



IAMU 2012 Research Project
(No. 2012-5)

**Balancing vocational and academic
education: A global profiling of
maritime universities reviewed
by their curricula and instructor qualifications**

By

Regional Maritime University (RMU)

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International Association of Maritime Universities

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**By
Regional Maritime University (RMU)**

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Ghana

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Contents

1. Introduction	2
2. Methodology	2
2.1 Data collection template	2
2.2 Sample	3
2.3 Association of indicated subjects with STCW functions	4
2.4 Data entry and analysis	4
2.5 The notion of “density”	5
2.6 The Theoretical Ideal	6
3. Research findings	6
4. Discussions	9
4.1 Limitations	9
5. Conclusions and recommendations	10
5.1 Common MET curriculum for IAMU members	10
5.2 Future research	10
Appendix 1 – Template used for data collection	12
Appendix 2 – Institutional subject index linked to STCW functions	14

Balancing vocational and academic education: A global profiling of maritime universities reviewed by their curricula and instructor qualifications

Quality MET at maritime universities

Regional Maritime University In partnership with California Maritime Academy and World Maritime University

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Abstract: *The profile of lecturers and their qualifications is of vital importance in the delivery of an MET curriculum. Over the past decade or more, the original exclusive emphasis on vocational training for Certificates of Competency has been replaced with a trend towards University style education which goes beyond the acquisition of vocational skills to the development of inquiring minds via academic degrees. This research project was intended to explore the current situation with respect to the balance of vocational and academic qualifications in IAMU member institutions. It was found that there is still a substantial gap between the status quo and what could be considered the ideal where all lecturers on the programmes have the highest level academic degree and highest level certificates of competency. Also found was a substantial imbalance between males and females. An ideal balance of a ratio of one to one is still a utopian ideal..*

Keywords: *M.E.T., quality, global curriculum, instructor qualification*

¹The author held this position at the time of signing of the IAMU contract and up till April 30th 2013.

1. Introduction

The subject matter of this research effort was the profile of lecturers' qualifications and curricula used in the membership of the International Association of Maritime Universities (IAMU). Indisputably, these two (qualifications and curricula) are of vital importance in the delivery of a Maritime Education and Training (MET) curriculum. There is a trend where the original exclusive emphasis on vocational training for Certificates of Competency is being replaced by one that emphasises University style education which goes beyond the acquisition of vocational skills to the development of inquiring minds via academic degrees. This trend has many advantages, one of them being that the graduates of MET Institutions (METI) are more prepared for careers beyond working on ships, once that phase of their working life is over. However it has also been anecdotally suggested that this shift in emphasis compromises the quality of training that students receive in METI. This work did not seek to discuss the merits of the two sides of the debate, but only to profile the current situation via data collected from IAMU members. Data was received from eighteen (18) Institutions.

It had originally been intended to improve and empirically apply (as a benchmarking indicator) a mathematical model/tool developed by the researchers for assessing institutional capacity based on staff qualification and introduced in earlier IAMU conferences [1]. However this was not possible given the response rate to an earlier database [2] that would have contained the data in the appropriate form.

It also became evident that another intended objective of determining the spread of maritime educational infrastructure globally was not possible within the time-frame of the research.

The project achieved the following other objectives:

- Identifying the leaning of current Global MET curricula and human resource with respect to academic degrees or competency certification
- Presenting data that can enhance the possibility of global inter-university cooperation based on comparison to a theoretical ideal and individual institutional strengths in balancing academic and competency education
- By way of the presented data offering an opportunity for IAMU members to optimise MET management and policy formulation in the areas of curriculum structure/content and staff qualifications.

2. Methodology

2.1 Data collection template

After a number of discussions between the researchers and guided by previous research in the subject area, a template was designed as a data collection tool.

The data template used was intended to get data on the subject listings being taught in the membership of IAMU with respect to STCW-related degree programmes. The template is attached as Appendix 1. Ideally the data would have consisted of a list of subjects associated with a list of specific persons lecturing in the institutions and their qualifications. An early research attempt indicated that this data acquisition process would lead to a very low response rate that would not allow for analysis. The template in its current form was therefore developed for the purpose.

The research effort focused on qualifications of lecturers divided into competency qualifications and academic qualifications. For academic degrees the various options given were for academic degrees at the Doctoral, Masters and Bachelors levels. For competency qualifications the options were based on two of the Seafarers' Training, Certification and Watchkeeping (STCW) Code[3] levels of

responsibility as indicated in Part A of the Annex I of the Code i.e. management level and operational level evidenced by Certificates of Competency (CoC).

Data points required to be input into the template were the number of lecturers for each listed subjects across a range of highest level qualification and gender as follows:

Lecturers with:

- i. Academic degrees at the Doctoral level (no CoC)
- ii. Academic degrees at the Masters level (no CoC)
- iii. Academic degrees at the Bachelors level (no CoC)
- iv. CoC at the Management level (no academic degrees)
- v. CoC at the Operational level (no academic degrees)
- vi. Academic degrees at the Doctoral level and CoC at Management level
- vii. Academic degrees at the Doctoral level and CoC at Operational level
- viii. Academic degrees at the Masters level and CoC at Management level
- ix. Academic degrees at the Masters level and CoC at Operational level
- x. Academic degrees at the Bachelors level and CoC at Management level
- xi. Academic degrees at the Bachelors level and CoC at Operational level
- xii. Female lecturers
- xiii. Male lecturers

Notes were included in the template to serve as a guide to their filling. On a number of occasions, the researchers followed up on respondents for clarification of data.

2.2 Sample

Questionnaires were distributed to the membership of IAMU. Responses were obtained as indicated in Table 1, with data received from Africa, Asia, Europe, North America and South America².

Table 1: List of responding Institutions

1	Admiral Makarov State Maritime University
2	AMET University
3	California Maritime Academy
4	Dalian Maritime University
5	John B. Lacson Colleges Foundation – Bacolod
6	John B. Lacson Maritime University - Arevalo
7	John B. Lacson Maritime University – Molo
8	Maine Maritime Academy
9	Mexico – Escuela Nautica Mercante, Cap. Alt. Antonio Gomez Maqueo, Mazatlan
10	Mexico – Escuela Nautica Mercante, Cap. Alt. Luis Gonzaga Priego Gonzalez, Tampico
11	Mexico – Escuela Nautica Mercante “Cap. Alt. Fernando Siliceo y Torres” - Veracruz
12	Massachusetts Maritime Academy
13	Maritime Institute Willem Barentsz
14	Regional Maritime University
15	Shanghai Maritime University
16	SUNY Maritime College
17	Texas Maritime Academy
18	United States Merchant Marine Academy

² - Stephen Kreta (affiliated to California Maritime Academy) collected data from North and South America
 - Takeshi Nakazawa (affiliated to World Maritime University) collected data from Asia, Australia and parts of Europe
 - Michael Manuel (affiliated to Regional Maritime University) collected data from Africa and parts of Europe

In some cases the data returned (especially with regard to subject offerings) was surprisingly limited in content. Further feedback confirmed that this was the data the Institution concerned considered relevant and that there were no errors.

2.3 Association of indicated subjects with STCW functions

The STCW Code sets out seven (7) functions under which the competency abilities required by the Standards of Training, Certification and Watchkeeping (STCW) Convention as amended[3] may be grouped. The functions are:

1. Function 1 (F1) – Navigation
2. Function 2 (F2) – Cargo handling and stowage
3. Function 3 (F3) – Controlling the operation of the ship and care for persons on board
4. Function 4 (F4) – Marine engineering
5. Function 5 (F5) – Electrical, electronic and control engineering
6. Function 6 (F6) – Maintenance and repair
7. Function 7 (F7) – Radio communications

The listed subjects from the Institutions were linked to these seven (7) functions indicated in Part A of the Annex of the STCW Code. These linkages were done subjectively with reference to some subject area experts. Subjects that were determined as not relating directly to the STCW functions were grouped under *Non-STCW* (NS) and those for which no determination could be made under *Not Determined* (ND)

2.4 Data entry and analysis

Data entry and analysis were undertaken using Microsoft Excel 2007. Based on the determinations of the most appropriate STCW Function for each subject, aggregations of all the qualifications indicated against the respective subject/functions were then found and graphical representations generated to give a readily accessible format for interrogation, comparison and discussion. The graph points are abbreviations of the name of the Institution followed by the function number e.g. Admiral Makarov State Maritime University is coded as AMF1 for function 1 and AMF2 for function 2 etc. The final total aggregation for all the Institutions is coded as TF1 etc. while a theoretical ideal is coded as TIF1 etc. (see table 2).

Similarly the various qualifications were coded as indicated in table 2.

Table 2: Coding used in graphs

F1	STCW function F1
F2	STCW function F2
F3	STCW function F3
F4	STCW function F4
F5	STCW function F5
F6	STCW function F6
F7	STCW function F7
NS	Non-STCW
ND	Not determined
AMF1	Admiral Makarov for STCW function F1 etc.
AUF1	AMET University for STCW function F1 etc.
CMAF1	California Maritime Academy for STCW function F1 etc.
DMUF1	Dalian Maritime University for STCW function F1 etc.
JBBacF1	J. B. Lacson Colleges Foundation (Bacolod) for STCW function F1 etc.
JBLMUF1	J. B. Lacson Maritime University (Arevalo) for STCW function F1 etc.
JBLMUMF1	J. B. Lacson Maritime University (Molo) for STCW function F1 etc.
MMAF1	Maine Maritime Academy for STCW function F1 etc.
MENMF1	Mexico – Escuela Nautica Mercante (Mazatlan) for STCW function F1 etc.
MENTF1	Mexico – Escuela Nautica Mercante (Tampico) for STCW function F1 etc.
MENVF1	Mexico – Escuela Nautica Mercante (Veracruz) for STCW function F1 etc.
MsMAF1	Massachusetts Maritime Academy for STCW function F1 etc.
MIWBF1	Maritime Institute Willem Barentsz for STCW function F1 etc.
RMUF1	Regional Maritime University for STCW function F1 etc.
SMUF1	Shanghai Maritime University for STCW function F1 etc.
SUNYF1	SUNY Maritime College for STCW function F1 etc.
TMAF1	Texas Maritime Academy for STCW function F1 etc.
USMMAF1	US Merchant Marine Academy for STCW function F1 etc.
B	Bachelors level no CoC
cocM	Management level CoC with no academic degree
cocO	Operational level CoC with no academic degree
DcocM	Doctorate level with CoC at Management level
DcocO	Doctorate level with CoC at Operational level
McocM	Masters level with CoC at Management level
McocO	Masters level with CoC at Operational level
BcocM	Bachelors level with CoC at Management level
BcocO	Bachelors level with CoC at Operational level

2.5 The notion of “density”

The template used in the research work allows for the aggregation of data regarding lecturer qualifications and subject areas. The numbers generated are **not discrete** as a particular lecturer in any institution could be listed a number of times for different subjects. This aggregation of numbers (per qualifications) has been termed “density” in this work and is the quantification of all the various qualifications of all the subjects as they relate to the STCW functions. The graphs are reflective of

these “densities” plotted against the STCW functions and the *non-STCW* and *not determined* categories.

2.6 The Theoretical Ideal

Competency training is ideally about the development of practical skills while standard university education is about the development of an inquiring mind to challenge the status quo and thereby bring progress in any given society via research. Based on this premise, maritime education that combines competency and academic qualifications in a University setting may be argued to be ideal when the deliverers of the curriculum have the highest level qualifications in both domains. This would be illustrated by figure as shown in figure 1.

Furthermore, an ideal with respect to the “gender” category would be fifty per cent for each of the categories male and female, again as indicated in figure 1.

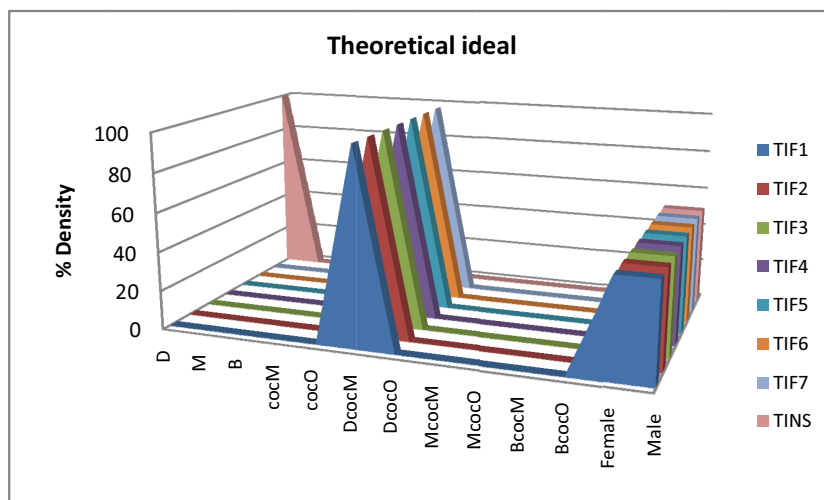


Figure 1: Theoretical ideal of “density” for lecturers per STCW Functions

3. Research findings

The research indicates that there is still a large gap between what could be considered ideal in a Maritime University in terms of lecturer qualifications and the status quo. While there are some gaps between the conditions of the various Institutions (see Appendix 2) the aggregation shown in figures 2 and 3 indicate that globally there is a significant gap between the status quo and what could be argued to be ideal as indicated in figure 1.

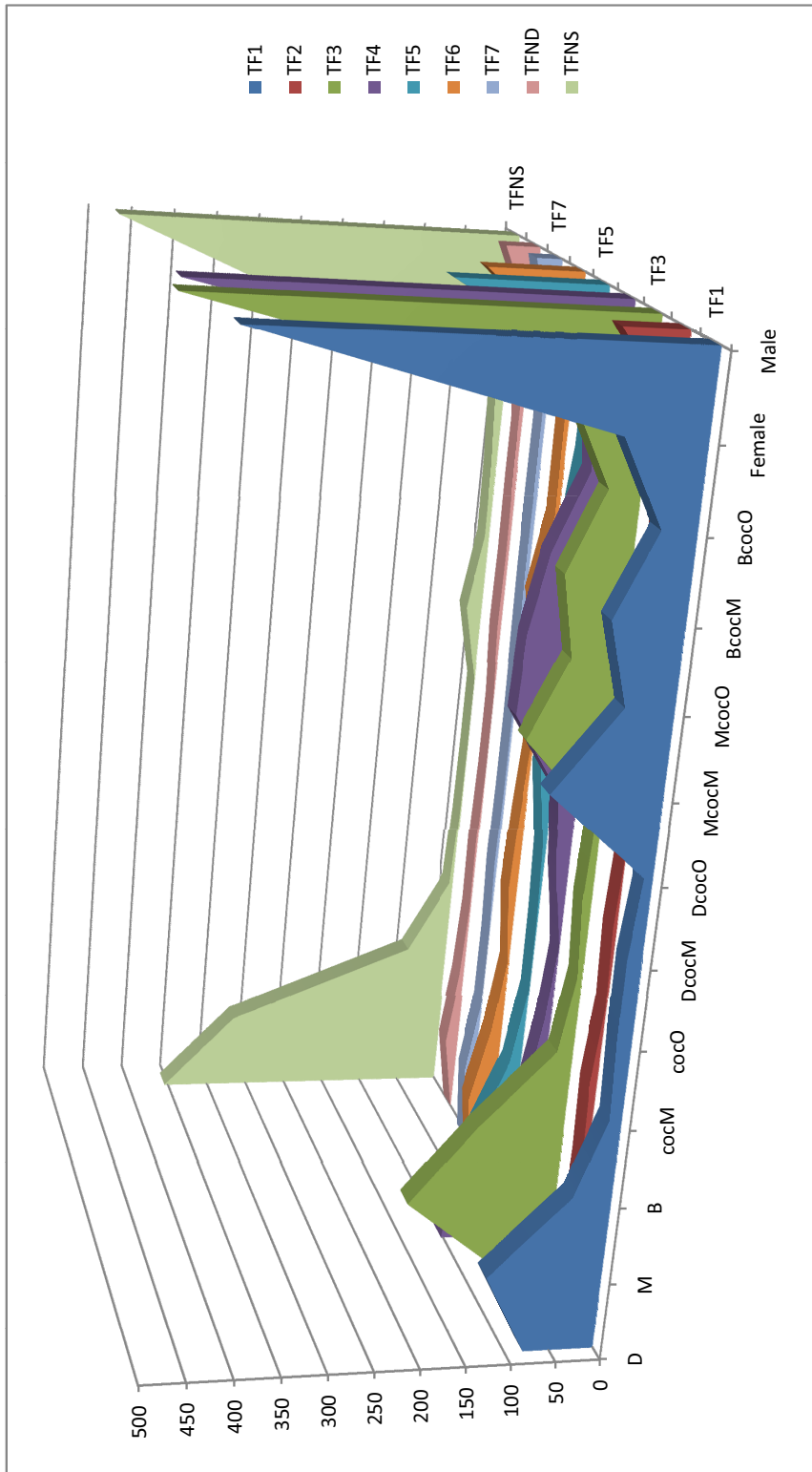


Figure 2: Aggregation of all data

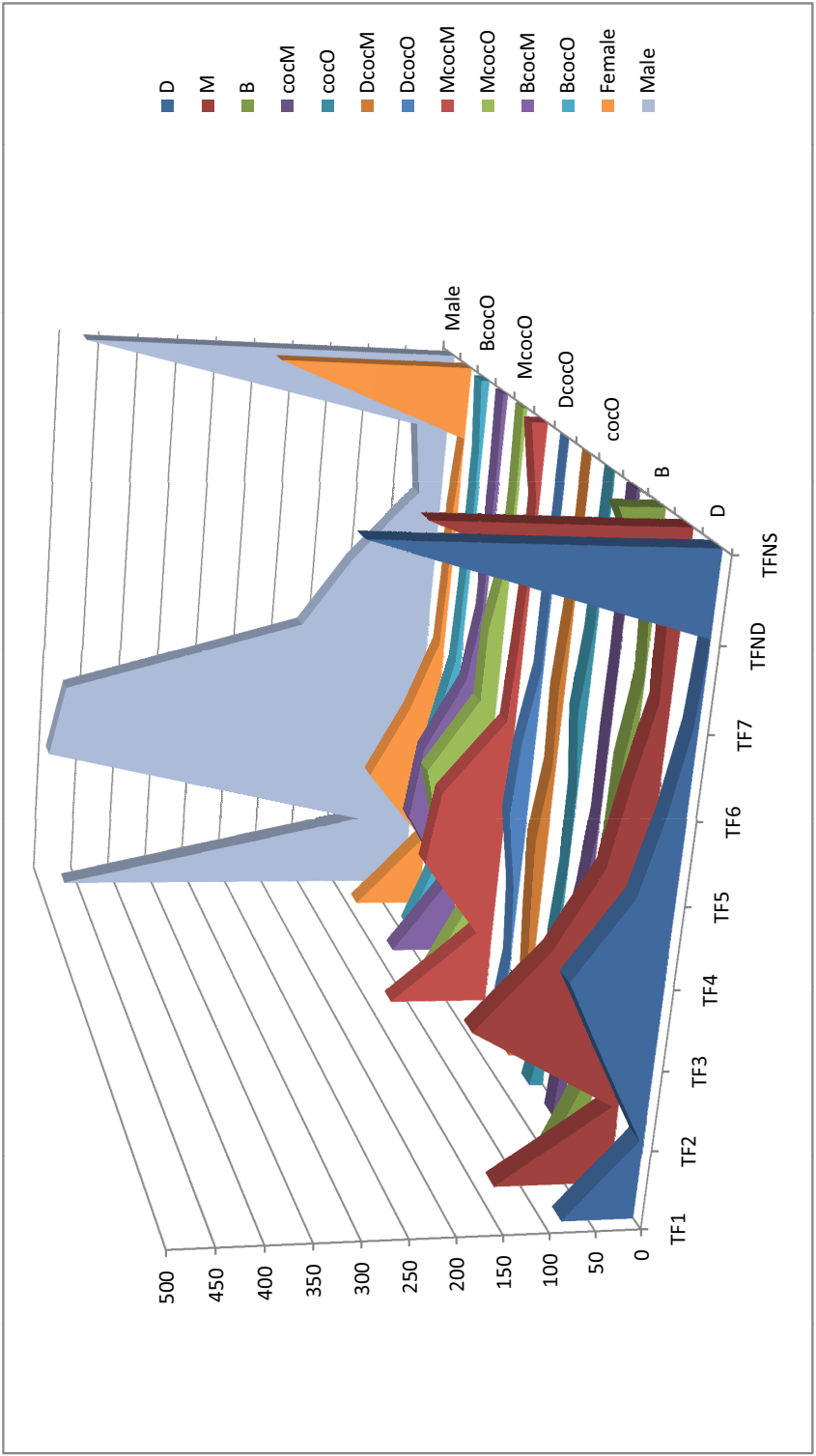


Figure 3: Aggregation of all data (data switched for perspective)

4. Discussions

The following are noteworthy:

1. Most people with Doctoral qualifications and no certificates of competency lecture on non-STCW subjects
2. Similar to Doctoral qualifications with no CoC, Masters level academic degrees with no CoC are more concentrated on non-STCW subjects.
3. Functions 3 and 4 appear to have the highest level of high academic qualification (with no CoC) associated with them.
4. Where there are CoC holders with academic degrees, there is a leaning towards qualifications of Masters level and Management level CoC, with functions 1, 3 and 4 showing the highest “density” of this mix.
5. In keeping with all other gender studies in the maritime industry [4, 5], there is a significant gap between the gender “densities” with the male gender dominating.
6. The rarest qualification mix was that of Doctoral level academic degree and Management level certificate of competency. Having this level of qualification on all subjects/functions is obviously the ideal but given the current supply/demand balance of ship officers [6, 7], perhaps the ideal situation will not be globally attainable in the short to medium term.
7. The results show a very low density in the use of faculty with either only Bachelor level qualifications or only Operational level CoC. However there is still a significant reliance on Bachelor level qualifications combined with CoCs at Management or Operational level. This must obviously be because of the shortage of human resource at the requisite qualification levels. Nevertheless it is an observation that does not align to the goals of enhanced MET.

The data required to use the mathematical tool developed earlier by Manuel & Nakazawa [1], needs a consistent updating of a database into which the Maritime Universities (members of IAMU) will input specific data. This effort could be merged with the Human Resource data base which was the outcome of a funded project by the IAMU[2].

The current research was able to give an indication of the bias of academic versus competency-based qualifications in the Maritime Universities in the sample. Also indicated is a compilation of the subjects being taught and the dispersion in terminology and nomenclature for the curriculum. Data presented enhances the possibility of inter-university cooperation based on a comparison to the theoretical ideal (shown in figure 1) and individual institutional strengths (see Appendix 2) in balancing academic and competency education. The presented data also offers directions for the IAMU membership in optimising management, recruitment and policy formulation in regards to curriculum structure/content and staff qualifications.

4.1 Limitations

For such a global study, quality of the data remains an issue. Optimum processes of data checking and screening were limited to follow-up contacts and clarifications by email and/or phone. As a result the data is used as presented by the various respondents and premised on the assumption that all the data provided is indeed reflective of the status quo in the various Institutions.

The numbers on which the analysis is based are not discrete numbers i.e. they do not directly reflect the number of individual lecturers the Institutions employ. They rather represent an aggregation of qualifications of lecturers teaching on specific subjects across programmes offered. These aggregations are further (subjectively) placed under an STCW Function. In this work, the term “density” has been chosen to signify the meaning of these numbers. The greatest difficulty/limitation was in subjectively ascribing the STCW Code Functions to the different subjects on the basis of name

of the subject. The time frame of the research and restrictions on the researchers could not allow for a content analysis of the various curricula vis-à-vis the requirements of the STCW Code. Under the circumstances it is felt that there is no significant departure from the Code's functions and that the results/findings reflect in a generic way the profile of the membership of the IAMU (as sampled) in terms of lecturer qualifications and curricula.

The concept of "density" is new and has not been previously presented in literature on the topic. This concept is however intuitively and logically defensible and allows for the accessible graphic presentation of the aggregation of qualifications in the Institutions.

5. Conclusions and recommendations

The research suggests that globally, not enough Certificate of Competency holders are making the transition to the education and training environment in time to gain the necessary academic qualifications for service in METI.

5.1 Common MET curriculum for IAMU members

In light of the disparity between the Institutions, it may be worth debating in the IAMU forum whether there is a place for a common curriculum across the membership of IAMU which is directly linked to the STCW requirements. There will certainly be challenges (not least the goals of each specific jurisdiction with respect to MET), merits and demerits of such an idea, but at the minimum it is worthy of research and debate.

5.2 Future research

In the event that the database mentioned in 5.1 can be sufficiently populated by the IAMU membership, this will provide a data source which will not only be reliable and valid but will also allow for extensive research into the subject matter that forms the goals of IAMU.

Future research could also explore whether CoC holders with Academic Degrees have those degrees in their area of lecturing.

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Appendix 1 – Template used for data collection

Name of Institution: XYZ Maritime University Location: City, Country Established: dd/mm/yyyy																		
PROGRAMME (1)	SUBJECTS (2)	FACULTY PROFILE (3)																
		Academic Degrees (with no COCs) (4)			Certificates of Competence (with no academic degrees) (5)		Academic Degrees WITH Certificates of Competence (6)					Gender (7)						
		No. with PhD (A)	No. with Masters (MSc. etc) (B)	No. with Bachelor (BSc.,etc.) (C)	No. with COC mgmt level (D)	No. of COC ops level (E)	PhD & COC Mgmt level (F)	PhD & COC Ops level (G)	Masters degree & COC Mgmt level (H)	Masters degree & COC Ops level (I)	Bachelor & COC Mgmt level (J)	Bachelor & COC Ops level (K)	No. female (L)	No. male (M)				

See notes on next page

Notes:

Column 1 – PROGRAMME(FOR SHIP OFFICERS) – In this column list the names of the programmes being offered in the Institution for students who will work at sea as ship officers e.g. BSc. Nautical Science

Column 2 – Subjects – In this column please list the specific names of the subjects being offered in the listed programme e.g. the BSc Nautical Science subjects like Navigation, Cargo Work, Meteorology etc. The subjects listed are indicative only (examples). Expand the table as necessary with input specific to the Institution and programme.

Column 3 – Faculty Profile – In the sub-columns under this title, please put the number of people with the criteria indicated who are lecturing on the specific subject

e.g. Mr. Smith lectures Navigation Systems in the BSc Nautical Science Programme. If Mr. Smith has a PhD with no COC, count 1 in the Navigations Systems row under PhD (column A) and under male (column M).

If Capt. Tango is a male Master Mariner with no academic degrees count 1 under COC management (column D) and under male (column M) in the Navigation Systems row.

If Mrs. Alpha has both a PhD and a COC at the management level, count 1 under column F and Column L in the Navigation Systems row

Column 4 is for counting individuals with **academic degrees and no COCs**.

For **Column 4 (sub-columns A, B and C)** please count the highest level academic qualifications for each individual. For example if Mr Smith has a Masters degree and a PhD count him as a PhD holder and not as an MSc.

Column 5 is for counting individuals **with COCs and no academic degrees**

For **Column 5 (sub-columns D and E)**, please count the highest level COC for each individual. For example if Capt. Smith has a Master Mariner certificate count him under COC management level and do not count him under COC operational level

For Column 6 (sub-columns F-K), please count individuals as specified. For each individual use the highest level academic degree or highest level COC to count

Column L and M – Gender – please count gender as indicated

If there are academic staff members with unique qualifications not covered by table above, please indicate on a separate sheet the numbers of such staff and the nature of the qualifications

For further details and clarifications, please contact:

- **michael.manuel@rmu.edu.gh OR**
- **tn@wmu.se OR**
- **skreta@csum.edu**

Appendix 2 – Institutional subject index linked to STCW functions³

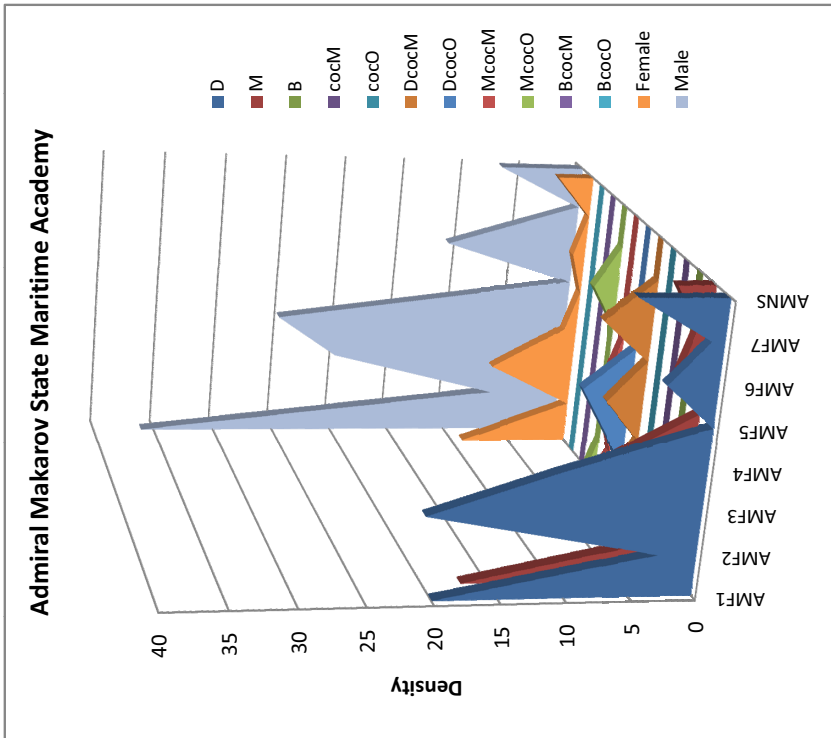
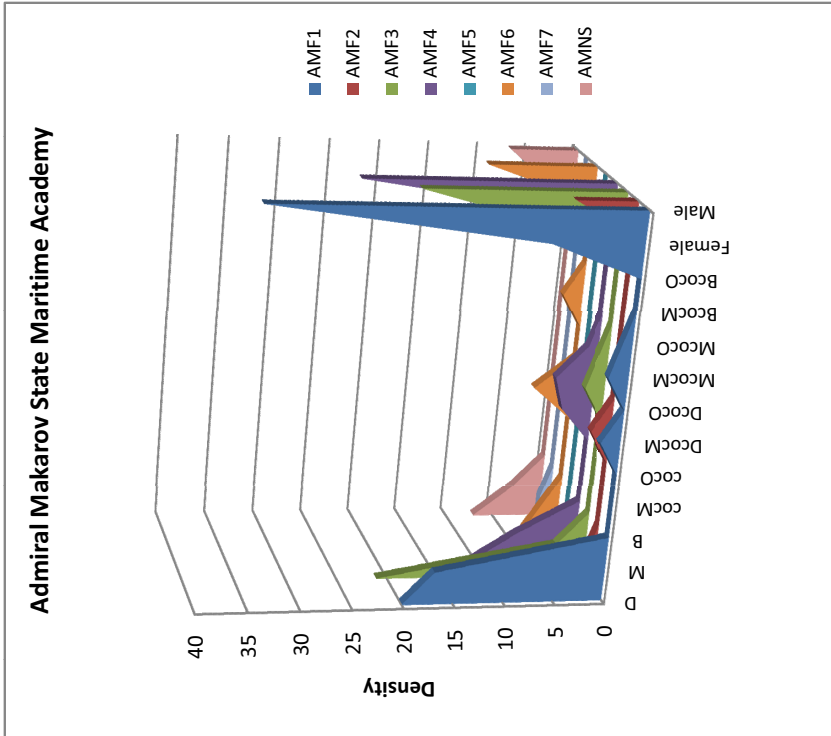
Page Guide

Admiral Makarov State Maritime Academy	15
AMET University	17
California Maritime Academy	19
Dalian Maritime University	21
John B. Lacson Colleges Foundation - Bacolod	23
John B. Lacson Maritime University - Arevalo	25
John B. Lacson Maritime University - Molo	27
Maine Maritime Academy	29
Mexico – Escuela Nautica Mercante “Cap. Alt. Antonio Gomez Maqueo” - Mazatlan	31
Mexico – Escuela Nautica Mercante “Cap. Alt. Luis Gonzaga Priego Gonzalez” - Tampico.....	33
Mexico – Escuela Nautica Mercante “Cap. Alt. Fernando Siliceo y Torres” - Veracruz.....	35
Massachusetts Maritime Academy.....	37
Maritime Institute Willem Barentsz.....	39
Regional Maritime University.....	41
Shanghai Maritime University	43
SUNY Maritime College	45
Texas Maritime Academy	49
United States Merchant Marine Academy	51

³The determination of the related STCW functions is subjectively done by the researchers

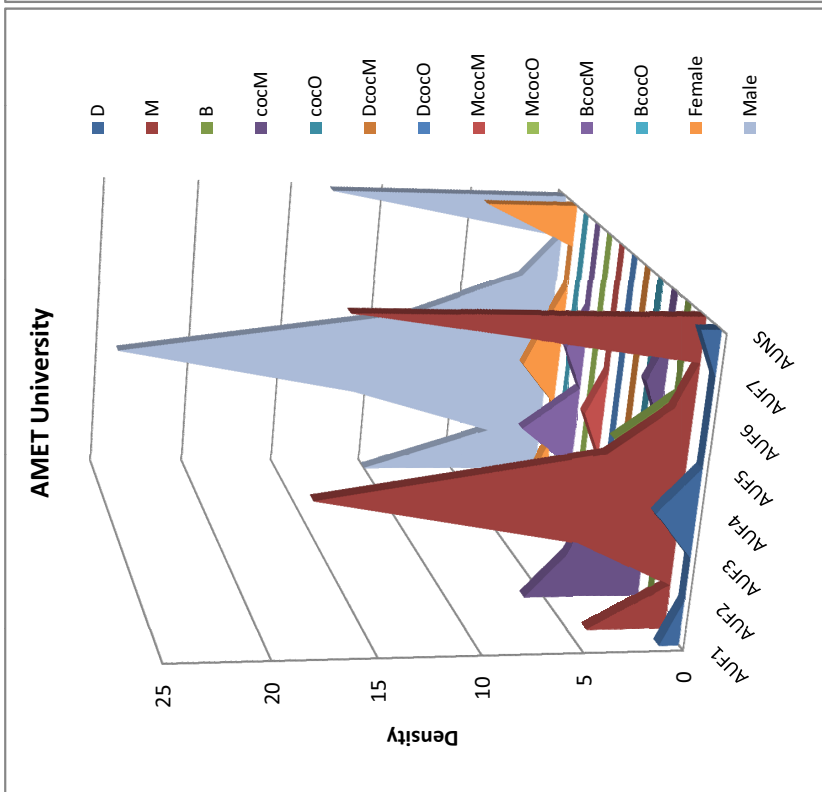
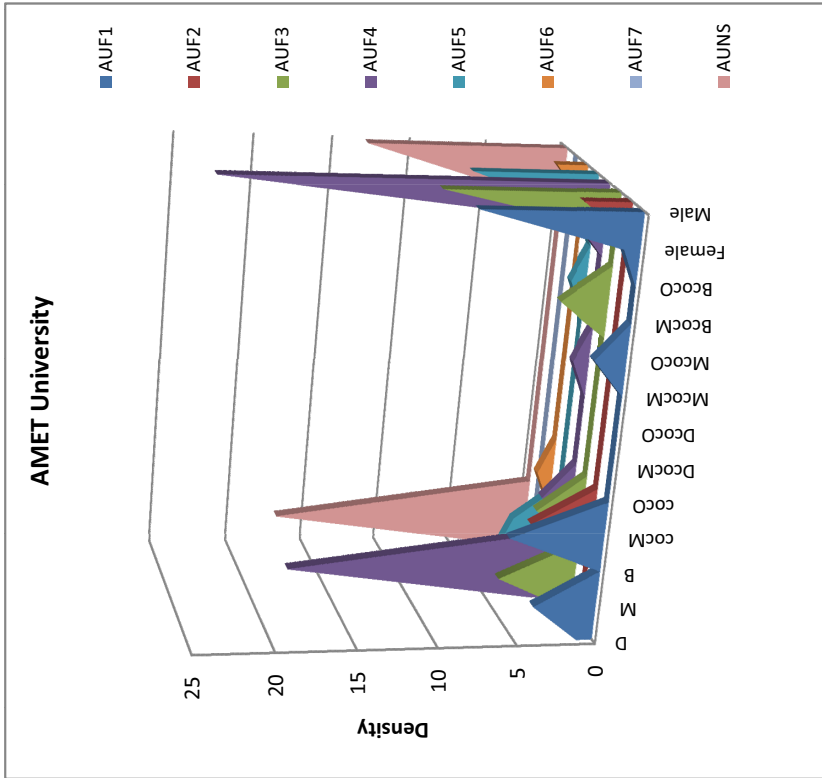
Bachelors degree in Nautical Science					
<i>SN</i>	Subject	Function	<i>SN</i>	Subject	Function
1	Navigation (including celestial navigation)	F1	9	Safety of cargo transportation	F2
2	Mathematical fundamentals of navigation	F1	10	Technology of cargo transportation	F2
3	Automation of navigation	F1	11	Naval architecture	F3
4	Technical aids to navigation	F1	12	Maritime law	F3
5	Manoeuvring and ship handling	F1	13	Risk assessment	F3
6	Collision avoidance	F1	14	Radio and telecommunications	F7
7	Hydrometeorology	F1	15	Geography of waterways	NS
8	English	F1	16	Economics	NS
			17	Professional psychology	NS
Bachelors degree in Marine Engineering					
1	Naval architecture	F3	12	Electrical equipment of ships	F4
2	Safety at sea	F3	13	Automatics and control systems	F4
3	Hydrodynamics	F3	14	Ship's systems and their operation	F4
4	Naval medical training	F3	15	Ship's power plants	F4
5	Thermodynamics	F4	16	Electrical engineering	F5
6	Mechanics	F4	17	Materials science	F6
7	Ship's internal combustion engines	F4	18	Metrology and standardization	F6
8	Ship's turbines	F4	19	Reliability theory and diagnostics	F6
9	Ship's boilers and steam-raising units	F4	20	Maintenance and repair of ships	F6
10	Ship's refrigerating machines and air-conditioning systems	F4	21	Technical safety of ships	F6
11	Ship's ancillary systems	F4	22	Descriptive geometry	NS

Admiral Makarov
State Maritime
Academy
(1876)



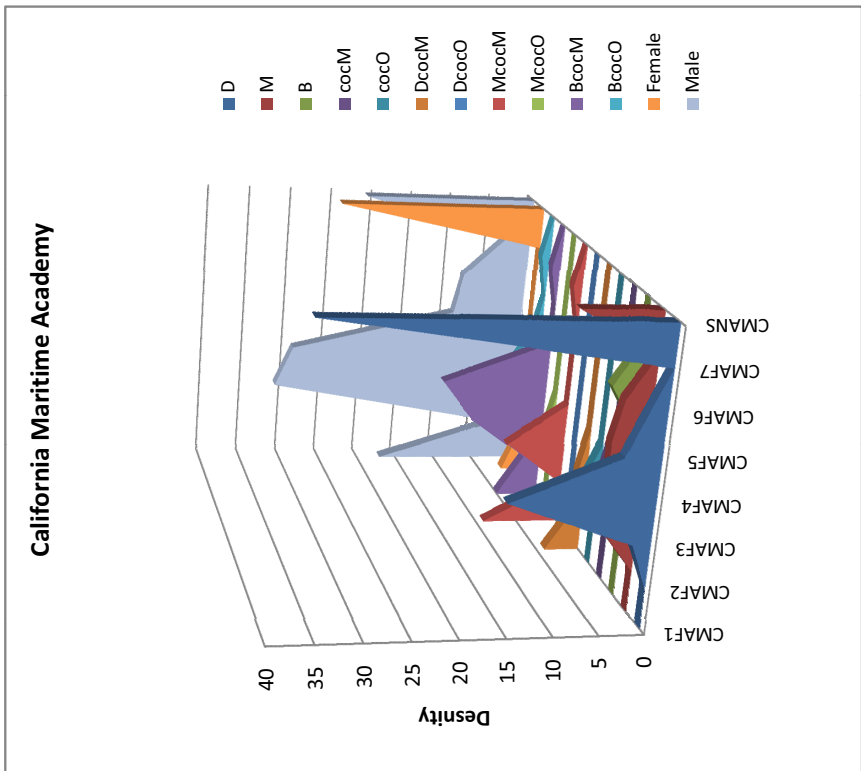
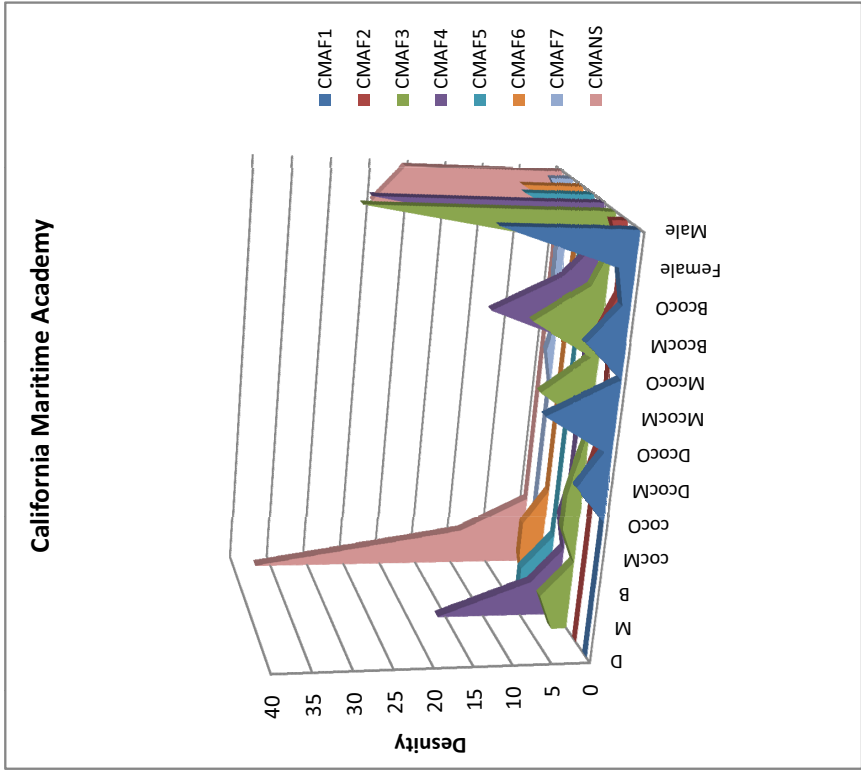
BSc. Nautical Science					
SN	Subject	Function	SN	Subject	Function
1	English	F1	12	Marine management	F3
2	Navigation I	F1	13	Marine engineering	F4
3	Chart work and collision regulations I	F1	14	Control systems III	F5
4	Navigation II	F1	15	Maths I	NS
5	Navigation III	F1	16	Physics I	NS
6	Ship operation technology I	F2	17	Physics lab	NS
7	Ship operation technology II	F2	18	Computer programming and utilities	NS
8	Ship operation technology IV	F2	19	Maths III	NS
9	Ship construction II	F3	20	Chemistry	NS
10	Maritime law I	F3	21	Environmental science	NS
11	Maritime commerce	F3	22	Marine carpentry	NS
BSc. Marine Engineering					
1	Afloat training	F3	15	Engineering marine equipment drawing I	F4
2	Basic ship structure	F3	16	Marine auxiliary machinery I	F4
3	Naval architecture	F3	17	Marine internal combustion engines II	F4
4	Basic fire fighting lab	F3	18	Fuel and lubrication technology	F4
5	Engineering mechanics I	F4	19	Marine electrical control and automation	F5
6	Engineering chemistry	F4	20	Instrumentation and control	F5
7	Technical English I	F4	21	Marine electrical technology	F5
8	Mechanics of machines	F4	22	Basic electronics lab	F5
9	Engineering mathematics I	F4	23	Basic electrical engineering lab	F5
10	Engineering drawing I	F4	24	Basic electronics	F5
11	Thermal engineering II	F4	25	Pneumatics, hydraulics and electrical control systems	F5
12	Engineering physics	F4	26	Advanced workshop practice	F6
13	Refrigeration and air-conditioning lab	F4	27	Material science	F6
14	Marine refrigeration and air-conditioning	F4	28	Computer basics and utilities	NS

AMET University
(1993)



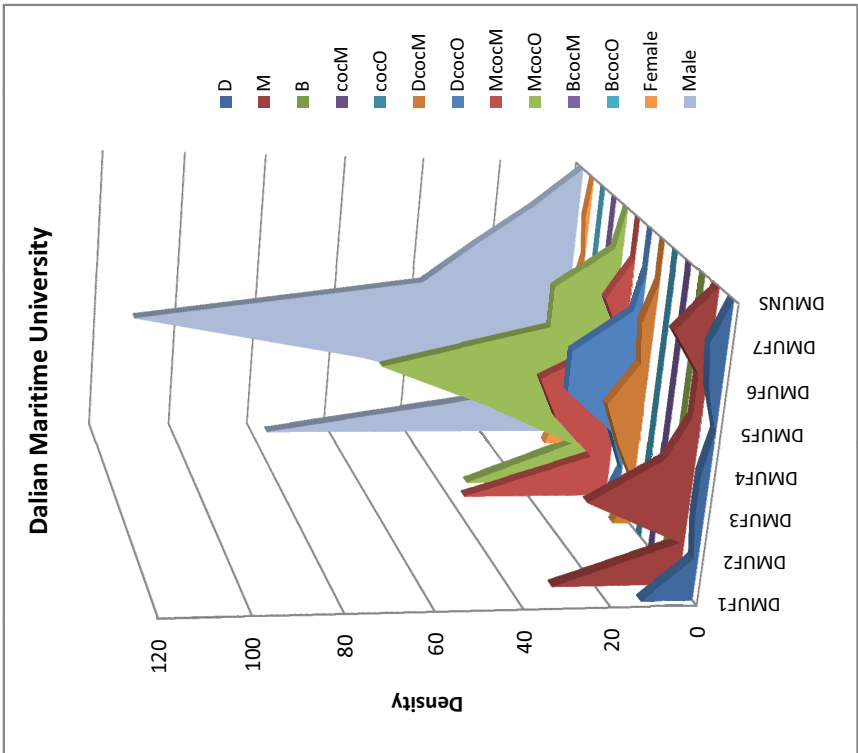
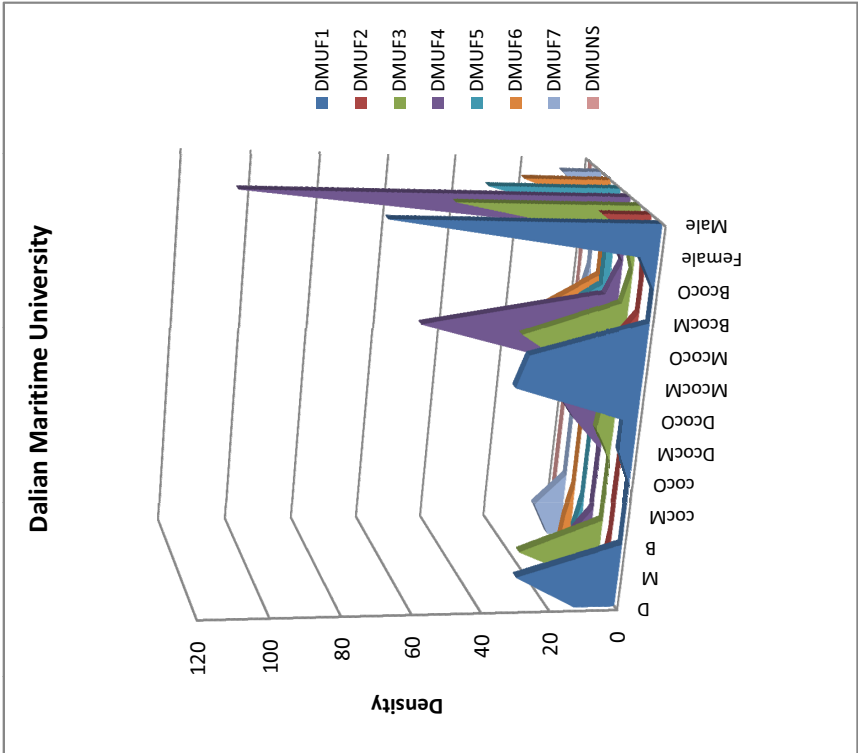
BSc. Nautical Science									
S/N	Subject	Function	S/N	Subject	Function	S/N	Subject	Function	Function
1	ECDIS	F1	11	LifeBoat	F3	21	Critical Thinking		NS
2	Meteorology	F1	12	Management	F3	22	Economics		NS
3	Navigation - Celestial	F1	13	Medical	F3	23	English Composition (placed under Humanities)		NS
4	Navigation - Terrestrial	F1	14	Seamanship	F3	24	Ethics		NS
5	RADAR	F1	15	Ship Construction (Structure)	F3	25	Literature		NS
6	Rules of the Road	F1	16	Ship Stability	F3	26	Physics		NS
7	Simulation	F1	17	Small Craft ops	F3	27	SS Electives		NS
8	Cargo Vessel Operations	F2	18	Engineering	F4	28	US Government		NS
9	Tank Vessel Operations	F2	19	GMDSS	F7	29	US History		NS
10	Law	F3	20	Chemistry	NS				
BSc. Marine Engineering									
1	Firefighting	F3	12	Simulation	F4	23	Materials (Properties)		F6
2	LifeBoat (BST)	F3	13	Simulation - Diesel	F4	24	Materials (Strengths)		F6
3	Medical	F3	14	Simulation - Steam	F4	25	Welding		F6
4	Naval Architecture	F3	15	Statics	F4	26	Chemistry		NS
5	Boilers	F4	16	Thermodynamics	F4	27	Critical Thinking		NS
6	Diesel Engineering	F4	17	Turbines	F4	28	English Composition (placed under Humanities)		NS
7	Dynamics	F4	18	Automation	F5	29	Ethics		NS
8	Fluid Mechanics	F4	19	Controls	F5	30	Literature		NS
9	Machinery	F4	20	Electricity	F5	31	Physics		NS
10	Plant Operations	F4	21	Electronics	F5	32	SS Electives		NS
11	Refrigeration and HVAC	F4	22	Machining	F6	33	US Government		NS
						34	US History		NS

California
Maritime
Academy
(1927)



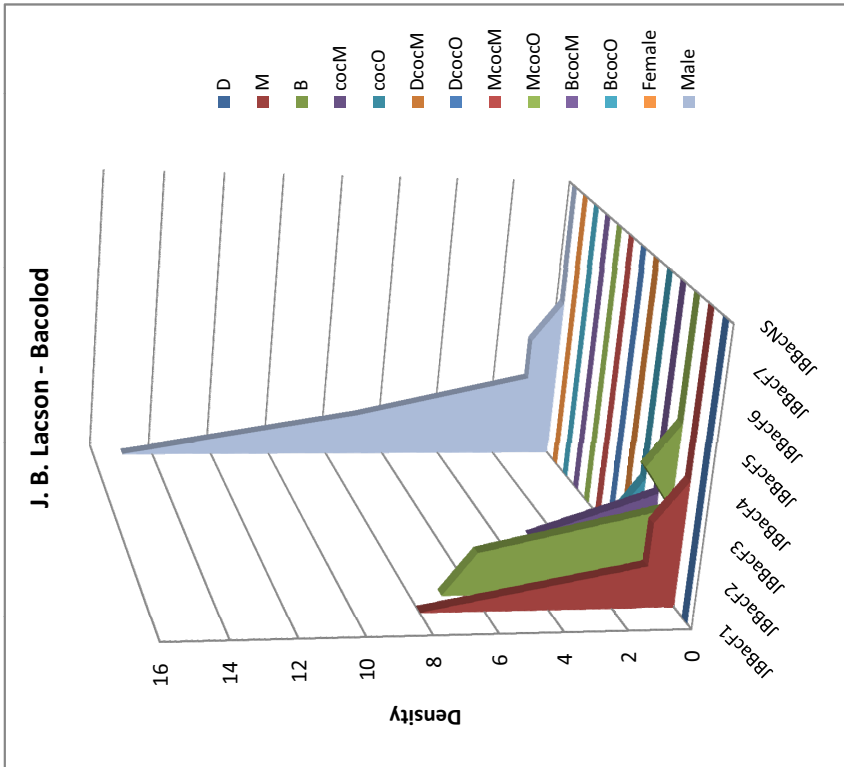
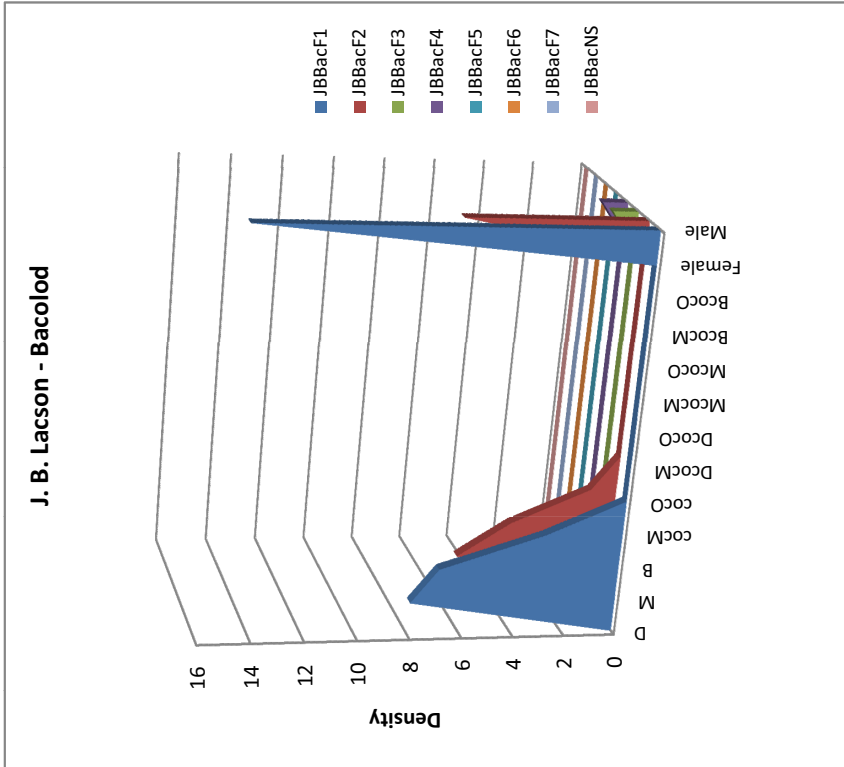
BSc. Nautical Science		
SN	Subject	Function
1	Collision Avoidance	F1
2	Marine meteorology	F1
3	Maritime English for Nautical studies	F1
4	Navigation	F1
5	Navigational Instrument	F1
6	Cargo work	F2
7	Safety and management	F3
8	Ship's structure and equipment	F3
9	GMDSS	F7
BSc. Marine Engineering		
1	Ship management	F3
2	Fundamental knowledge for marine engineering	F4
3	Marine auxiliary	F4
4	Maritime English for Marine Engineering	F4
5	Power plant for main propulsion	F4
6	Ship electrical and automation	F5
7	Ship's maintenance and repair	F6

**Dalian Maritime
University
(1909)**



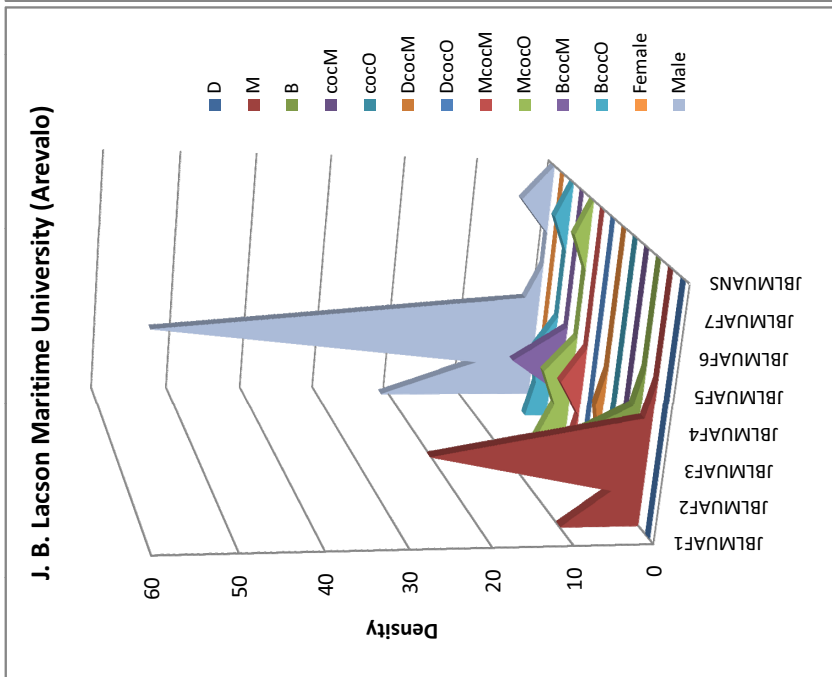
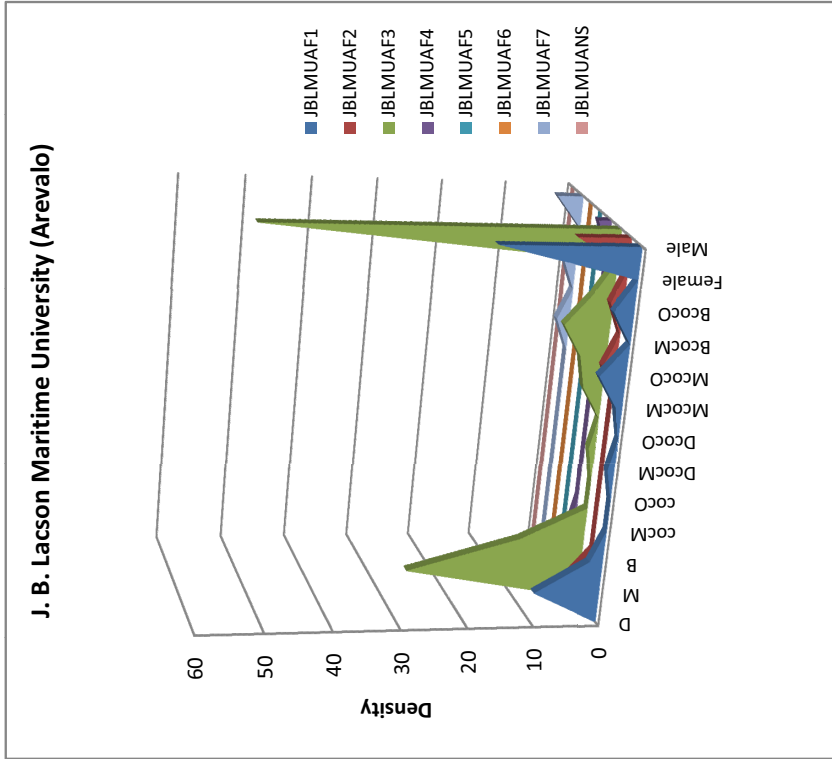
BSc. Nautical Science		
SN	Subject	Function
1	Navigation Systems	F1
2	Cargo Handling	F2
3	Economics	NS
BSc. Marine Engineering		
1	Naval Architecture	F3
2	Thermodynamics	F4

**John B. Lacson Colleges
Foundation - Bacolod
(1976)**



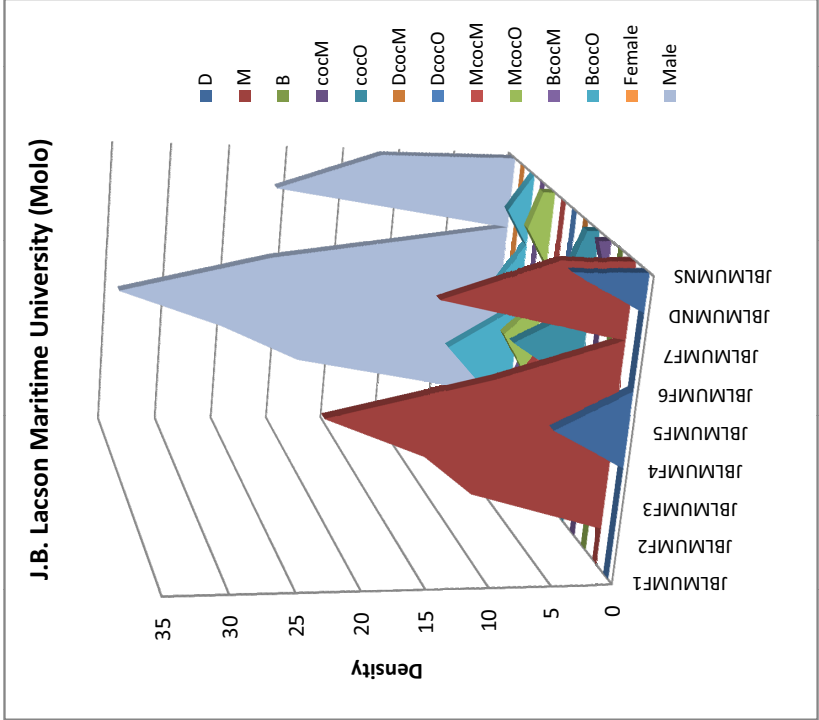
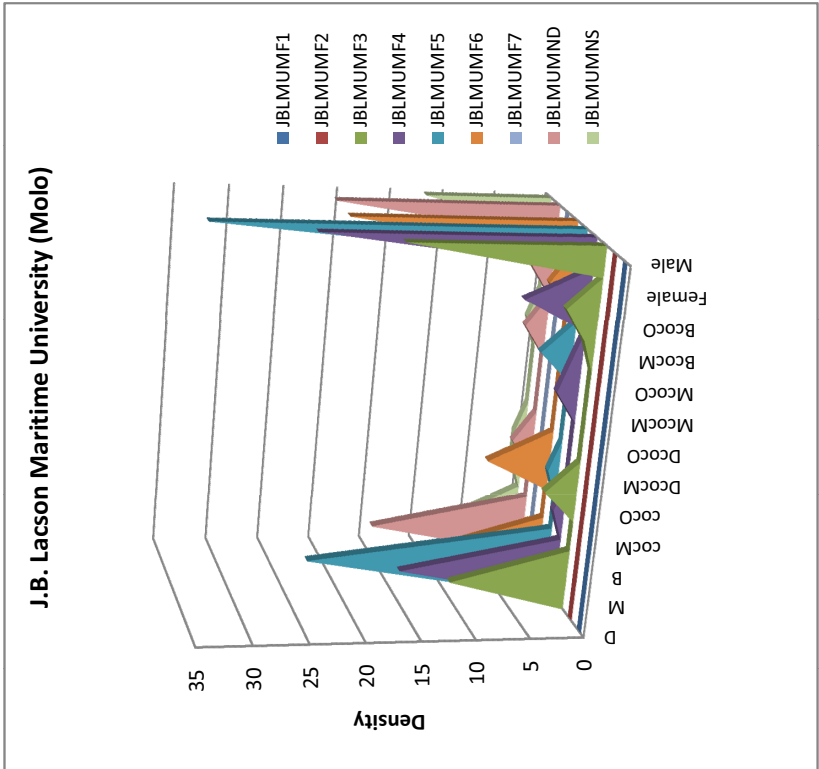
BSc. Marine Transportation		
SN	Subject	Function
1	E Navigation 1	F1
2	E Navigation 2	F1
3	E Navigation 3	F1
4	Navigation 1	F1
5	Navigation 2	F1
6	Navigation 3	F1
7	Navigation 4	F1
8	Navigation 5	F1
9	Deck Watch 1	F2
10	Deck Watch 2	F2
11	Maritime law	F3
12	Marpol	F3
13	Mersar	F3
14	Personnel management	F3
15	Seamanship 1	F3
16	Seamanship 2	F3
17	Seamanship 3	F3
18	Seamanship 4	F3
19	Seamanship 5	F3
20	Shipconstruction	F3
21	Marine power	F4
22	Communication 1	F7
23	Communication 2	F7

**John B. Lacson Maritime
University - Arevalo
(1947)**



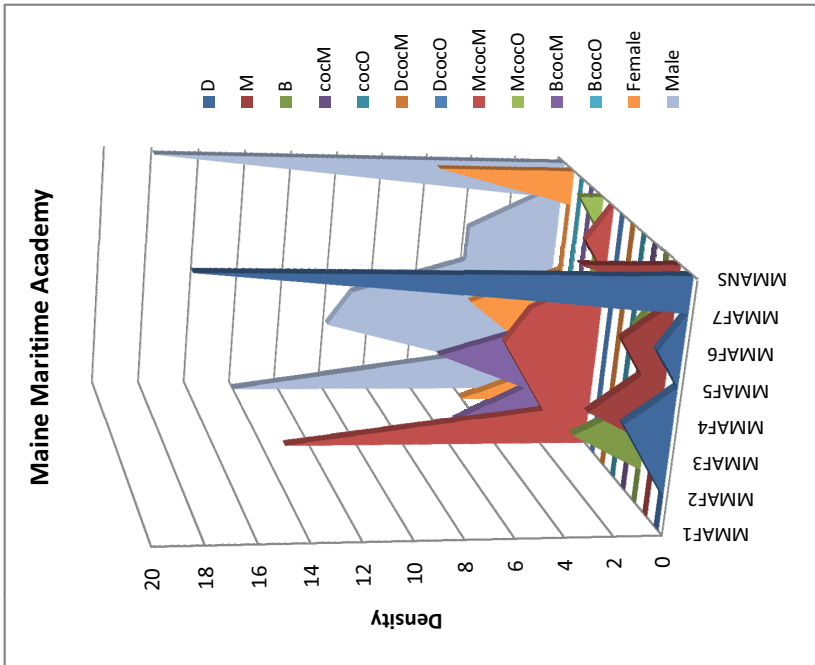
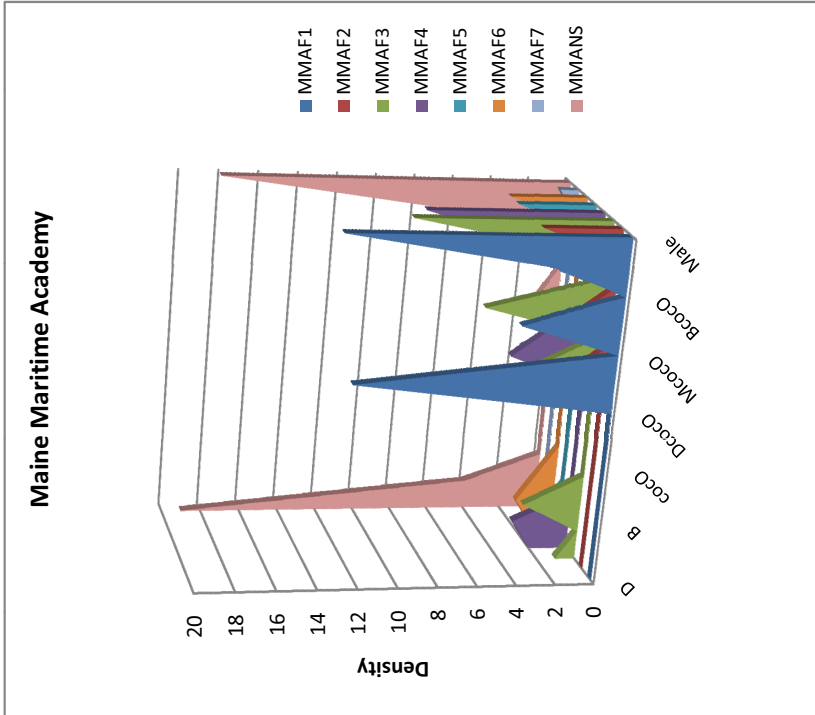
BSc. Marine Engineering		
SN	Subject	Function
1	MARPOL	F3
2	Personnel Management	F3
3	Seamanship	F3
4	Auxiliary Machines 1	F4
5	Auxiliary Machines 2	F4
6	Engineering Watch	F4
7	Power 1	F4
8	Power 2	F4
9	Auto 1	F5
10	Auto 2	F5
11	Electro 1	F5
12	Electro 2	F5
13	Electro 3	F5
14	Machine shop 1	F6
15	Machine shop 2	F6
16	Machine shop 3	F6
17	CBT/Review	ND
18	Cont-E	ND
19	NAS	ND
20	PP 3	ND
21	Chemistry 2	NS
22	Social Science 4	NS

**John B. Lacson Maritime
University - Molo
(1948)**



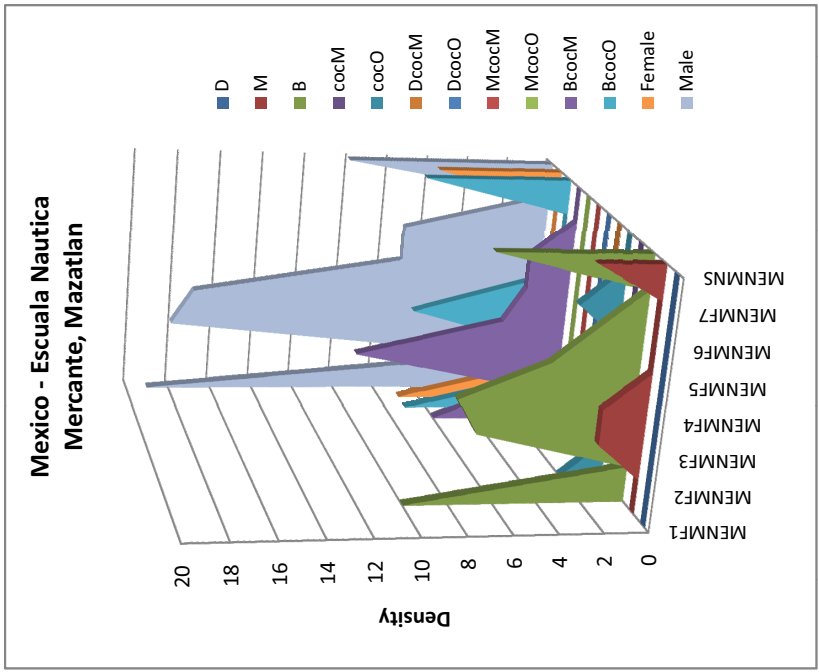
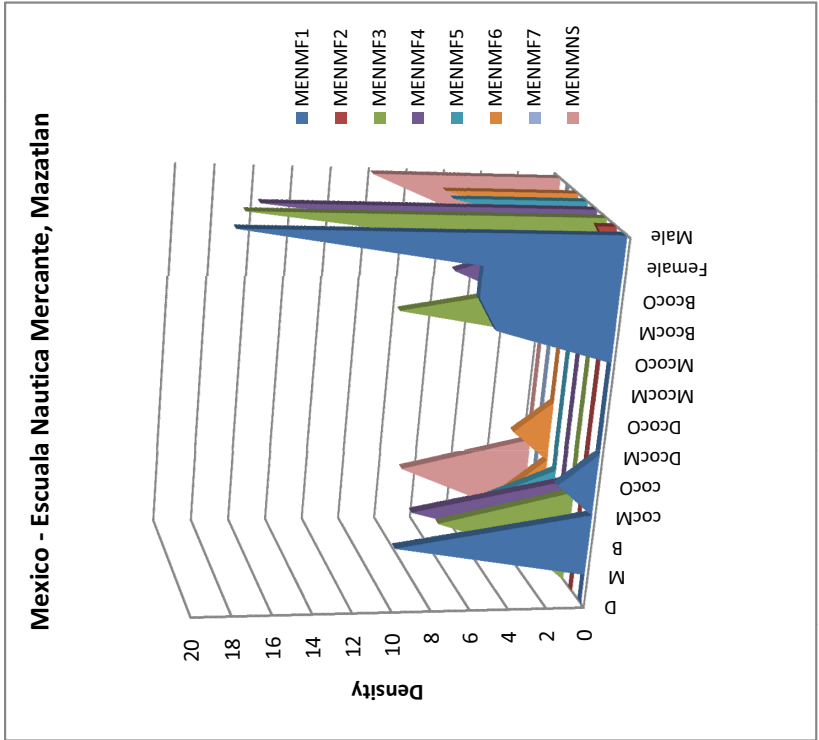
BSc. Nautical Science		BSc. Marine Engineering						
SN	Subject	Function	SN	Subject	Function	SN	Subject	Function
1	ECDIS	F1	11	Law	F3	21	Chemistry	NS
2	Meteorology	F1	12	LifeBoat	F3	22	Critical Thinking	NS
3	Navigation - Celestial	F1	13	Management	F3	23	Economics	NS
4	Navigation - Terrestrial	F1	14	Medical	F3	24	English Composition (placed under Humanities)	NS
5	RADAR	F1	15	Seamanship	F3	25	Ethics	NS
6	Rules of the Road	F1	16	Ship Construction (Structure)	F3	26	Literature	NS
7	Simulation	F1	17	Ship Stability	F3	27	Physics	NS
8	Ship handling	F1	18	Small Craft ops	F3	28	SS Electives	NS
9	Cargo Vessel Operations	F2	19	Engineering	F4	29	US Government	NS
10	Tank Vessel Operations	F2	20	GMDSS	F7	30	US History	NS
BSc. Marine Engineering								
1	Firefighting	F3	12	Simulation	F4	23	Materials (Properties)	F6
2	LifeBoat (BST)	F3	13	Simulation - Diesel	F4	24	Materials (Strengths)	F6
3	Medical	F3	14	Simulation - Steam	F4	25	Welding	F6
4	Naval Architecture	F3	15	Statics	F4	26	Chemistry	NS
5	Boilers	F4	16	Thermodynamics	F4	27	Critical Thinking	NS
6	Diesel Engineering	F4	17	Turbines	F4	28	English Composition (placed under Humanities)	NS
7	Dynamics	F4	18	Automation	F5	29	Ethics	NS
8	Fluid Mechanics	F4	19	Controls	F5	30	Literature	NS
9	Machinery	F4	20	Electricity	F5	31	Physics	NS
10	Plant Operations	F4	21	Electronics	F5	32	SS Electives	NS
11	Refrigeration and HVAC	F4	22	Machining	F6	33	US Government	NS
						34	US History	NS

**Maine Maritime
Academy
(1927)**



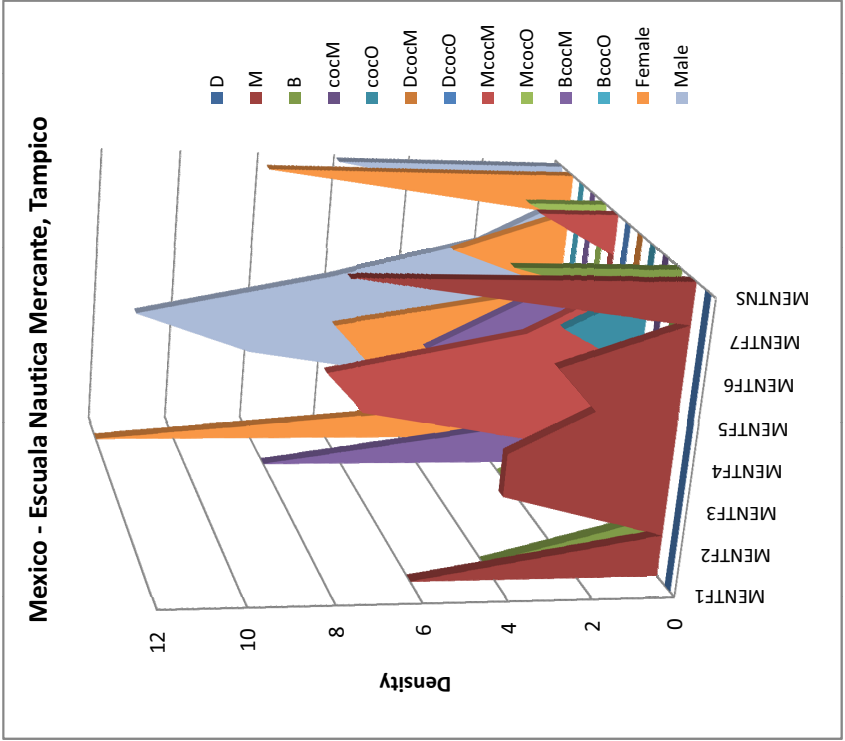
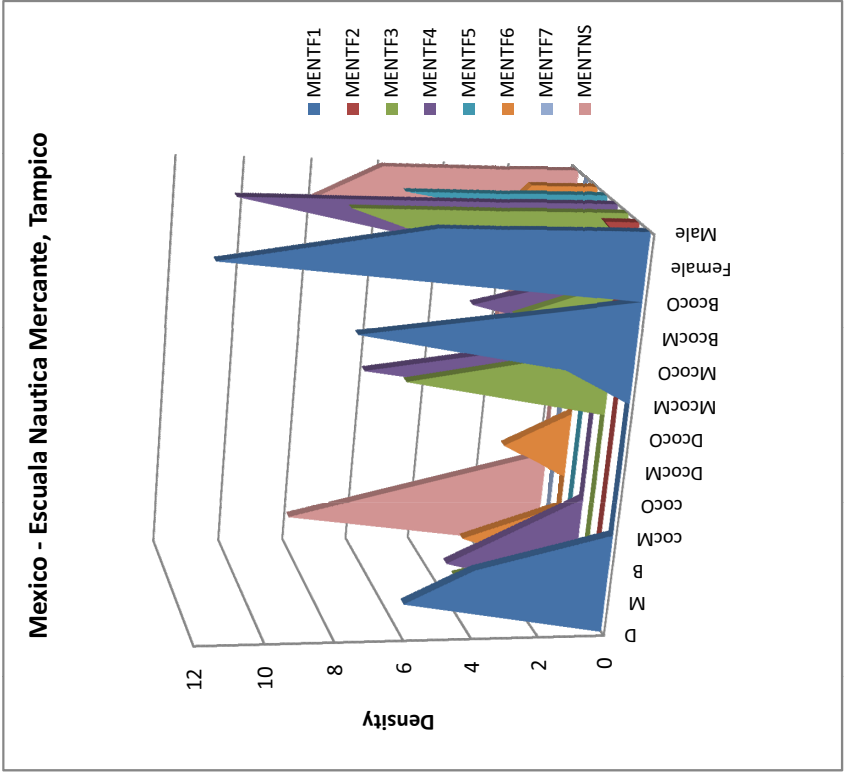
BSc. Nautical Science										
SN	Subject	Function	SN	Subject	Function	SN	Subject	Function	Subject	Function
1	Maritime English	F1	12	Investigation methodology	F3	23	Materials Resistance	F6		
2	Maritime Rating Shiphandling	F1	13	Maritime Law	F3	24	Workshop	F6		
3	Meteorology	F1	14	Naval Architecture & Const.	F3	25	Cartography	NS		
4	Navigation	F1	15	Ship and Port administration	F3	26	Chemistry	NS		
5	Navigation Laboratory	F1	16	STCW Basic Courses	F3	27	Geography	NS		
6	Navigation Simulator	F1	17	Auxiliary Machinery	F4	28	Hydrography	NS		
7	Ship Handling	F1	18	Dynamics	F4	29	Maritime Economics	NS		
8	Visual Communication	F1	19	Engineering Drawing	F4	30	Maritime Transport	NS		
9	Cargo work and handling	F2	20	Statics	F4	31	Mathematics	NS		
10	Emergency Situations	F3	21	Electricity	F5	32	Physics	NS		
11	IMO Regulations	F3	22	Electronics	F5	33	Topography	NS		
BSc. Marine Engineering										
1	Maritime English	F1	12	Dynamics	F4	23	Electricity	F5		
2	Maritime Rating Shiphandling	F1	13	Engine Laboratory	F4	24	Electro technology	F5		
3	IMO Regulations	F3	14	Engine Simulator	F4	25	Electronics	F5		
4	Investigation methodology	F3	15	Engineering Drawing	F4	26	Materials Resistance	F6		
5	Maritime Law	F3	16	Fluid mechanical	F4	27	Metal Technology	F6		
6	Ship and Port administration	F3	17	Gas Turbines	F4	28	Workshop	F6		
7	Ships Stability and Construction	F3	18	Maritime Engines	F4	29	Chemistry	NS		
8	STCW Basic Courses	F3	19	Refrigeration Systems	F4	30	Maritime Economics	NS		
9	Auxiliary Machinery	F4	20	Statics	F4	31	Maritime Transport	NS		
10	Boilers and Steam Eng	F4	21	Thermodynamic	F4	32	Mathematics	NS		
11	Diesel Laboratory	F4	22	Automatic Systems	F5	33	Physics	NS		

Mexico –
Escuela Nautica
Mercante “Cap.
Alf. Antonio
Gomez
Maqueo” -
Mazatlan
(1880)



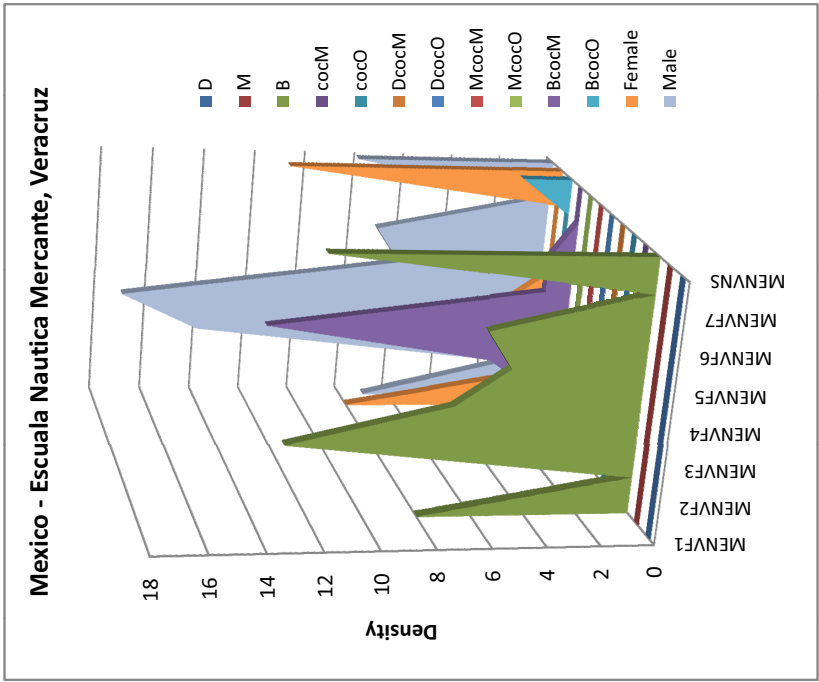
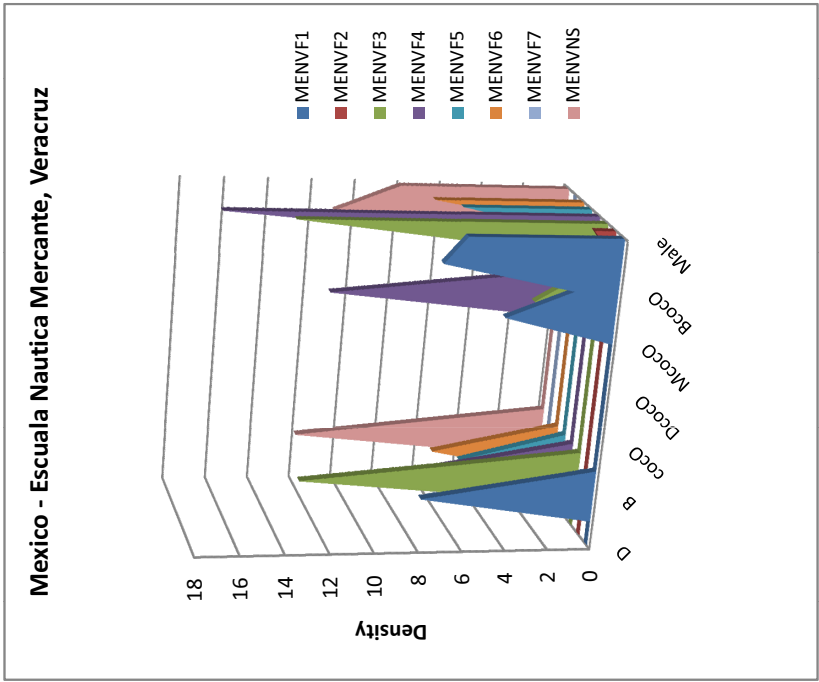
BSc. Nautical Science									
SN	Subject	Function	SN	Subject	Function	SN	Subject	Function	Function
1	Maritime English	F1	12	Investigation methodology	F3	23	Materials Resistance	F6	F6
2	Maritime Rating Shiphandling	F1	13	Maritime Law	F3	24	Workshop	F6	F6
3	Meteorology	F1	14	Naval Architecture & Const.	F3	25	Cartography	NS	NS
4	Navigation	F1	15	Ship and Port administration	F3	26	Chemistry	NS	NS
5	Navigation Laboratory	F1	16	STCW Basic Courses	F3	27	Geography	NS	NS
6	Navigation Simulator	F1	17	Auxiliary Machinery	F4	28	Hydrography	NS	NS
7	Ship Handling	F1	18	Dynamics	F4	29	Maritime Economics	NS	NS
8	Visual Communication	F1	19	Engineering Drawing	F4	30	Maritime Transport	NS	NS
9	Cargo work and handling	F2	20	Statics	F4	31	Mathematics	NS	NS
10	Emergency Situations	F3	21	Electricity	F5	32	Physics	NS	NS
11	IMO Regulations	F3	22	Electronics	F5	33	Topography	NS	NS
BSc. Marine Engineering									
1	Maritime English	F1	12	Dynamics	F4	23	Electricity	F5	F5
2	Maritime Rating Shiphandling	F1	13	Engine Laboratory	F4	24	Electro technology	F5	F5
3	IMO Regulations	F3	14	Engine Simulator	F4	25	Electronics	F5	F5
4	Investigation methodology	F3	15	Engineering Drawing	F4	26	Materials Resistance	F6	F6
5	Maritime Law	F3	16	Fluid mechanical	F4	27	Metal Technology	F6	F6
6	Ship and Port administration	F3	17	Gas Turbines	F4	28	Workshop	F6	F6
7	Ships Stability and Construction	F3	18	Maritime Engines	F4	29	Chemistry	NS	NS
8	STCW Basic Courses	F3	19	Refrigeration Systems	F4	30	Maritime Economics	NS	NS
9	Auxiliary Machinery	F4	20	Statics	F4	31	Maritime Transport	NS	NS
10	Boilers and Steam Eng	F4	21	Thermodynamic	F4	32	Mathematics	NS	NS
11	Diesel Laboratory	F4	22	Automatic Systems	F5	33	Physics	NS	NS

Mexico –
Escuela Nautica
Mercante “Cap.
Alt. Luis
Gonzaga Priego
Gonzalez” -
Tampico
(1945)



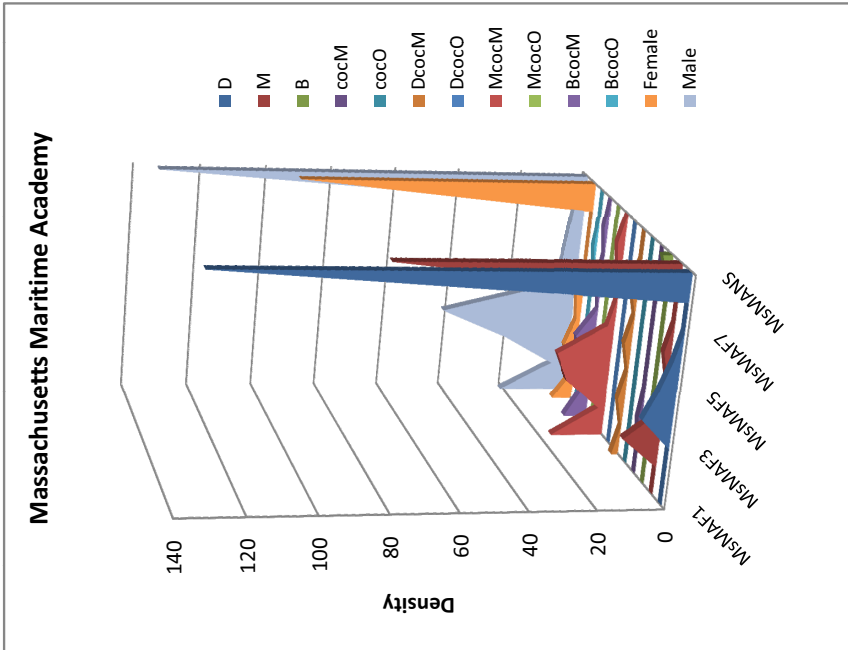
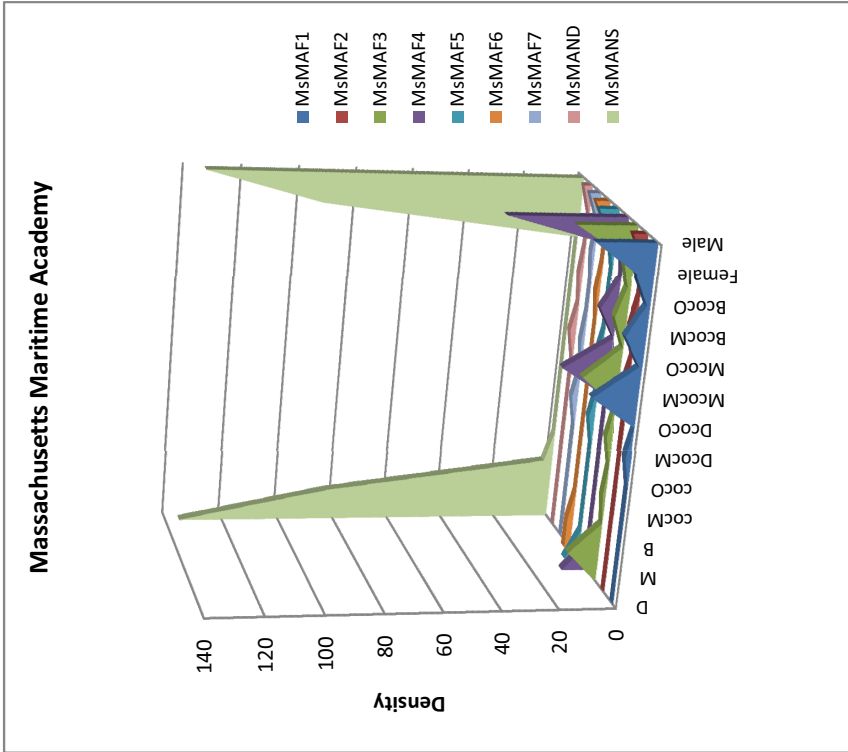
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SN	Subject	Function	SN	Subject	Function	SN	Subject	Function	Subject	Function
1	Maritime English	F1	12	Investigation methodology	F3	23	Materials Resistance	F6		
2	Maritime Rating Shiphandling	F1	13	Maritime Law	F3	24	Workshop	F6		
3	Meteorology	F1	14	Naval Architecture & Const.	F3	25	Cartography	NS		
4	Navigation	F1	15	Ship and Port administration	F3	26	Chemistry	NS		
5	Navigation Laboratory	F1	16	STCW Basic Courses	F3	27	Geography	NS		
6	Navigation Simulator	F1	17	Auxiliary Machinery	F4	28	Hydrography	NS		
7	Ship Handling	F1	18	Dynamics	F4	29	Maritime Economics	NS		
8	Visual Communication	F1	19	Engineering Drawing	F4	30	Maritime Transport	NS		
9	Cargo work and handling	F2	20	Statics	F4	31	Mathematics	NS		
10	Emergency Situations	F3	21	Electricity	F5	32	Physics	NS		
11	IMO Regulations	F3	22	Electronics	F5	33	Topography	NS		
BSc. Marine Engineering										
1	Maritime English	F1	12	Dynamics	F4	23	Electricity	F5		
2	Maritime Rating shiphandling	F1	13	Engine Laboratory	F4	24	Electro technology	F5		
3	IMO Regulations	F3	14	Engine Simulator	F4	25	Electronics	F5		
4	Investigation methodology	F3	15	Engineering Drawing	F4	26	Materials Resistance	F6		
5	Maritime Law	F3	16	Fluid mechanical	F4	27	Metal Technology	F6		
6	Ship and Port administration	F3	17	Gas Turbines	F4	28	Workshop	F6		
7	Ships Stability and Construction	F3	18	Maritime Engines	F4	29	Chemistry	NS		
8	STCW Basic Courses	F3	19	Refrigeration Systems	F4	30	Maritime Economics	NS		
9	Auxiliary Machinery	F4	20	Statics	F4	31	Maritime Transport	NS		
10	Boilers and Steam Eng	F4	21	Thermodynamic	F4	32	Mathematics	NS		
11	Diesel Laboratory	F4	22	Automatic Systems	F5	33	Physics	NS		

Mexico –
Escuela Nautica
Mercante “Cap.
Alf. Fernando
Siliceo y
Torres” -
Veracruz
(1919)



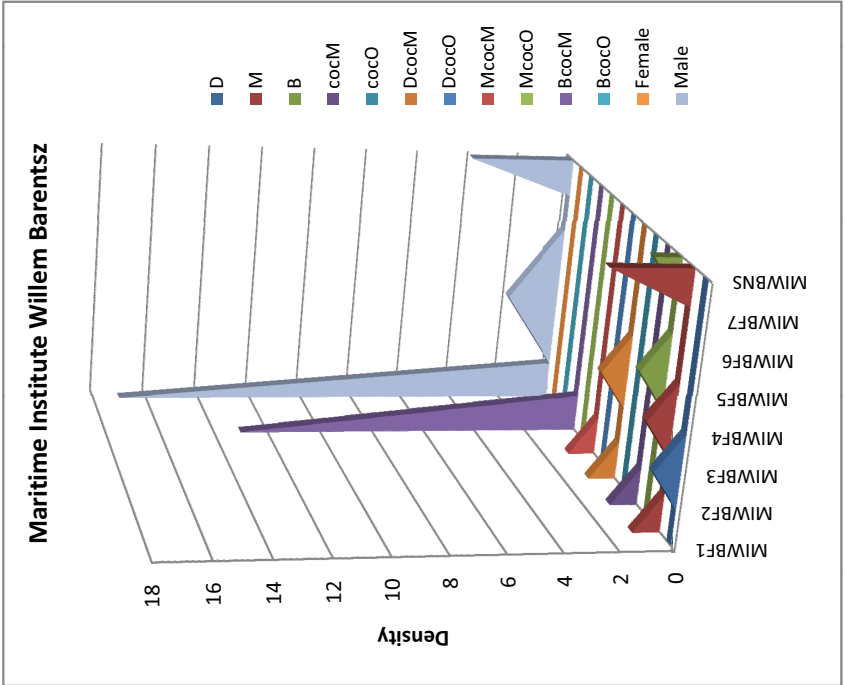
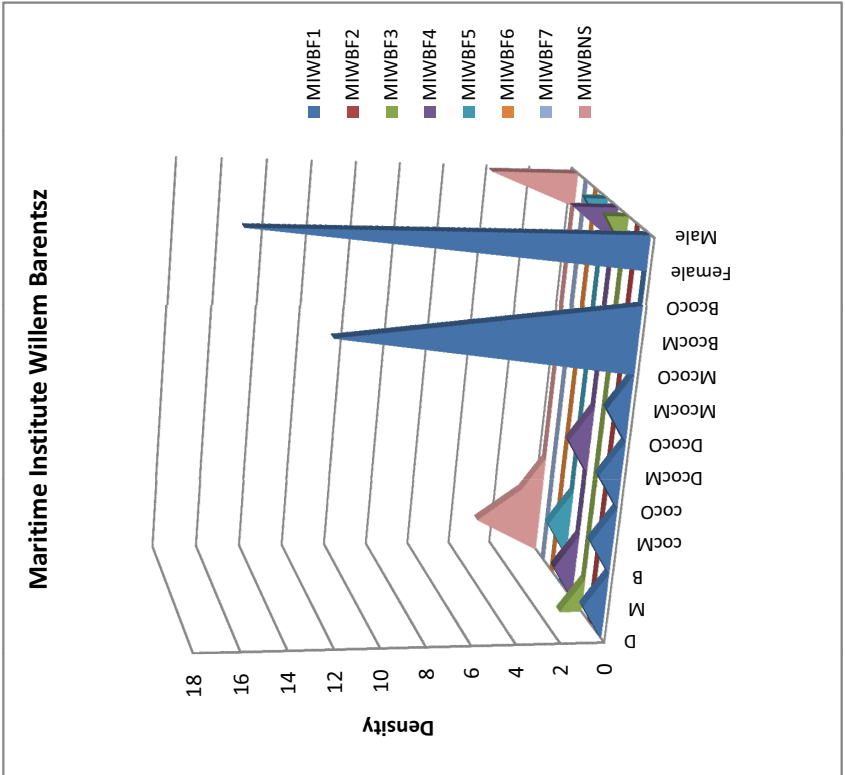
BSc. Nautical Science						
SN	Subject	Function	SN	Subject	Function	SN
1	Coastal Navigation	F1	14	First Aid/CPR	F3	27
2	Applied Shiphandling	F1	15	Lifeboat Training	F3	28
3	ARPA (lab included)	F1	16	Marine Safety	F3	29
4	Meteorology	F1	17	Ship Construction	F3	30
5	Navigation	F1	18	Stability and Trim	F3	31
6	Radar Observer Certification	F1	19	Vessel Familiarization and BST	F3	32
7	Rules of the Road	F1	20	Engineering Systems & Safety	F4	33
8	Watchkeeping	F1	21	GMDSS	F7	34
9	Dangerous Liquid Cargo	F2	22	License Seminar	ND	35
10	Modern Cargo Stowage	F2	23	Sea Term	ND	36
11	Admiralty Maritime Law	F3	24	Algebra and Trigonometry	NS	37
12	Advanced Seamanship	F3	25	American Government	NS	38
13	Basic Seamanship	F3	26	Analysis of Literature	NS	39
BSc. Marine Engineering						
1	CAD	F3	15	Thermodynamics	F4	28
2	Applied Naval Arch.	F3	16	Electrical Machines	F5	29
3	First Aid/CPR	F3	17	Electrical Machines Lab	F5	30
4	Lifeboat Training	F3	18	Electronics	F5	31
5	Vessel Fam and BST	F3	19	Electronics Lab	F5	32
6	Auxiliary Machinery	F4	20	Machine Tool Technology	F6	33
7	Engine Systems & Safety	F4	21	Strength of Material	F6	34
8	Fluid Mechanics	F4	22	Strength of Materials Lab	F6	35
9	Internal Combustion Eng	F4	23	License Seminar	ND	36
10	Mechanics	F4	24	Naval Science	ND	37
11	Refrigeration	F4	25	Sea Term	ND	38
12	Steam & Gas Turbines	F4	26	Additional Humanities Course	NS	39
13	Steam Generators	F4	27	Additional Social Science Course	NS	40
14	Thermo/Fluids Lab	F4				

Massachusetts
Maritime
Academy
(.....)



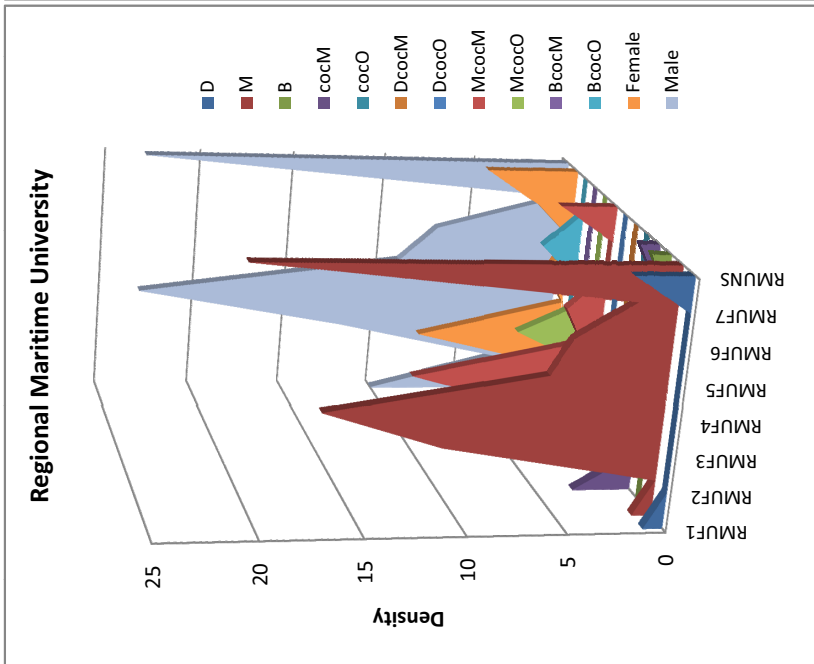
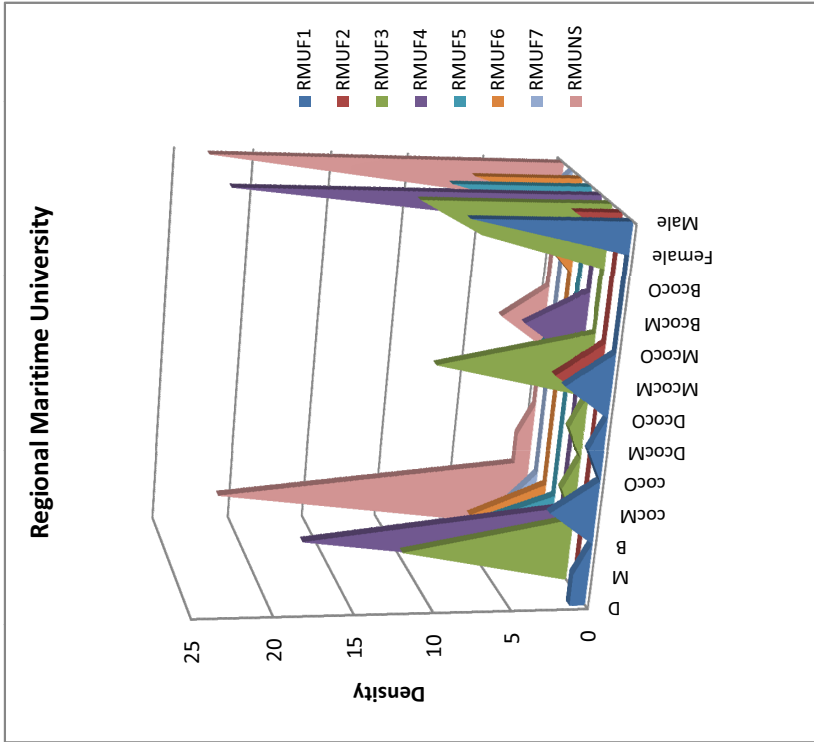
BSc. Nautical Science		
SN	Subject	Function
1	English	F1
2	Navigational systems	F1
3	Economics	NS
4	Hydrographics	NS
5	Mathematics	NS
BSc. Marine Engineering		
1	Oil Spill	F3
2	Mechanical engineering	F4
3	Ship Electronics	F5
4	Information Technology	NS

**Maritime Institute
Willem Barentsz
(1875)**

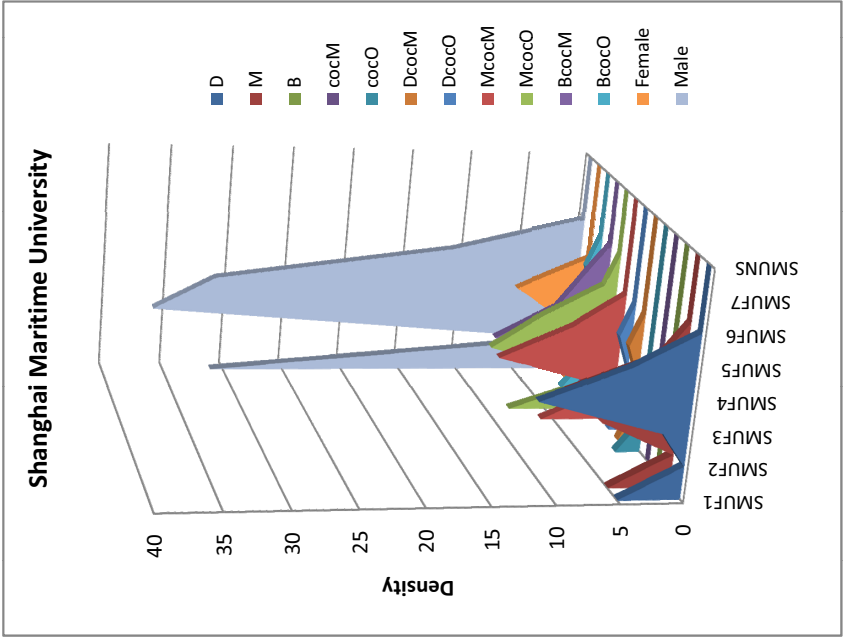
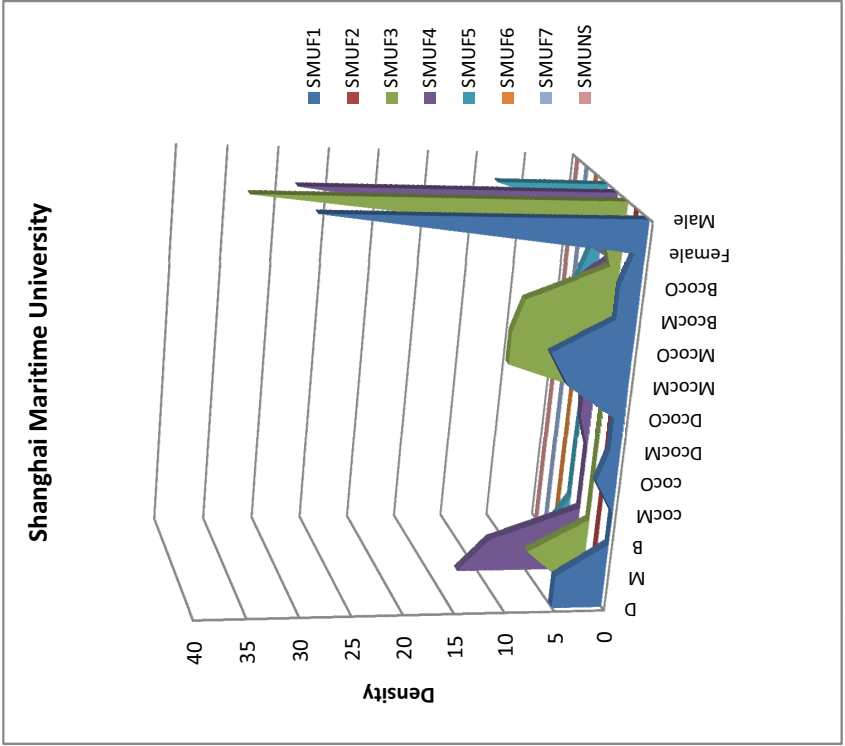


BSc. Nautical Science						
SN	Subject	Function	SV	Subject	Function	SN
1	Astronomy	F1	13	Seamanship	F3	24
2	Meteorology	F1	14	Ship business	F3	25
3	Navigation	F1	15	Shipboard operations	F3	26
4	Navigation systems	F1	16	Marine engineering systems	F4	27
5	Shiphandling/simulator	F1	17	Control systems	F5	28
6	Cargo handling	F2	18	Electronics	F5	29
7	Computer aided design [CAD]	F3	19	Instrumentation & control	F5	30
8	Law	F3	20	Communication skills	F7	31
9	Management	F3	21	Computer studies	NS	32
10	Marine insurance	F3	22	Economics	NS	33
11	Maritime safety & env. protection	F3	23	French	NS	34
12	Naval architecture	F3				
BSc. Marine Engineering						
1	Maritime Law & Convection	F3	14	Refrigeration & Air Conditioning	F4	
2	Naval Architecture	F3	15	Thermodynamics	F4	
3	Ship Construction	F3	16	Control Engineering	F5	
4	Ship Environmental Studies	F3	17	Instrumentation	F5	
5	Basic Mechanic	F4	18	Machine Design	F6	
6	Engineering Drawing	F4	19	Marine Plant Op & Maintenance	F6	
7	Fluid Mechanics	F4	20	Material Science	F6	
8	General Engineering Knowledge	F4	21	Strength of Materials	F6	
9	Marine Diesel Engines	F4	22	Workshop Technology	F6	
10	Marine Engine Systems	F4	23	Industrial Chemistry	NS	
11	Mechanics of Machine	F4	24	Mathematics	NS	
12	Motor Engineering Knowledge	F4	25	Statistics	NS	
13	Power Plant	F4				

**Regional
Maritime
University
(1958/2007)**



BSc. Nautical Science		
SN	Subject	Function
<i>1</i>	Navigation aids	F1
<i>2</i>	Navigation technology	F1
<i>3</i>	Seamanship	F3
<i>4</i>	Ship management	F3
BSc. Marine Engineering		
<i>1</i>	Naval Architecture	F3
<i>2</i>	Auxiliary machinery	F4
<i>3</i>	Main propulsion plant	F4
<i>4</i>	Thermodynamics	F4
<i>5</i>	Marine automation	F5
Shanghai Maritime University (1909)		



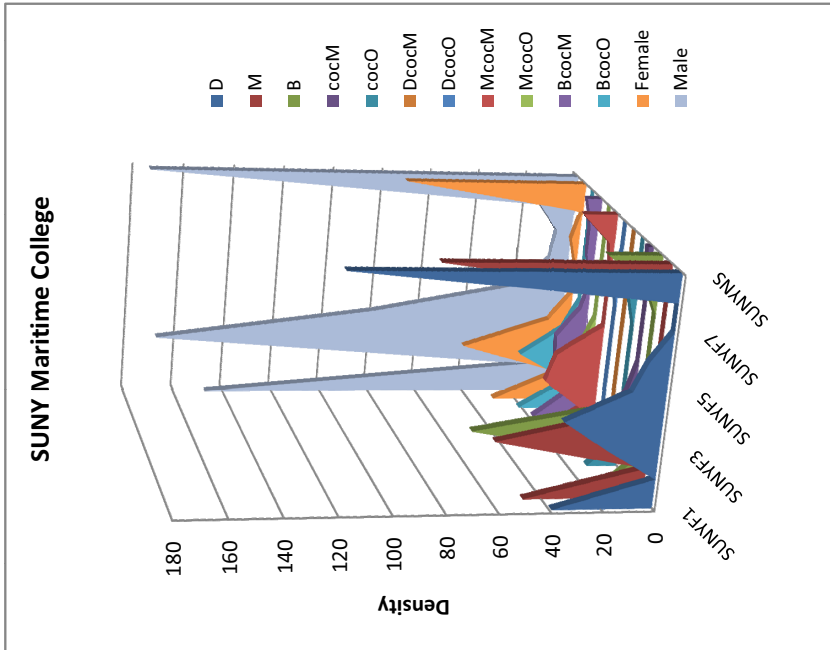
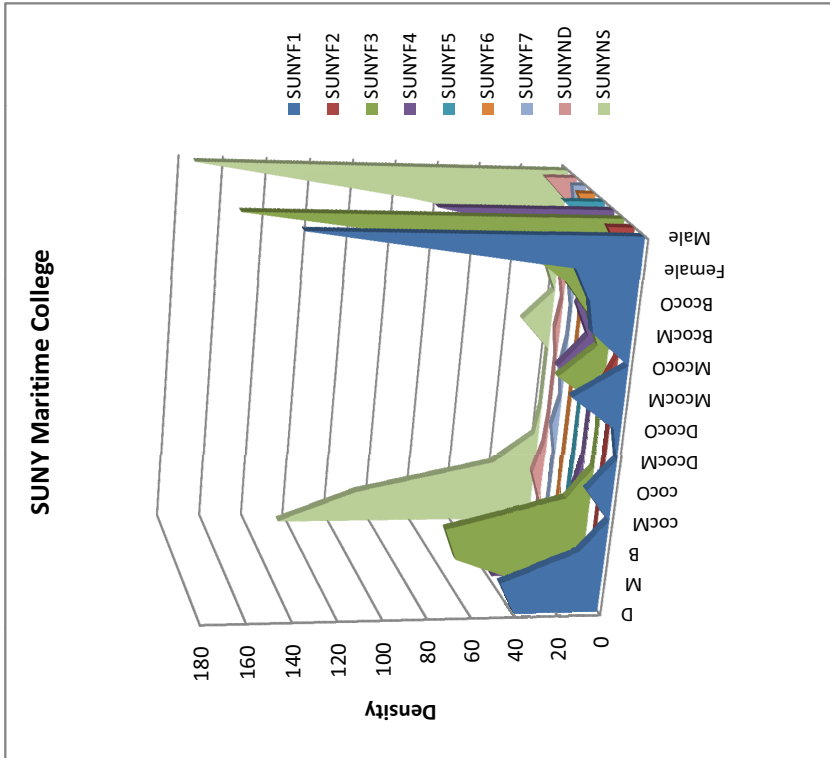
BS Marine Transportation – Deck Licence						
SN	Subject	Function	SN	Subject	Function	SN
1	Advanced Marine Navigation	F1	15	Haz Mat & Oil Spill Response	F3	29
2	Bridge Watchstanding	F1	16	International Safety Management	F3	30
3	Celestial Navigation	F1	17	Intro Vessel Ops & Seamanship	F3	31
4	Collision Avoidance	F1	18	Leadership	F3	32
5	Elect Navigation & Voyage Plan	F1	19	License Seminar: Safety	F3	33
6	English	F1	20	Management	F3	34
7	Meteorology	F1	21	Maritime Security	F3	35
8	Rules of the Road	F1	22	Medical Care Provider	F3	36
9	Terrestrial Navigation	F1	23	Nautical Operations: Safety	F3	37
10	Intro to Cargo Ops & Ship Stab	F2	24	Prin of Emergency Mgmt Systems	F3	38
11	Marine Cargo Operations	F2	25	Ship Construction & Stability	F3	39
12	Basic Safety Training	F3	26	Ship Management	F3	40
13	Business Law	F3	27	Water Safety & Survival Mariners	F3	
14	Environmental Management	F3	28	Maritime Communications	F7	
BE Mechanical Engineering – Engine Licence						
1	English	F1	13	Fluid Mechanics	F4	23
2	Applied Naval Architecture	F3	14	Heat Transfer	F4	24
3	Basic Safety Training	F3	15	Intro to Engineering Analysis	F4	25
4	Leadership	F3	16	Marine Engineering Design	F4	26
5	Medical Care Provider	F3	17	Mechanical Engr Design	F4	27
6	Nautical Operations: Safety	F3	18	Ship Systems	F4	28
7	Water Safety & Survival Mariners	F3	19	Statics	F4	29
8	Dynamics	F4	20	Thermodynamics	F4	30
9	Engineering Graphics	F4	21	Transport Processes Laboratory	F4	31
10	Engineering License Seminar	F4	22	Vibrations	F4	32
11	Engineering Physics	F4				
12	Engineering Statistical Analysis	F4				
SUNY Maritime College (1874) Subject: Cadet Observer Function: ND SN: 29 Subject: Lifetime Fitness & Conditioning Function: ND SN: 30 Subject: Accounting Function: NS SN: 31 Subject: Business Function: NS SN: 32 Subject: Computer Science Function: NS SN: 33 Subject: Economics Function: NS SN: 34 Subject: General Physics Function: NS SN: 35 Subject: History Function: NS SN: 36 Subject: Humanities Function: NS SN: 37 Subject: Math Function: NS SN: 38 Subject: Professional Studies Function: NS SN: 39 Subject: Transportation and Trade Function: NS SN: 40 Subject: Electrical Engineering Function: F5 SN: 23 Subject: Machine Design Function: F6 SN: 24 Subject: Strength Of Materials Function: F6 SN: 25 Subject: Lifetime Fitness & Conditioning Function: ND SN: 26 Subject: Chemistry Function: NS SN: 27 Subject: Engineering Economics Function: NS SN: 28 Subject: Humanities Function: NS SN: 29 Subject: Manufacturing Processes Function: NS SN: 30 Subject: Math Function: NS SN: 31 Subject: Professional Studies Function: NS SN: 32						

BS Marine Business and Commerce – Deck Licence						
SN	Subject	Function	SN	Subject	Function	SN
1	Advanced Marine Navigation	F1	12	Business Law	F3	23
2	Bridge Watchstanding	F1	13	Intro Vessel Ops & Seamanship	F3	24
3	Celestial Navigation	F1	14	Leadership	F3	25
4	Collision Avoidance	F1	15	License Seminar: Safety	F3	26
5	Elect Navigation & Voyage Plan	F1	16	Medical Care Provider	F3	27
6	English	F1	17	Nautical Operations: Safety	F3	28
7	Meteorology	F1	18	Ship Construction & Stability	F3	29
8	Rules of the Road	F1	19	Water Safety & Survival Mariners	F3	30
9	Terrestrial Navigation	F1	20	Maritime Communications	F7	31
10	Cargo Ops	F2	21	Cadet Observer	ND	32
11	Basic Safety Training	F3	22	Lifetime Fitness & Conditioning	ND	
BS Marine Engineering – Engine Licence						
1	English	F1	14	Heat Transfer	F4	27
2	Applied Naval Architecture	F3	15	Intro to Engineering Analysis	F4	28
3	Basic Safety Training	F3	16	Marine Engineering Design	F4	29
4	Leadership	F3	17	Mechanical Engr Design	F4	30
5	Medical Care Provider	F3	18	Ship Systems	F4	31
6	Nautical Operations: Safety	F3	19	Statics	F4	32
7	Water Safety & Survival Mariners	F3	20	Thermodynamics	F4	33
8	Dynamics	F4	21	Transport Processes Laboratory	F4	34
9	Engineering Graphics	F4	22	Vibrations	F4	35
10	Engineering License Seminar	F4	23	Analog Controls	F5	36
11	Engineering Physics	F4	24	Electrical Engineering	F5	37
12	Engineering Statistical Analysis	F4	25	Electronics	F5	
13	Fluid Mechanics	F4	26	Marine Electrical Systems	F5	

SUNY Maritime College (1874)

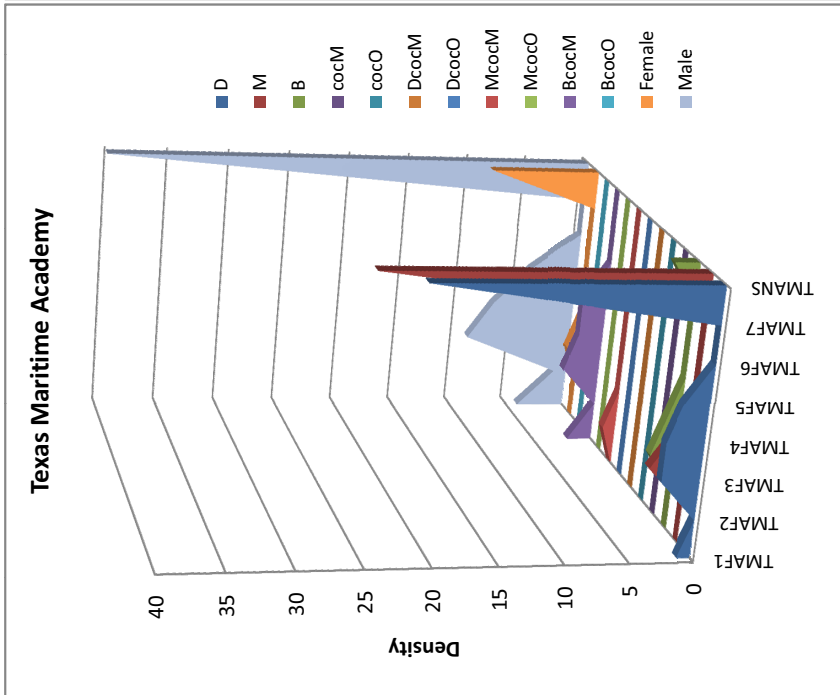
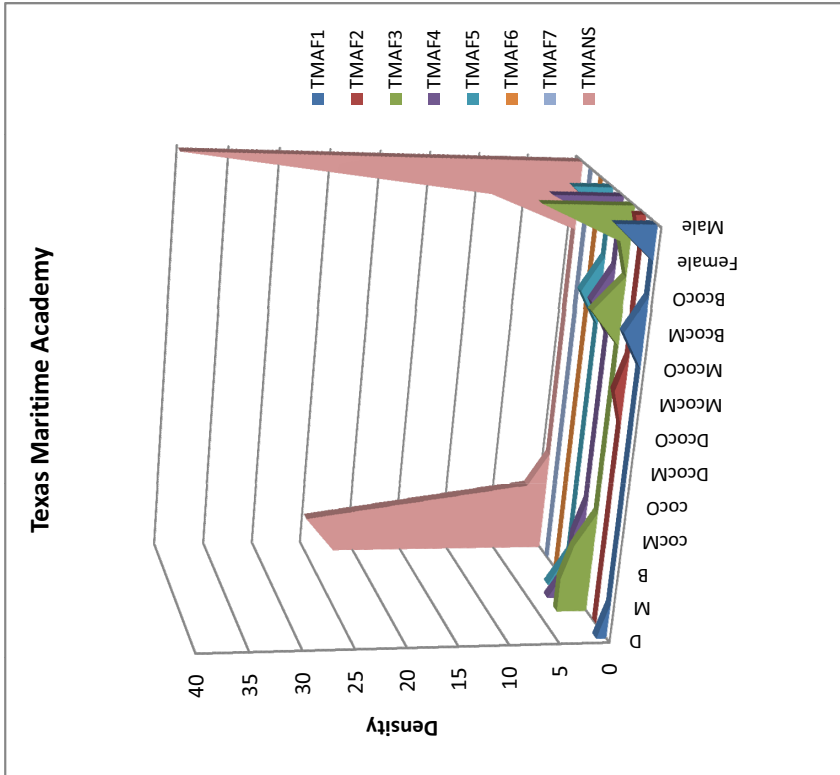
BS Marine Operations – Deck Licence									
SN	Subject	Function	SN	Subject	Function	SN	Subject	Function	SN
1	Advanced Marine Navigation	F1	14	International Safety Management	F3	27	Cadet Observer	ND	
2	Bridge Watchstanding	F1	15	Intro Vessel Ops & Seamanship	F3	28	Lifetime Fitness & Conditioning	ND	
3	Celestial Navigation	F1	16	Leadership	F3	29	Accounting	NS	
4	Collision Avoidance	F1	17	License Seminar: Safety	F3	30	Business	NS	
5	Elect Navigation & Voyage Plan	F1	18	Management	F3	31	Chemistry	NS	
6	English	F1	19	Maritime Communications	F3	32	Computer Science	NS	
7	Meteorology	F1	20	Maritime Security	F3	33	General Physics	NS	
8	Rules of the Road	F1	21	Medical Care Provider	F3	34	History	NS	
9	Terrestrial Navigation	F1	22	Nautical Operations: Safety	F3	35	Humanities	NS	
10	Intro to Cargo Ops & Ship Stab	F2	23	Ship Construction & Stability	F3	36	Math	NS	
11	Marine Cargo Operations	F2	24	Ship Management	F3	37	Professional Studies	NS	
12	Basic Safety Training	F3	25	Water Safety & Survival	F3	38	Transportation and Trade	NS	
13	Environmental Law And Policy	F3	26	Ship Systems	F4				
BS Facilities Engineering – Engine Licence									
1	English	F1	11	Engineering Statistical Analysis	F4	21	Transport Processes Laboratory	F4	
2	Applied Naval Architecture	F3	12	Facilities Engineering Design	F4	22	Analog Controls	F5	
3	Leadership	F3	13	Fluid Mechanics	F4	23	Electrical Engineering	F5	
4	Medical Care Provider	F3	14	Heat Transfer	F4	24	Strength Of Materials	F6	
5	Nautical Operations: Safety	F3	15	Hvac System Design	F4	25	Lifetime Fitness & Conditioning	ND	
6	Water Safety & Survival	F3	16	Intro to Engineering Analysis	F4	26	Chemistry	NS	
7	Dynamics	F4	17	Marine Engineering Design	F4	27	Engineering Economics	NS	
8	Engineering Graphics	F4	18	Ship Systems	F4	28	Humanities	NS	
9	Engineering License Seminar	F4	19	Statics	F4	29	Manufacturing Processes	NS	
10	Engineering Physics	F4	20	Thermodynamics	F4	30	Math	NS	

SUNY Maritime College (1874)



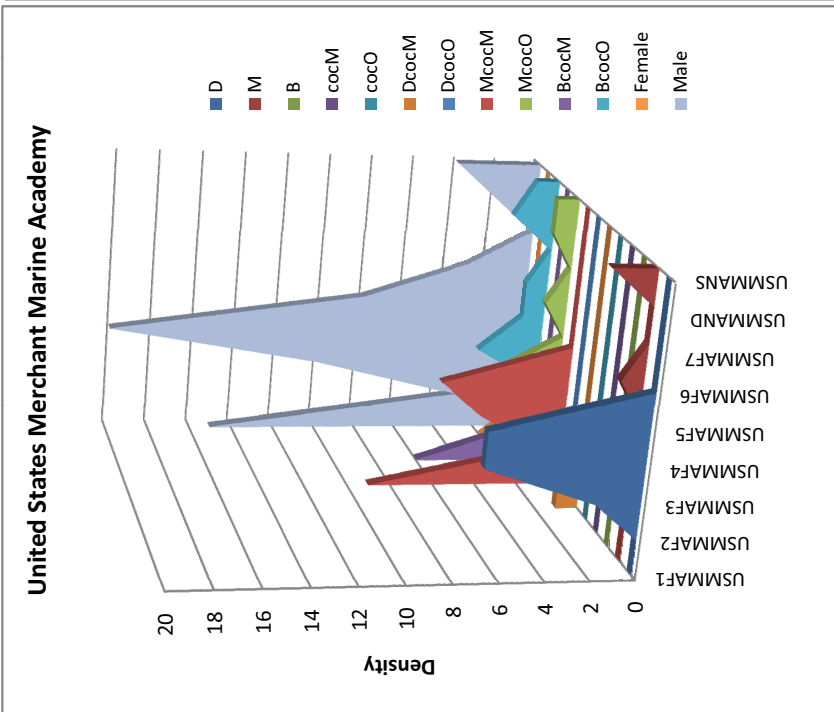
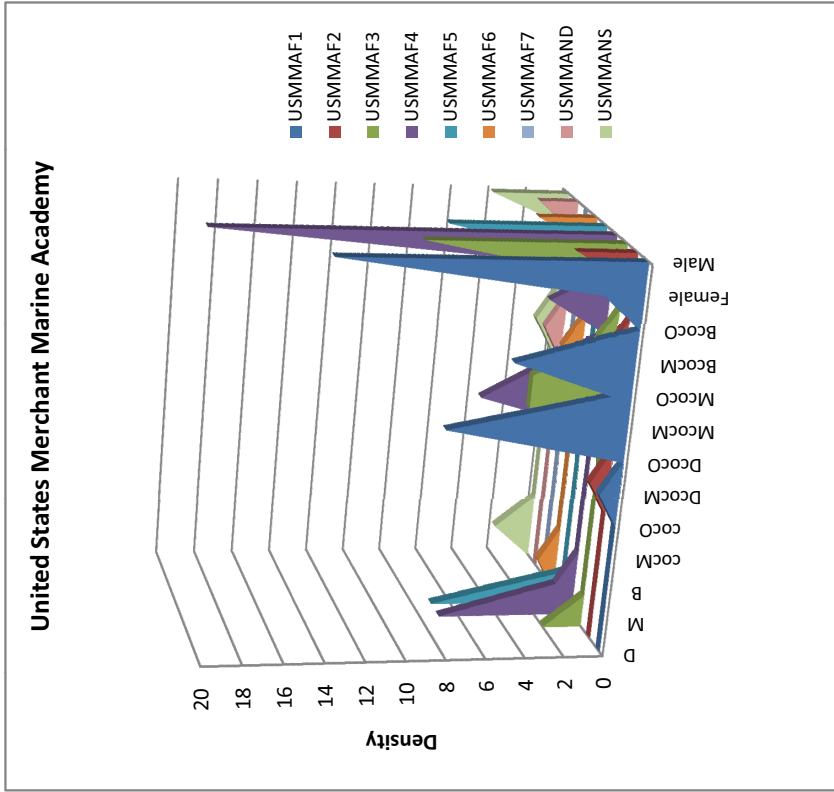
BSc. Nautical Science							
SN	Subject	Function	SN	Subject	Function	SN	Function
1	ECDIS	F1	12	Law	F3	23	Critical Thinking
2	Meteorology	F1	13	Lifeboat	F3	24	Economics
3	Navigation - Celestial	F1	14	Management	F3	25	English Comp
4	Navigation - Terrestrial	F1	15	Medical	F3	26	Ethics
5	RADAR	F1	16	Seamanship	F3	27	Ethics
6	Rules of the Road	F1	17	Ship Construction (Structure)	F3	28	Literature
7	Ship Handling	F1	18	Ship Stability	F3	29	Physics
8	Simulation	F1	19	Small Craft ops	F3	30	SS Electives
9	Cargo Vessel Operations	F2	20	Engineering	F4	31	US Government
10	Tank Vessel Operations	F2	21	GMDSS	F7	32	US History
11	Fire-fighting	F3	22	Chemistry	NS		
BSc. Marine Engineering							
1	Firefighting	F3	13	Simulation - Diesel	F4	24	Materials (Strengths)
2	Lifeboat (BST)	F3	14	Simulation - Steam	F4	25	Welding
3	Medical	F3	15	Statics	F4	26	Chemistry
4	Naval Architecture	F3	16	Thermodynamics	F4	27	Critical Thinking
5	Boilers	F4	17	Turbines	F4	28	English Comp
6	Diesel Engineering	F4	18	Automation	F5	29	Ethics
7	Dynamics	F4	19	Controls	F5	30	Literature
8	Fluid Mechanics	F4	20	Electricity	F5	31	Physics
9	Machinery	F4	21	Electronics	F5	32	SS Electives
10	Plant Operations	F4	22	Machining	F6	33	US Government
11	Refrigeration and HVAC	F4	23	Materials (Properties)	F6	34	US History
12	Simulation	F4					

Texas Maritime Academy (1962)



BSc. Nautical Science					
<i>SN</i>	Subject	Function	<i>SN</i>	Subject	Function
<i>1</i>	Navigation - Terrestrial	F1			
<i>2</i>	Cargo Vessel Operations	F2			
<i>3</i>	Seamanship	F3			
<i>4</i>	SOLAS/Fire Fighting	F3			
BSc. Marine Engineering					
<i>1</i>	Naval Architecture	F3	<i>14</i>	Electrical Engineering	F5
<i>2</i>	Ship Structures	F3	<i>15</i>	Electrical General	F5
<i>3</i>	Engineering Mechanics	F4	<i>16</i>	Electrical Power systems	F5
<i>4</i>	Fluid Mechanics	F4	<i>17</i>	Engineering Shop I & II	F6
<i>5</i>	Heat Transfer	F4	<i>18</i>	Intro to Materials	F6
<i>6</i>	Marine Design	F4	<i>19</i>	Welding Ship Repair	F6
<i>7</i>	Marine Engineering I	F4	<i>20</i>	I.C.E.	ND
<i>8</i>	Marine Engineering II	F4	<i>21</i>	KPI00	ND
<i>9</i>	Marine Ops & Tech	F4	<i>22</i>	Engineering Economics	NS
<i>10</i>	Refrigeration	F4	<i>23</i>	Graphics	NS
<i>11</i>	Thermodynamics	F4	<i>24</i>	Manufacturing Processes	NS
<i>12</i>	Electrical Machines	F5	<i>25</i>	Production Management	NS
<i>13</i>	Electrical Circuits	F5			

**United States Merchant
Marine Academy
(1993)**





International Association of Maritime Universities

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