the latitude by Meridian Altitude of a star. Latitude by an observation of Polaris.

(c) From an observation of a star near the Meridian to find the position line and the latitude through which it passes corresponding to a given longitude.

(d) To determine the position line and a position through which it passes from an observation of a star out of the Meridian.

(e) Recognition of stars of the 1st magnitude by reference to the principal constellations.

Stability and Seaworthiness

(a) The meaning of Metacentre, Metacentric height, Initial Stability, Righting lever, Centre of Flotation, Moment to Change Trim.

(b) Determination of the Centre of Gravity of a ship in a new condition, the Centre of Gravity in the old condition being given. The effect on the position of the Centre of Gravity of adding, removing or shifting weights. Stiff and tender ships.

Effect of a shift of cargo or solid ballast. Cargoes liable to shift and precautions to be taken. Deck Cargoes. Ballasting. The danger of "free surface" of liquids (without proof or calculation).

(c) The use of stability curves and the data supplied to a ship.

(d) Simple trim problems.

(e) Damage affecting seaworthiness. Temporary repairs at sea or in port. Certificates of seaworthiness.

(f) A knowledge of the stowage required and precautions to be taken when carrying certain cargoes coastwise.

Compass Deviation

(a) A simple knowledge of the meaning of hard and soft iron. Simple ideas of the effect of hard iron, vertical soft iron and horizontal soft iron on the deviations of the compass. The means used to compensate for these effects with special reference to home trade ships.

(b) Care and maintenance of magnetic compasses. Siting of compasses with particular reference to the proximity of magnetic material and electrical appliances.
(c) To find the magnetic bearing of a distant object from compass bearings taken in equidistant points and to construct a table of deviations.

English

This paper will be designed to test the candidate's ability to write clear and grammatical English with due attention to spelling, legibility and neatness. It will in no sense be a test of technical knowledge. This paper may consist of an essay or an exercise in writing a letter or report.

Oral

1. Regulations for Preventing Collisions at Sea,etc. As paragraph 29 section 1(a), (b), (c) (Oral: Mate (Home Trade).
2-(a) Handling a ship in bad weather and when it is disabled.
(b) Preservation of crew and passengers in the event of wreck. abandoning a wrecked ship. Rockets and rocket apparatus. Communication with the shore.
(c) Assisting a vessel in distress. Rescuing the crew of a disabled ship.
(d) Effect of screws on the steering of a ship. Manoeuvering a ship in rivers and harbours.
3-(a) General knowledge of the requirements of the Merchant Shipping Acts relating to strandings, collisions or other casualties, reports to be made out in cases of death or injury, return of crew list, agreements and certificates of discharge.

(b) A shipmaster's knowledge of the law relating to loadline marks and entries and reports to be made respecting them.

(c) Entering and clearing a home trade ship.

4. Meteorology sufficient to understand the meaning of Weather Bulletins for Shipping (Coastal Areas). Visual and broadcast storm warnings.

5. The practical use of RADAR, DECCA and CONSOL.

Signals

1. To send and receive signals in :

(a) British Semaphore up to eight words per minute.

(b) Morse code by flash lamp up to six words per minute.

(c) International Code of Signals.

2. The practical use of shipborne W/T D/F.

MATE (OFFSHORE)

Navigation

Paper 1 - Candidates will be required -

(a) to use an Admiralty chart or plan and have a sound knowledge of the information to be derived from it, e.g., abbreviations, depth of water, nature of bottom, navigation lights and marks, variation therein and other relevant material.

(b) to set a course to steer from a position to any harbour or other position, being given the set and drift of the tide or current, the first position being fixed either by cross bearings or by plotting the courses and distances run from a previous position making allowances for a given tide or current.

(c) to take a bearing by compass, by using a card of deviation, convert it to a magnetic and thence to a true direction to lay on the chart.

Paper 2 - Candidates will be required -

(a) to find the latitude from an observation of the sun when on the meridian.

(b) to understand the difference between compass direction, magnetic direction and true direction.

(c) to find the deviation of the compass by the following methods-

(i) transit bearings,

(ii) bearing of the sun at noon and on rising or setting, and

(iii) approximately by bearing of the Pole Star.

Ship Knowledge

Candidates must -

(a) demonstrate practical acquaintance, of an elementary nature, with ship construction in so far as it relates to framing, shell plating, deck, watertight bulkheads, sounding pipes and air pipes.

(b) know what is meant by the terms, displacement and deadweight.

(c) know how to use displacement and tons per inch scales to determine weights of cargo, etc., from draughts of vessels.

(d) know the effect of density of water on draught.

(e) be able to make appropriate allowance for fresh water in proper case.

(f) have a general understanding of the terms, centre of gravity and centre of buoyancy, and in particular, the effect thereon of adding or removing weights, and the danger of slack ballast tanks.

Oral and Practical

Candidates must, in the oral and practical parts of examination under these regulations, understand and give satisfactory answers to questions on any of the following, that is to say -

(a) the use of the sextant and finding of index error,

(b) the use and reading of the Aneroid barometer,

(c) the marking and use of the lead line,

(d) the contents and application of the Collision Rules,

(e) life-saving and fire appliances required to be carried in vessels of Classes III and VII (A), including care and maintenance of lifeboats and their equipment, buoyant apparatus, inflatable liferafts, lifebuoys, life-jackets, line-throwing apparatus and fire appliances,

(f) the uniform system of buoyage and wreck marking system,
(g) the distress and pilot signals and penalties for misuse,
(h) the use of line-throwing apparatus in the event of stranding,
(i) the man overboard procedure,
(j) the rigging and use of a jury rudder,
(k) manoeuvering, getting under way, coming to anchor etc.,
(l) the requirements of the Merchant Shipping Act 1962 relating to strandings, collisions or other casualties,
(m) the definition of latitude, longitude, true altitude, zenith distance, and declination,
(n) other duties of a practical nature which a person in charge of an offshore vessel up to 100 tons is expected to know in the course of his work.

Signalling

Candidates must be able -
(a) to send and receive only in Morse and at the rate of not less than 4 words a minute,
(b) to recognise the flags of the International Code and know the meanings of the following single flag urgent and important signals, namely -
A, D, F, K, L, O, R, U, V.

MASTER (OFFSHORE)

Navigation

Candidates will be required -

(a) to find the latitude by meridian altitude of the sun.

(b) to find the deviation of the compass by time azimuth of the sun by means of tables, diagrams or any other method the candidate may select,

(c) to answer elementary questions in nautical astronomy dealing with solar meridianal observations, including the definitions of latitude, longitude, mean and apparent time, equation of time, dip, refraction, semi diameter, true altitude, zenith distance, declination, and polar distance.

Chartwork

Candidates will be required -

(a) to use a chart or plan and understand the meaning of all the signs, marks and abbreviations thereon,

(b) to find the compass course (or courses) and distance (or distances) between two positions on the chart,

(c) to find the ship's position by cross bearings of two objects, and the set and drift experienced,

(d) to find the ship's position from two bearings of the same object, the course and distance run between taking the bearings being given, making due allowance for given tide or current, and the distance of the ship from any given position at the time of taking the second bearing,

(e) to find on a chart or plan, the course to steer by compass in order to counteract the effect of a given tide or current, and find the distance the vessel will make good towards a given position in a given time.

(g) the Collision Rules with regard to both steamers and sailing vessels, their regulation lights and sound and fog signals,

(h) the use and management of the Rocket apparatus in the event of stranding,

(i) distress and pilot signals and penalties for their misuse,

(j) uniform system of buoyage and wreck marking system,

(k) local seamarks, lights, etc.,

(l) life-saving and fire appliances required to be carried in off-shore vessels, including care and maintenance of lifeboats and their equipment, buoyant apparatus and inflatable liferafts, lifebuoys, lifejackets, line throwing and fire appliances,

(m) any other duties of a Master (Off Shore) which he is expected to know and the examiner may ask.

Signalling

Candidates must be able -

(a) to send and receive Morse at the rate of not less than 4 words a minute,

(b) to send and receive Semaphore at the rate of not less than 6 words a minute,

(c) to recognise the flags of the International Code and to know their single letter meanings.

ANNEX 5

OND (FG) SYLLABUS

MARITIME ACADEMY OF NIGERIA, ORON
NAUTICAL STUDIES DEPARTMENT

COURSE DESCRIPTION

NS - 252: ECONOMIC GEOGRAPHY: (2-0-2)

The concept of Geography. The man. Cultivation and agriculture. Raw materials, Energy. Flow of trade by sea. Economic resources of oceans. Population, Inland transport: roads, rails, Inland waterways and air transportation. Influence of politics on trade. Common market and the European Economic Community (EEC) Economic Commission for Africa (ECA) and the Organisation of African Unity (OAU).

NS - 541: INTRODUCTION TO MARITIME LAW: (2-0-2):

Introduction to law. Introduction to Maritime Law. The ship and the persons of Maritime Law. Commercial exploitation of ships. Maritime contacts according to carriage of goods by sea. Carrier's responsibilities. Introduction to International Maritime Law. Introduction to International Maritime Conventions: Safety at seas, collisions at sea, loadline and pollution.

NS - 153: INTRODUCTION TO MARITIME TRANSPORT: (2-0-2):

Introduction. Trends in ship types. Cargoes. Maritime Canals. Passenger fares and freights rates. Liner Conferences Documentation. The Shipping Organisation. Ports, International Consignment. Political aspects of shipping. West African and African Shipping.

NS - 461: METEOROLOGY AND OCEANOGRAPHY: (3-2-4):

Composition of the atmosphere and its heat exchange processes. The meteorological elements and their measurements. Atmospheric conditions of stability, instability and turbulence. Air marses. Frontal and synoptic systems. Fog, mist and surface wind. Mean sea level presure and factors affecting it. Intro-

duction to Marine forecasting. Broadcasting of weather messages, radio signals and meteological codes. Radar as an aid to forecasting.

NS - 321: NAVAIDS AND INTRUMENT: (1) (2-2-3):

Magnetic Compass. The Earth's magnetic field, poles equator. Angle of Dip. Horizontal and Vertical components. Variation Modern Magnetic compass. Ship's Magnetism. Deviation, its cause and effect. Compass Adjustment Gyro compass: The free gyroscode and the controlled gyroscope. Tilt, drift and Precession. Control and damping. Correction of latitude, speed and course errors. Main types of gyro compass: Ship's Logs. Measurement of speed. The electromagnetic log. Other types of logs. Errors of ships log. Doppler speed log. Automatic Pilot: Block diagram. System and procedures. Practicals application.

NS - 421: NAVAIDS AND INSTRUMENTS: (II) (2-4-4):

Hyperbolic Navigation systems: Principles Decca Navigator, Loran, Omega; Statellite Navigation system. Radio Direction Finder:- Block diagram operation and applications. Radar:- Fundamental principles of operation. Plotting to determine C.P.A. time; speed and course of target.

NS - 341: BASIC ELECTRONICS: (1-2-2):

Electromagnetic wave: Properties; propagation. Sky waves and ground waves. Types of Antennas, Types of Modulation - AM. FM and SSB. Basic semi conductor theory, semi conductor diodes, Rectifiers, transistors. FET. Simple amplifier and oscillator circuits. Simple transmitter and Receiver.

ME - 412: ELEMENTS OF MARINE ENGINEERING: (2-0-2)

Elementary study od propulsion machinery Internal combustion engines, steam engines and turbines

Introduction to Marine Boilers; fire tubes, water tubes and auxiliary type. Fundamentals of different types of pumps, engine room systems and auxilliaries. Deck machinery and steering gear.

NS - 211: TERRESTRIAL NAVIGATION (1) (2-4-4):

a) Introduction to marine navigation

b) The earth and its coordinates

c) D. lat. D. long and Departure

d) Chart projections, mercator projection; gnomonic projection

e) Nautical charts

f) Compasses and compass errors, Direction measurements

g) The art of Dead reckoning

h) The art of fixing the ship by terrestrial objects

i) The application of current in the art of piloting

j) Handling and using of navigational publications.

NS - 311: TERRESTRIAL NAVIGATION (II) (2-2-3):

a) Introduction to the Sailing

b) Trigonometrical Solutions of rhumb line courses and distances by parallel, plane, traverse tables and mercator sailings.

c) Spherical trigonometrical solutions of courses and distances by great circle sailing.

d) The composite sailing

e) Introduction to tides and their courses

f) The tables.

g) Finding the time and height of tide

h) Finding the actual height and actual depth

i) Grounding and passing over shoals problems.

NS - 312: CELESTIAL NAVIGATION (I) (2-4-4-):

a) The celestial sphere and celestial coordinates

b) The apparent diurnal motion of C.B.S.

c) The apparent annual motion of the Sun.

d) The astronomical triangle and its solution. The application of PZX formulae for sailing particular astronomical problems.

e) The time and the chronometer

f) The solar system

g) The marine sextant and its errors

h) The sextant altitude corrections.

i) Rising and setting of C.B.S. Times of sun rise, sun set, twilight, moonrise and moon set.

j) Meridian passage of C.B.A. Thimes of upper and lower m.p. of C.B.S.

NS - 412: CELESTIAL NAVIGATION (II) (2-2-3):

a) Latitude by meridian altitude

b) Latitude by Polaris (Lat. from alt. of the Pole star)

c) The celestial position Line

d) The intercept Method

e) The ex-Maridian

f) Longitude by Chronometer

g) Simultenous sights

h) Double sights

i) Compass correction

j) Selection of star for sight

k) Sight Reduction Tables

NS - 131: SEAMANSHIP (I) (2-4-4):

Introduction to merchant navy, ship and ship's routine, ship's organization and nomenclature responsibilities of seamen, deck officers and engineers. Type of Merchant Ships. Features main parts, load lines, tonnage, draft, freeboard, bridge layout and deck machinery, Fire fighting on board ships, theory of combustion, fire [illegible] triangle type and sources of fires, fire fighting equipment, necessary precautions for fire prevention, different methods of fire fighting, safe working practices, life boats, life-rafts, survival at sea. Pollution prevention of marine environment.

NS - 231: SEAMANSHIP(II) (1-4-3):

Bridge layout, inter ship communication, deck equipment, stage gang way, bosun's chair, pilot ladder, rope work, knots and hitches, material strength of ropes, wires chains and their calculations, mooring lines of ship. Types of blocks and shackles power gained stress on the hauling part of tackles, anchor work, derrick work and fitting gears, preparation of heavy derrick, deck machines, steam and electric winch loss and capstan; helm steering order, steering gear, corrosion, maintenance, paint work, deck officers responsibilities and duties.

NS - 331: SEAMANSHIP (III) (2-2-3):

Ship handling, vessel turning circle, characteristic effect of propeller and rudder, wind and current, mooring, manoeuvering alongside and clearing berth. Mooring lines, special ship manoeuvers, shallow water effect, bank effect, securing to buoys, bad weather manoeuvers, emergency manoeuvers, deep sea towing, beaching and grounding. Drydocking, Abandon ship, [illegible] sailing boat and sailing terms, the international regulation for preventing collision at sea. Buoyage system, including those Annexes concerned with safe navigation. Knowledge of basic principles of observed in keeping a navigational watch.

NS - 242: SHIP CONSTRUCTION AND STABILITY: (2-2-3):

Dimensions and layouts of cargo ships, oil tankers and oil carriers, structural members. Shell and deck plating, framing system and methods of connection, bow and stern construction, bulk head, rudder, tanks hatches, piping systems, riveting and welding. Centre of gravity and centroids, stability of floating bodies and including experiment, tonnages, load lines, form coefficient

Simpson's rule, free surface effects, stability and hydrostatic curves, trim calculations, aid to stability.

NS - 344: CARGO WORK: (2-2-3):

Review of cargo gear, rigging and safety precaution, proper weight distribution, types of cargoes, stowage and care of cargo, ventilation theory and practice cargo documentations and damage reports, liquid bulk cargo, preparation for loading ballasting and de-ballasting, oil measurement, ullage volume and weight tanker cleaning and safety code, knowledge of pre-cautions to be observed to prevent pollution of marine environment.

GS. 212 (English II) 3

- Varieties of writing including prosod
- Composition and literature
- Report Writing
- Preparation and Presentation of Technical Papers, Theses and Dissertations
- Visual aids and illustrative material
- Mechanics of technical writing
- Summary Writing
- Oral Communication and speechwork
- Telegrams and telexes
- Advanced comprehension and Reading Techniques
- Technological information

GS. 313 (English III) 2

- Advanced Composition
- Advanced Comprehension
- IMO Standard Marine Navigational Vocabulary (Handbook and Tapes)
- Literature of the Maritime Industry

GS.414 (English IV) 2

Style in technical writing

Technical descriptions

- Instruction Manuals
- Explanation of a Technical Process
- Marine Engineering Literature and Terminology

GS. 123 (Physics I)

- Kinematics and dynamics of a particle
- Statics of a rigid body
- Dynamics of a rigid body
- Elasticity
- Frictions
- Heat and Introductory Thermodynamics
- Kinetic Theory of Gases
- Heat Transfer
- Electrostatics
- Current Electricity
- Electromagnetism
- Electromagnetic Induction
- Magnetic Fields due to conductors
- Magnetic Properties of Materials

GS. 224 (Physics II (N)) 4

- Theory of Wave Motion
- Accoustic Phenomena
- Geometrical and Physical Optics
- AC Circuits
- Electromagnetic Waves
- Electronics
- Themoionic Emission
- Waves
- Semiconductors
- Ionic Circuits
- Introductory to Applied Chemistry
- Marine Pollution and Prevention

GS. III (English I 2

- The need for effective communication
- The use of English as a language
- Origin and development of the English language
- The problems of English as a second language
- The use of the Dictionary
- Semantics
- Grammatical accuracy and sentence construction
- Parts of speech and their functions
- Participles
- Gerund
- Conditionals and other structures
- Common errors
- Idiom and construction
- Mechanics of writing
- Composition
- Letter Writing
- Comprehension

GS. 121 Mathematics I

- Definition of the limit of a function
- Theorems about limits
- Limits as applied to Areas
- Derivatives of algebraic functions
- FUNCTIONS: Polynomial, Rational and Inverse Functions.
- The Increment of a Function and its differential.
- Composite Functions
- L' Hospital's Rule
- Application of the derivatives in finding the MAXIMA and MINIMA and Inflection Points
- The Indefinite and Definite Integral
- Simple Application of Integration
- Complex Numbers
- Determinants and their Applications
- Analytic Geometry
- Graphs
- The Straight Line
- The Circle
- CONICS
- Introduction of Integration.

GS. 222 (Mathematics II) (N)

- Plane Trigonometry
- Review of Fundamental Definitions and Identities
- Solution of Plane Triangles
- Use of Nautical Tables
- Spherical Trigonometry: definition and fundamental theorems
- The spherical triangle
- Right angle and quadrantal triangles
- Use of Napier's Rule
- Solution of any spherical triangle
- Advanced Differentiation and Integration
- Differentials and their use in APPROXIMATIONS
- Small Errors Calculations