

Skills Strategy for Marine & Offshore Industry

An initiative by:



Supported by:



NTUC's Marine Engineering Cluster

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Marine Week Activities

Join us at the inaugural Marine Week where you can participate in a suite of events as Singapore journey into Marine 4.0. Hear from notable speakers and professional development courses to equip you with skills and knowledge to be a marine worker 4.0.

TIME	EVENT	REGISTER
Monday 3 Dec	9:00am – 1:00pm Marine & Offshore Technology & Training Symposium	https://event.e2i.com.sg/web/marinesymposium2018  
	1:30pm – 4:30pm Industry 4.0 Certificate in IoT Innovation Management (Augmented and Virtual Reality: Fundamentals and Applications)	https://event.e2i.com.sg/web/avr  
Tuesday 4 Dec	2:00pm – 5:00pm ASMI Industry Sharing Seminar on Liquefied Natural Gas (LNG)	https://event.e2i.com.sg/web/lng-seminar  
Wednesday 5 Dec	2:00pm – 6:00pm Introduction to Digital Skills in RPA and Computation Thinking for Professionals	https://event.e2i.com.sg/public/webpage/1/1751  
	1:00pm – 5:00pm 1 st Ignite/Roundtable on Marine Plastics: An Action Plan for Shipping [In conjunction with the International Conference on Plastics in the Marine Environment (ICPME) 2018 5-7 th Dec.]	Closed door event, by invitation only.
Thursday 6 Dec	9:00am – 2:00pm Digitalisation: First Step in Industry 4.0 Journey for SME	https://event.e2i.com.sg/web/FSI4.0  
	2:00pm – 5:00pm Learning Journey to Sembcorp Marine Integrated Yard (SMIY)	Closed door event, by invitation only.
Friday 7 Dec	9:30am & 2:00pm Job Opportunity Briefing for Drafting Specialist	https://event.e2i.com.sg/web/JFSCM2  
Weeklong 3-7 Dec	9:30am – 4:00pm Masterclass in Automation Welding Machine & Welding Production Management System	Closed door event, by invitation only.

Organised by:



NTUC's Marine Engineering Cluster:



In Partnership with:



Marine & Offshore Technology and Training Symposium

3 Dec 2018, Monday | 9am to 1pm
Devan Nair Institute for Employment and Employability
Level 1, Registration Hub,
80 Jurong East Street 21, Singapore 609607

Symposium Programme | Hall 1

Welcome Address

Mr. Tommy Goh, President of NTUC Marine Engineering Cluster and President of Shipbuilding & Marine Engineering Employees' Union (SMEEU)

Mr. Gilbert Tan, Assistant Director-General of NTUC & CEO of e2i

Opening Address by Guest-of-Honour

Mr. Ng Chee Meng, Secretary-General of National Trades Union Congress, Minister of the Prime Minister's Office

Memorandum-of-Understanding (MOU) Signing Ceremony

Association of Singapore Marine Industries (ASMI), NTUC Marine Engineering Cluster, NTUC's e2i (Employment & Employability Institute), SkillsFuture Singapore (SSG), Institute of Marine Engineering, Science & Technology (IMarEST)

Keynote 1

A Structured Model for Effective Technological Innovation

Mr. Subrata Chanda, Director, Centre of Innovation (COI) Marine & Offshore Technology

Keynote 2

Leading Industry Transformation

Mr. Chris Chung, Director, Digital Innovation & Strategic Projects at Wärtsilä

Transforming the Marine & Offshore Industry: Be Industry 4.0 Ready

Ms. Serene Low, Specialist (Electronic & Transport Engineering), e2i

Tea Break

Keynote 3

Digitalisation on Future Manufacturing

Ms. Chong Pei Ling, Senior Application Engineer, Hitachi Sunway Information Systems

Keynote 4

Embracing Change: Technology & Workforce 4.0

Mr. Daniel Zhang, Assistant Director, Singapore Maritime Institute

Supporting Partners:



Skills Strategy for Marine & Offshore Industry

Digital Readiness Framework (BBIP)

Proficient

Digital Proficiency Programme

- Further development in **digital skills to enhance employability**
- Broaden employment opportunities by displaying enhanced skills to enter IT related jobs

Examples:

- Digital Proficiency Programme (DigiPro)
- Business Data & Insights
- Branding Your Professional Image in the Digital Economy

Intermediate

Digital Productivity Programme

- Apply digital technologies into work and daily life
- **Increase personal productivity** through the use of technologies

Examples:

- Go RPA & Go Lean
- Digital Confidence for Productivity
- Digital Confidence for Cybersecurity & IoT

Beginner

SkillsFuture for Digital Workplace

- Create awareness of **emerging technologies**
- Understand the importance of technologies at the workplace

Examples:

- SkillsFuture for Digital Workplace
- Introduction to Wireless Technology

Bridging

Basic Digital Confidence Course

- Build digital confidence in mobile devices for the older workers
- Bridge gaps to perform **basic mobile operations**

Examples:

- Introduction to Tablets 101
- Understanding Mobile Apps

* The examples listed here are not exhaustive, please contact e2i to tap on more training programmes from our network of Institutes of Higher Learning (IHLs) and Training Partners (TPs).

LEVEL OF COMPETENCY

Step-by-step guide for companies and workers transiting to Marine 4.0 with advances in digital and technological skills training.

Advanced Manufacturing Framework (PIDA)

Process Automation

- Robotics Systems
- Line Automations
- Vision Sensing Systems
- Automated Quality Analysis

Examples:

- Industry 4.0 Certificate In Digital Manufacturing & Business”
- 3D Printing & Ecosystem



Internet of Things (IoT)

- Data Connectivity
- Remote Monitoring & Tracking
- Smart Factories

Examples:

- Building an Internet-of-Things Project
- IoT & Hybrid Mobile App Development”
- Industry IoT Networking



Data Analytics

- Big Data
- Data Mining Systems
- Predictive Analytics
- Digital Factories

Examples:

- Data Visualisation with Tableau
- Introduction to Data Science
- CAD and Additive Manufacturing

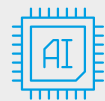


Artificial Intelligence

- Virtual Reality
- Artificial Intelligence
- Machine Learning

Examples:

- Using Augmented Reality (AR) and Artificial Intelligence (AI) in Business and Training
- Autonomous Robots and Computer Vision



Foundation Level

- Introduction to robotics and data analysis
- Basic knowledge of programming and coding

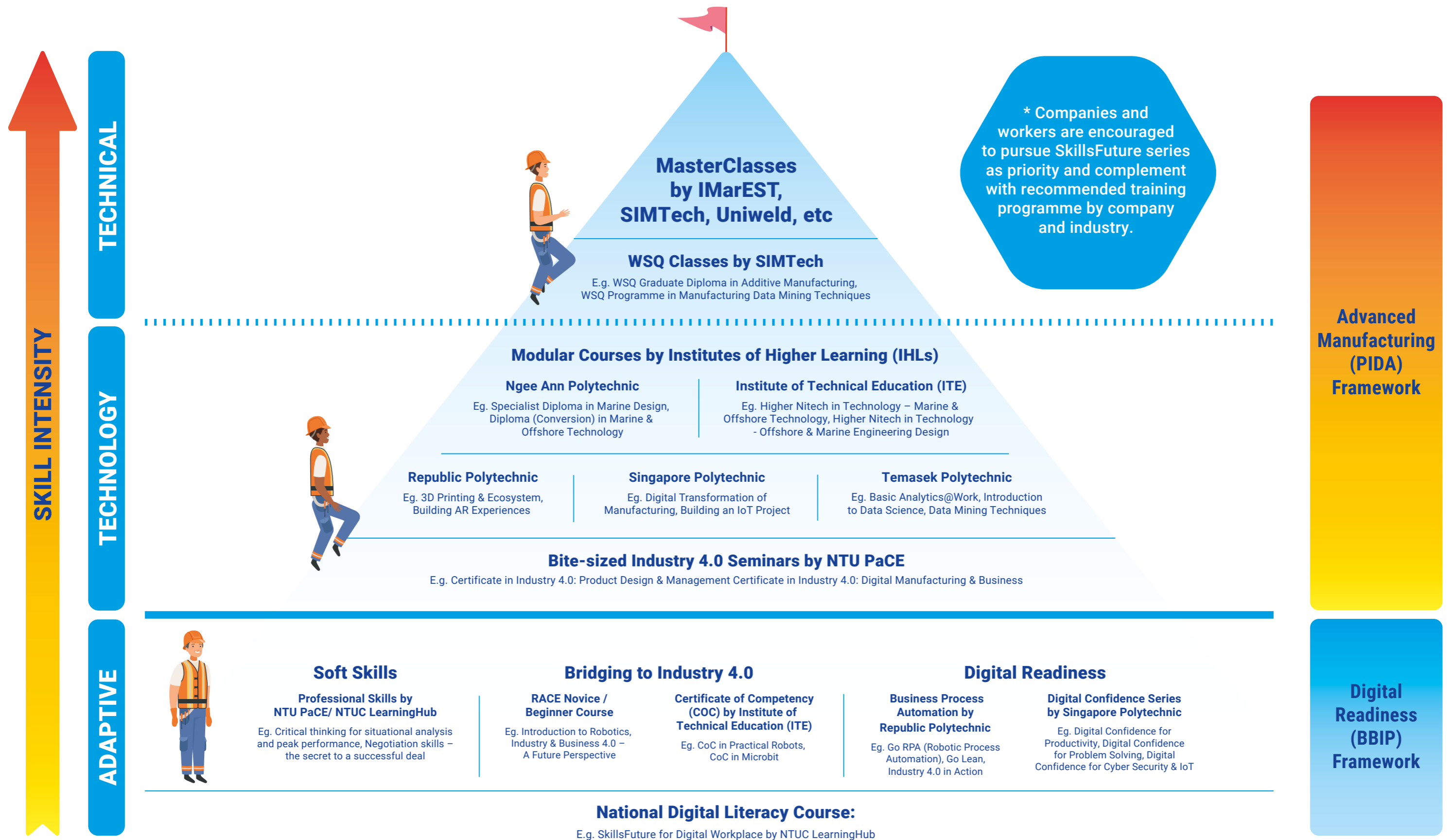
Examples:

- Introduction to Robotics
- Industry & Business 4.0 – A Future Perspective



* The examples listed here are not exhaustive, please contact e2i to tap on more training programmes from our network of Institutes of Higher Learning (IHLs) and Training Partners (TPs).

A Snapshot Of A Training Roadmap For Marine Worker 4.0



Course Listings of the Training Roadmap for Marine Worker 4.0

Masterclasses by IMarEST, SIMTech, Uniweld

- Marine Renewable Energy
- Offshore Windfarm Development
- Fundamentals of Metaocean Engineering
- Beyond Marine Spatial Planning – A training course in delivering Integrated Marine Management
- LNG Course includes containerization, current LNG market – supply & demand dynamics, industry overview & assessment of vessels types adopting LNG fuel, operations safety & efficiency
- Ballast Water & Biofouling
- Shipping
- Automation Welding Machine and Welding Production Management System
- Emerging Manufacturing Technologies - Design Optimisation for Additive Manufacturing

Masterclasses by SIMTech

- WSQ Graduate Diploma in Additive Manufacturing
- WSQ Programme in Implement OEE for Productivity Improvement
- WSQ Programme in Energy Efficiency Management
- WSQ Programme in Digital Transformation & Innovation (DTI)
- WSQ Programme in Manufacturing Data Mining Techniques
- WSQ Programme in Operations Management Innovation (OMNI)
- WSQ Graduate Diploma in Advanced Welding Technologies
- WSQ Programme in Corrosion Protection

Modular Courses by Institutes of Higher Learning (IHLs)

Ngee Ann Polytechnic

Modular under Diploma in Engineering (Marine)

1. Fundamentals of Naval Architecture Analysis
2. Fundamentals of Hydrostatics
3. Marine Design
4. Marine Engineering Systems
5. Offshore Production Technology
6. Offshore Drilling & Structures
7. Engineering Materials
8. Marine Production Technology
9. Marine Project Management
10. Engineering Mechanics
11. Strength of Materials
12. Mechanics of Machines
13. Fluid Mechanics
14. Thermodynamics

Offshore Technology

1. Fundamentals of Naval Architecture
2. Fundamentals of Marine Engineering
3. Fundamentals of Marine Offshore Design
4. Fundamentals of Offshore Oil & Gas Technology
5. Fundamentals of Offshore Engineering

Modular under Specialist Diploma in Marine Production

1. Marine Production Process
2. Yard Layout Design
3. Marine Commissioning
4. Marine Specialisation in Hull, Outfitting & Shipwright

Modular under Specialist Diploma in Electrical Design and Operation

1. Electrical System Design
2. Electrical Project Management
3. Testing & Commissioning of Electrical Systems
4. Operation & Maintenance of Electrical Systems

Institute of Technical Education (ITE)

Autocad 2017 (Beginner and Intermediate)

Modular under Higher Nitec in Technology - Marine & Offshore Technology

1. Quality Engineering
2. Ship Systems
3. Welding Technology
4. Fabrication Technology
5. Pipe Design & Systems
6. Offshore Technology

Modular under Higher Nitec in Technology - Offshore & Marine Engineering Design

1. Engineering Graphics
2. Offshore & Marine Structure Design
3. Offshore & Marine Electrical System Design
4. Offshore & Marine Piping System Design
5. Offshore & Marine HVAC System Design

Republic Polytechnic

1. Warehousing Technologies and Management
2. Lean Transformation
3. 3D Printing and Ecosystem
4. Collaborative and Mobile Robotic Systems for Industrial Application
5. Building AR Experiences
6. Simulation Modelling

Temasek Polytechnic

1. Basic Analytics@Work
2. Introduction to Data Science
3. Data Mining Techniques
4. Data Visualisation
5. Introduction to Big Data & Analytics
6. Using Augmented Reality (AR) and Artificial Intelligence (AI) in Business and Training

Course Listings of the Training Roadmap for Marine Worker 4.0

Modular Courses by Institutes of Higher Learning (IHLs)

Singapore Polytechnic

1. Digital Transformation of Manufacturing
2. Industrial Robotised Polishing
3. Program and Operate Robots in Manufacturing
4. Robotic Process Automation
5. Selecting Additive Manufacturing (AM) Materials and Processes
6. Managing Quality and Safety in Additive Manufacturing (AM)
7. SolidWorks – 3D Modelling and Drawing
8. Advanced Manufacturing and Industrial IoT
9. Building an IoT (Internet of Things) project
10. IoT and Hybrid Mobile App Development
11. Practical Approach to Cloud Computing
12. Practical Approach to Wireless and Computer Networks
13. Appreciation of IoT and Data Management
14. Autonomous Robots and Computer Vision
15. Data Visualization with Tableau
16. Data Visualization with Python
17. Fundamental Data Analysis using Excel 2016
18. Introduction to AI and Machine Learning

Bite-sized Industry 4.0 Seminars by NTU PaCE (Each seminar is 2-3 hours)

Certificate Title: Industry 4.0: Product Design and Management

1. New Product Development - Planning & Design
2. Product Strategy and Modularization
3. Human Factors Evaluation
4. Digital integration, collaboration and product life cycle management

Certificate Title: Industry 4.0: Digital Manufacturing and Business

1. Fundamentals of Augmented Reality
2. Cybersecurity
3. Virtual reality in design, analysis and manufacturing
4. Robotics Applications
5. Additive Manufacturing

Certificate Title: Industry 4.0: Digital Manufacturing and Business

1. IoT based Mass Personalization
2. Digital Manufacturing, Condition Monitoring and Maintenance
3. Digital integration, collaboration and product life cycle management
4. Industry & Business 4.0 – A Future Perspective

Certificate Title: Industry 4.0: IoT Innovation Management

1. Introduction to Robotics
2. Introduction of AI and its Recent Success
3. Cutting Edge Technology in the Internet of Things
4. Augmented and Virtual Reality: Fundamentals and Applications

Soft Skills

Professional skills by NTU PaCe/NTUC LearningHub NTU PaCE

- Negotiation skills – the secret to a successful deal
- Critical thinking for situational analysis and peak performance
- Contract law

NTUC Learning Hub

- Critical thinking and Analytical Thinking Skills powered by Wiley
- Articulate & Discuss Ideas Powered By Wiley

Bridging to Industry 4.0

Certificate of Competency (COC) by Institute of Technical Education (ITE)

- CoC in Practical Robotics
- CoC in VTOL Aircraft (Drone) Repair, Operation & Maintenance

RACE Novice/Beginner Course by RACE

- Robotic &Automation (Apprentice Level 1)
- Robotic &Automation (Apprentice Level 2)

Digital Readiness

Digital Confidence Series by Singapore Polytechnic

- Digital Confidence for Productivity
- Digital Confidence for Problem Solving

- Digital Confidence for Communication & Collaboration
- Digital Confidence for Cyber Security & Internet of Things

Business Process Automation by Republic Polytechnic

- Go RPA (Robotic Process Automation)
- Go Lean

- Industry 4.0 in Action (Digital Confidence Track)

National Digital Literacy Course

- Skills Future for Digital Workplace (SFDW)* by NTUC LearningHub
- Others training providers at: <https://e2i.com.sg/individuals/skillsfuture-for-digital-workplace/>

* The proposed training programmes are not exhaustive, companies and workers should tap on funded programmes like SkillsFuture series as priority and beef up with training programmes recommended by industry and company's own in-house proprietary training programmes.

What is Worker 4.0?

Worker 4.0 is proficient in working with machines, using technology and tapping digital resources to be more productive at work.

Adaptive Skills

Ability to navigate and influence change and solve complex problems

Technology Skills

Knowledge and mastery of digital systems and programmes

Technical Skills

Job specific knowledge and skills



What Are Some of the Archetypes of Marine Worker 4.0?

Technician 4.0



Adaptive Skills

- Transdisciplinary thinking
- WSH culture/thinking
- Leadership
- Teamwork
- Managing diversity
- Service orientation
- Interpersonal Skills

Technical Skills

- Manufacture marine components
- Assemble ships, rigs & marine equipment
- Plan surface preparation & protection

Technology Skills

- Operate manufacturing machinery & tools, i.e.
- Addictive manufacturing
 - Computer numeric control
 - Robotics and automation application

What Are Some of the Archetypes of Marine Worker 4.0?

Production Engineer 4.0



Adaptive Skills

- Critical thinking
- Transdisciplinary thinking
- Innovation management
- WSH culture/thinking
- Problem Solving
- Communication
- Teamwork
- Interpersonal Skills

Technical Skills

- Manufacture marine components
- Assemble ships, rigs & marine equipment
- Plan surface preparation & protection
- Execute launching operations
- Coordinate commissioning
- Develop prototypes
- Coordinate maintenance & repair of equipment

Technology Skills

- Addictive manufacturing
- Computer numeric control
- Robotics and automation application
- Big data analytics
- Systems engineering skills
- Green shipping skills

Design Engineer 4.0



Adaptive Skills

- Critical thinking
- Computational thinking
- Drive innovation & research, i.e. green initiative, product innovation
- WSH culture/thinking
- Problem Solving
- Teamwork
- Communication

Technical Skills

- Develop technical drawings & design plans
- Develop remote operation capabilities
- Develop test prototypes

Technology Skills

- Advanced analytics & big data
- Rapid prototyping skills
- Systems engineering skills
- Green shipping skills

What Are Some of the Archetypes of Marine Worker 4.0?

Quality Assurance Engineer 4.0



Adaptive Skills

- Critical thinking
- Continuous quality improvement
- Change management
- Resource management
- WSH culture/thinking
- Problem solving
- Leadership
- Interpersonal skills
- Decision making

Technical Skills

- Develop quality assurance & quality control policies, processes, procedures
- Initiate external compliance audits
- Coordinate testing & commissioning
- Improve QA/QC performance
- Oversee QA/QC documentation & reporting

Technology Skills

- Advanced analytics & big data

Procurement Executive 4.0



Adaptive Skills

- WSH culture
- New business transactions/mode
- Service orientation
- Communication
- Lifelong learning
- Business negotiation
- Proposal writing

Technical Skills

- Drive procurement operations
- Develop sourcing strategies
- Oversee vendor selection & evaluation processes

Technology Skills

- Advanced analytics & big data
- Robotic process automation

What Are Some of the Archetypes of Marine Worker 4.0?

Project Engineer 4.0



Adaptive Skills

- Resource management
- WSH culture/thinking
- Teamwork
- Interpersonal skills
- Communication
- Business negotiation
- Business proposal

Technical Skills

- Oversee project plans & execution
- Manage project risks
- Manage project resources
- Manage warranty claims & variation orders
- Manage project quality

Technology Skills

- Advanced analytics & big data

WSH Officer 4.0



Adaptive Skills

- Change management
- Crisis management
- Critical thinking
- Emergency Response management
- Resource management
- WSH culture/thinking
- Problem Solving
- Teamwork
- Communication
- Decision Making

Technical Skills

- Deploy WSH programmes
- Develop WSH Management Systems
- Manage WSH performance
- Coordinate emergency response & incident & accident investigations

Technology Skills

- Advanced analytics & big data

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For enquiries or more information please contact us at:
<https://e2i.com.sg/contact-an-industry-specialist>
Or Call **6474 0606** from 9am-6pm (Mon to Fri) or 9am-1pm (Sat)

