

# 新加坡海事學院參訪報告

俞克維

**新加坡理工學院** (Singapore Polytechnic) 創立於 1954 年，是新加坡五所政府學院之一(新加坡理工學院、南洋理工學院、義安理工學院、淡馬錫理工學院及共和理工學院)，素來以學風嚴謹而受到教育界的高度評價，是一所被公認為世界一流的綜合性學院。每年都有數以萬計的海外學生慕名前往該校求學。學院目前共開設 53 個專業，有約 16500 名學生在校學習。校園占地 38 平方公頃，校園內建有先進的計算機通訊網路。對於成績優秀的學生，可申請政府助學金和學校獎學金。該學院的畢業生歷來都受到各大中型企業的歡迎，在各領域裡身居要職，對新加坡的繁榮與發展有卓越的貢獻。在該校中設有：商學院、設計與環境學院、化學與生命科學學院、電子工程學院、訊息通訊技術學院及很特殊的新加坡海事學院。

新加坡海事學院中設有輪機工程、海事運輸管理、航海等專業領域的科系，目前學制為三年制的證書課程(不頒發學位)，海事學院的航海學專業文憑課程 (Diploma in Nautical Studies)，規定學生必須完成一年(之前是一年半)的海上訓練。學生入學前即受雇於船運公司，並隨著船運公司的船隻到各個不同國家去。這些船隻包括油船 (tanker)、貨櫃船 (container) 和運輸船 (carrier)。

另外，該學院亦設置『遠洋職務海員文憑課程(DST)』是為使學生具備一名職務海員執行安全航行的能力而設計，並按照海運大學船務運輸的相關課程模式進行設定。無論是在海上還是岸上，均符合“職務海員的規範訓練資格(STCW) (1995)”VIII/2 中的規則和第 VIII 章中的每項規定以及國際海事組織課程模式的架構。就讀本課程需要經新加坡海事局 (MPA) 審核，學生完成課程並順利透過考試後，可獲新加坡 3 級職務海員資格證書。完成文憑課程，學生繼續進行 4 個月的能力資格準備課程。在擁有充分的海上服務經驗並透過 STET 及新加坡海事局 (MPA) 的筆試口試後，學生將被授予國際認可的甲板以上職務海員 3 級資格證書。

候選者可擔任海員在船上工作，月薪為 1500 到 1800 美元，18 個月後，候選人可獲得甲板以上職務海員 2 級能力資格證書，月薪約為 3000 美金。完成 18 個月的海上工作後，可獲得甲板以上職務海員 1 級資格證書，職位晉升為船長，月薪為 4500 美金。候選人也可得到岸上工作，比如管理者、安全經理、測量員、審計員等。

新加坡海事學院一直致力於培養高品質的海事人員，為支援新加坡國際海事中心 (IMC) 的主要人力來源。該學院為新加坡唯一的海事教育和培養訓練的機構，大多數畢業生都繼續在國內或國外的著名大學深造。該學院為多國籍海員提供教育培訓平台，其重點在於職員的多樣性和最先進的設備。其 50 多名教職員

工都是能勝任工作且其中許多人曾經是船長和輪機長，大多數人擁有在某一專業方向的碩士學位並從事包含研究在內的咨詢與合作項目。新加坡海事學院擁有全能機艙和航海模擬器為世界少數先進且完整的機構之一，該模擬機中心(Integral Simulator Center, ISC)由新加坡海事局提供經費建造，目的為提供船舶操縱與危機管理等多項培訓課程的實施。據悉，ISC耗資 1200 萬新元(折合新台幣約 2 億 5 千萬元) 建造該中心，以提供最先進的培訓以滿足培育優秀船員的需求。ISC 的各套設施可獨立操作，也可相互配合操作，是世界上最先進的綜合模擬機中心之一。

為了提供世界一流的海事教育和設備以滿足國內和國際學生的需要，該學院調整了其課程以更適應資訊技術應用在海事行業不斷增長的需要。它能全方位的滿足航運業培養訓練要求，並集中力量於最新技術的發展，這一直是其事業發展的基石。新加坡海事學院每年有大約 300 名畢業生。另外每年還有大約 250 名畢業生完成其各類 COC 課程。

#### 綜觀新加坡海事學院內部的設備與教學資源有以下特色：

1. 課程設計標準化：該系課程無論哪一種學程均詳細設有各項開班計畫書，各項課程的實施均事前設有授課大綱與教材，顯示其標準化作業程序十分完備。
2. 設備設置實體化：無論是商船或是輪機專業實習場地均以實船作為基準，其輪機實習工廠由配置環境與操作功能均與實船無異。並充分將電腦模擬機與實際機器結合，營造出完整的機艙實習環境。
3. 新加坡海事學院的經費來源除學生學費之外，並來自新加坡教育部及新加坡海事局，相較於台灣現行制度明顯經費寬裕許多，且新加坡海事局將其視為子弟學校，給予多方面的行政支援，此點足供我國參考。



圖一、SMA 歡迎本校參訪通告



圖二、水槽中為 SMA 獲得勞氏協會亞洲地區訓練中心評比獎章



圖三、標準化的開課程序與課程大綱



圖四、結合模擬機與實機的機艙控制



圖五、類比於實船配置的機艙(A)



圖六、配電盤模擬設備



圖七、類比於實船配置的機艙(B)



圖八、360 度環景式操船模擬機控制室



圖九、Capt. Mohd Salleh A Sarwan 合影



圖十、模擬機中心



### 輪機相關課程介紹 Diploma in Marine Engineering (DMR)

The Diploma in Marine Engineering is a three-year full-time course, which includes a 9-week Industrial Training Programme with approved establishments. The course structure is modularised to enhance learning and to provide flexibility of the course design.

#### **Practical Training**

The structure of the diploma programme provides for this in two ways:

- Through intensive training in our fully equipped workshops and laboratories specifically designed for hands-on learning.
- Through a structured 9-week Industrial Training Programme with approved industrial organisations.

In addition, mandatory safety courses in Fire Fighting and Fire Prevention, Personal Survival Techniques, Elementary First Aid, Personal Safety and Social Responsibility, and Tanker Familiarisation are conducted during the course.

#### **Assessment**

Students' performance and progress are evaluated through a combination of in-course and end-of-semester assessment. Each module is assessed according to its aims and objectives and may take the form of written and practical examinations, assignments, projects and oral presentations. A satisfactory standard must be attained during the Industrial Training Programme.

#### **Full-Time First Year, Stage 1A**

Module Code	Module Name	Total Hours
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MA1058	<b>Applied Mechanics</b>	75
MA1061	<b>*W/S Practice 1</b>	60
MA1086	<b>Marine Engg Knowledge 1</b>	45
MA1087	<b>*@Basic Safety Training 1</b>	30
MA1090	<b>Electric Circuits</b>	75
MS7503	<b>*Software Application and Programming</b>	45
LC0603	<b>*Report Writing and Presentation</b>	30
SP0602	<b>*#Innovation, Design &amp; Enterprise in Action</b>	30
	%General Elective Module	30

### **Full-Time First Year, Stage 1B**

<b>Module Code</b>	<b>Module Name</b>	<b>Total Hours</b>
MA1063	<b>*Engineering Drawing</b>	75
MA1064	<b>*W/S Practice 2</b>	60
MA1088	<b>*@Basic Safety Training 2</b>	30
MA1091	<b>Basic Thermodynamics</b>	75
MS7102	<b>Basic Mathematics</b>	60
LC0618	<b>*Critical Reasoning Skill</b>	30
SP0601	<b>*Character Development</b>	30
SP0602	<b>*#Innovation, Design &amp; Enterprise in Action</b>	30
	†%General Elective Module	30

### **Full-Time Second Year, Stage 2A**

<b>Module Code</b>	<b>Module Name</b>	<b>Total Hours</b>
MA1065	<b>Engineering Mechanics</b>	75
MA1067	<b>*Integrated Workshop Practice</b>	75
MA1068	<b>Ship Stability</b>	60
MA1069	<b>Marine Engg Knowledge 2</b>	60
MA1092	<b>Electronics</b>	60
LC0604	<b>*Communication Skills for Work</b>	30
	†General Elective Module	30
IS1006	<b>*Industrial Training Programme</b>	

### **Full-Time Second Year, Stage 2B**

<b>Module Code</b>	<b>Module Name</b>	<b>Total Hours</b>
MA1071	<b>Instrumentation</b>	60
MA1073	<b>*CAD</b>	75
MA1089	<b>Tanker Familiarisation</b>	30
MA1093	<b>Applied Thermodynamics</b>	75
MS7202	<b>Engineering Mathematics 1</b>	60
MS7581	<b>Multimedia in IT Application</b>	45
MS7582	<b>Computer Programming</b>	45
	General Elective Module	30
IS1006	<b>*Industrial Training Programme</b>	

### **Full-Time Third Year, Stage 3A**

<b>Module Code</b>	<b>Module Name</b>	<b>Total Hours</b>
MA1051	<b>*Project Work</b>	15
MA0070	<b>Ship Chartering Practices</b>	60
MA1076	<b>IC Engines and Boilers</b>	75
MA1077	<b>*Marine Workshop Practice</b>	75
MA1078	<b>Computer Control</b>	60
MA1094	<b>Electric Machines and Systems</b>	75
MA1095	<b>*Organisational Behaviour and Management</b>	60
MA1096	<b>Engineering Design</b>	60
	†#General Elective Module	30

### **Full-Time Third Year, Stage 3A**

<b>Module Code</b>	<b>Module Name</b>	<b>Total Hours</b>
MA1051	<b>*Project Work</b>	75
MA0070	<b>Ship Chartering Practices</b>	60
MA1076	<b>IC Engines and Boilers</b>	75
MA1077	<b>*Marine Workshop Practice</b>	75
MA1078	<b>Computer Control</b>	60

MA1094	<b>Electric Machines and Systems</b>	75
MA1095	<b>*Organisational Behaviour and Management</b>	60
MA1096	<b>Engineering Design</b>	60
	†#General Elective Module	

### **Full-Time Third Year, Stage 3B**

<b>Module Code</b>	<b>Module Name</b>	<b>Total Hours</b>
MA1051	<b>*Project Work</b>	75
MA1079	<b>Ship Powering and Construction</b>	60
MA1080	<b>Auxiliary Machinery</b>	75
MA1082	<b>Integrated Control</b>	75
MA1083	<b>Shipboard Drawings</b>	45
MA1084	<b>Shipping Business</b>	45
MA1097	<b>*Plant Diagnostics</b>	45
MS7302	<b>Engineering Mathematics 2</b>	45
	†#General Elective Module	

Marine Engineering is a challenging profession with very good monetary rewards. Because of the broad-based experience and early responsibility gained as a ship's engineer, graduates are well-sought after in shore-based industries.

Since the programme is essentially "integrated engineering" incorporating mechanical, electrical, thermal and control engineering, supported by IT and business and management studies, the opportunities for our graduates are wide-ranging.

Marine Engineers are managers and operators of complex and dynamic power plants and service systems. Their career prospects are bright because of their ability to adapt as technology and business activities change.

As sea-going marine engineers, graduates will progress, in stages, from assistant to chief engineer by qualifying for awards of Certificates of Competency. These licences are authorised and issued by the Maritime and Port Authority of Singapore. A graduate requires at least three-and-a-half years of approved work experience onboard ship to qualify as a Chief Engineer.

Many graduates continue their education and further improve their prospects by entering into a degree programme. The Diploma is accredited by the Institute of

Marine Engineers (UK) and has advanced standing for entry into related engineering degree programmes in many universities throughout the world.

### 航海相關課程介紹 **Diploma in Nautical Studies (DNS)**

This three-year training programme prepares students for the Diploma in Nautical Studies (DNS) and their first professional sea-going qualification - the Class 3 Deck Certificate of Competency. It is the first career step for the holder to sail as a junior deck officer, and later, as master of a ship.

The course comprises three phases. Phase 1 commences at the start of the SP academic year whilst Phase 3 is conducted each semester.

#### **Phase 1 - Pre-Sea Induction (12 months)**

This two-semester Pre-Sea Induction course at the Singapore Polytechnic prepares students as cadet officers aboard ship. Students are taught the fundamental knowledge and skills required for a deck officer. During this period, the student also attends the STCW95 Basic Safety Training course.

#### **Phase 2 - Sea-Training / Correspondence (12 months)**

During this phase the students undergo shipboard training and follow a structured training programme, which includes a correspondence course package and the completion of a training and assessment record book. As cadet officers, students are groomed to shoulder the responsibilities of a Navigating Officer. A minimum sea service of 12 months is required for the award of Diploma in Nautical Studies and the Class 3 Certificate of Competency.

#### **Phase 3 - Full-time study at Singapore Polytechnic (12 months)**

This final phase of study (two semesters) for the Diploma in Nautical Studies course includes the Class 3 Certificate of Competency Preparatory Course. The holder of the diploma may be granted exemption from the written part of the Class 3 Certificate of Competency examination conducted by MPA Singapore. The student will be required to attend the STCW95 Medical First Aid on Board Ship course as an ancillary. The curriculum also covers Electronic Navigation Systems, GMDSS, Advanced Fire-fighting and Tanker Familiarisation.

#### **Full Time Phase 1A**

<b>Module</b>	<b>Module Name</b>	<b>Total</b>
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<b>Code</b>		<b>Hours</b>
MA0536	<b>Introduction to Navigation</b>	90
MA0537	<b>Elementary Ship Knowledge</b>	60
MA0538	<b>Basic Safety Training</b>	112.5
MS7442	<b>Science 1</b>	45
MS7542	<b>Software Application</b>	30
LC0614	<b>Communication Skills for Work</b>	30
SP0602	<b>IDEA</b>	30

### **Full Time Phase 1B**

<b>Module Code</b>	<b>Module Name</b>	<b>Total Hours</b>
MA0539	<b>Principles of Navigation</b>	60
MA0540	<b>Ship Knowledge</b>	90
MA0546	<b>Watchkeeping &amp; Instruments</b>	75
MA0547	<b>Shipping Practices &amp; Maritime Law</b>	45
MS7141	<b>Mathematics 1</b>	30
LC0618	<b>Critical Reasoning Skills</b>	30
SP0601	<b>Character Development</b>	30
	General Elective Module (GEM)	30

### **Phase 2**

<b>Module Code</b>	<b>Module Name</b>	<b>Total Hours</b>
	<b>Sea attachment</b>	

### **Full Time Phase 3A**

<b>Module Code</b>	<b>Module Name</b>	<b>Total Hours</b>
MA0541	<b>Electronic Navigation System</b>	90
MA0527	<b>Maritime Communications</b>	105
MA0532	<b>Tanker Familiarisation</b>	45
MA0532	<b>Tanker Familiarisation</b>	45
MA0534	<b>Advanced Fire Fighting</b>	30

MA0548	<b>Chartering &amp; Brokerage</b>	30
MA0549	<b>Marine Surveying</b>	30
MA0550	<b>Ports &amp; Terminals</b>	30
	General Elective Module (GEM)	30

### **Full Time Phase 3B**

<b>Module Code</b>	<b>Module Name</b>	<b>Total Hours</b>
MA0542	<b>Practical Navigation</b>	75
MA0543	<b>Coastal Navigation</b>	52.5
MA0544	<b>General Ship Knowledge</b>	75
MA0545	<b>Meteorology</b>	30
MA0525	<b>Ship Operations</b>	90
MS7341	<b>Mathematics 2</b>	45
MS7452	<b>Applied Science</b>	45

More than 1,800 ships are registered in Singapore, and each requires a captain and three navigating officers. Candidates completing their Diploma in Nautical Studies will qualify to be a Second Officer on board a foreign-going vessel provided they have sufficient sea service and pass an Oral Examination conducted by the Maritime and Port Authority of Singapore. This examination leads to the award of a Class 3 Certificate of Competency (Deck), which is internationally recognised.