



# Hydrographic Education and Training at Universiti Teknologi Malaysia

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## Commission No. 4



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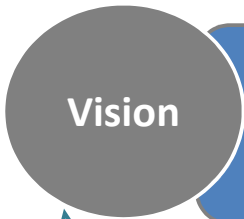
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Universiti Teknologi Malaysia (UTM), is one of Research Universities in Malaysia. The main campus is located in Johor Bahru south of Peninsular Malaysia and UM City Campus is located in Kuala Lumpur, the capital city of Malaysia. Universiti Teknologi Malaysia is one of the academic institutions in Malaysia that offers hydrographic courses in Malaysia.



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To be recognised as a world-class centre of academic and technological excellence



To be a leader in the development of human capital and innovative technologies that will contribute to the nation's wealth creation



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# UTM Quick Facts



Established	:	1904
Type	:	Research University
Vice Chancellor	:	Prof. Ir. Dr. Wahid bin Omar
<b>Postgraduate</b>	:	<b>12, 883</b>
<b>PhD Students</b>	:	<b>4,455</b>
Undergraduate	:	11, 392
International Student	:	5,043
Campus	:	UTM Johor Bahru Campus UTM Kuala Lumpur Campus



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(as at 30 June 2014)



# UTM Quick Facts



Malaysia Technology Expo (MTE2013)



National Robocon Competition

**13** S&T based faculties

Non S&T based faculties **8**

**10** Research alliances

Research centres **26**




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# UTM Faculties and Schools



S&T	Non S&T
Science	Built Environment
Electrical Engineering	Management
Civil Engineering	Education
Chemical Engineering	International Business School
Mechanical Engineering	Islamic Civilization
<b>Geoinformation &amp; Real Estate</b>	Perdana School of S&T Policies
Bioscience & Medical Engineering	School of Graduate Studies
Biomedical & Health Sciences	School of Professional and Continuing Education
Computing	
Petroleum Engineering & Renewable Energy	
Razak School of Advanced Engineering Management	
Advanced Informatics School	
Malaysian- Japan International Institute of Technology	



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# UTM Research Alliances



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# UTM Research Institute and Centre of Excellent



Institute for Environmental & Water Resource Management (IPASA)	Wireless Communication Centre (WCC)
Institute for Bioproducts Development (IBD)	Marine Technology Centre (MTC)
Ibnu Sina Institute for Fundamental Research (IIS)	Centre for Advanced Software Eng (CASE)
Automotive Development Centre (ADC)	Gas Technology Centre (GASTECH)
Institute of High Voltage & High Current (IVAT)	Composite Centre (CC)
Centre for Artificial Intelligence & Robotics (CAIRO)	<b>Institute for Geospatial Science and Technology (INSTEG)</b>
Institute of Coastal & Offshore Engineering (COEI)	Institute of Noise and Vibration (IKG)
<b>Centre for Real Estate Studies (CRES)</b>	Centre for Rural Development Study (PKPLP)
Institute of Advanced Information Tech (AITI)	Centre for Malay Achitecture Study (KALAM)
Steel Technology Centre (STC)	Centre for Tech Policy & International Study (CENTEPIS)
Photonics Technology Centre (PTC)	Advanced Membrane Technology Research Centre (AMTEC)



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# Faculty of Geoinformation and Real Estate



Faculty of Geoinformation and Real Estate (FGRE) was established on 14 Mac 1972. Presently, it comprises of two academic departments:

- Department of Geoinformation
- Department of Real Estate



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# Undergraduate Programmes



Bachelor of Engineering (Geomatic)

Bachelor of Science (Geoinformatic)

Bachelor of Science (Property Management)

Bachelor of Science (Land Administration and Development)



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# Master of Science (MSc) by Taught Course



Master of Science (Geomatic Engineering)

Master of Science (Geoinformatic)

Master of Science (Remote Sensing)

Master of Science (Land Administration and Development)

Master of Science (Real Estate)

Master of Science (Remote Sensing)

Master of Science (Asset and Facilities Management)

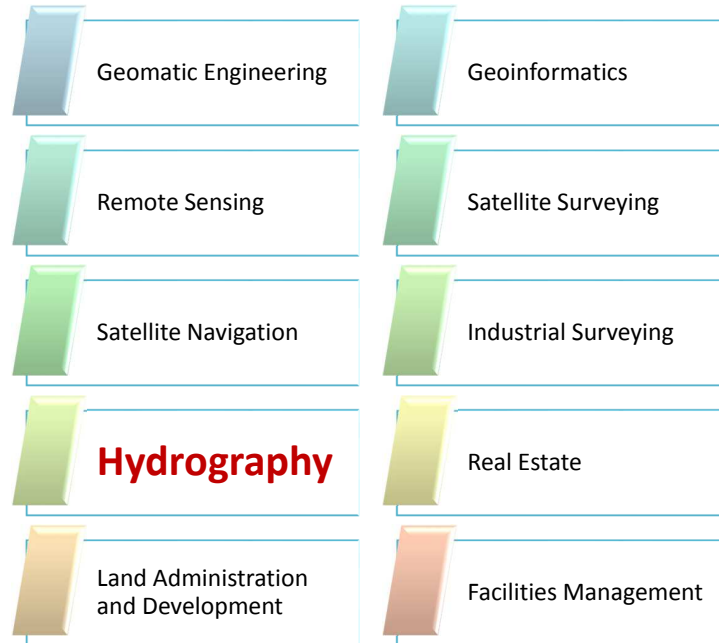


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# Master of Science (MSc) and Doctor of Philosophy (PhD) by Research



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# Research Groups



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# Hydrography Courses in UTM



## Short courses conducted in UTM:

- UTM HYDRO I Course
- UTM HYDRO II Course
- Short Courses on Tides
- Short Courses on Multibeam
- Short Courses on Marine Cartography
- Short Courses on FUGRO Employee Worldwide



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# Course in Hydrography



- Course in Hydrography UTM-HYDRO I Course (FIG/IHO/ICA Category B) with options to **Hydrography to Support Port Management and Coastal Engineering (Option 2)**, and **Inland Waters Hydrography (Option 7)** based on S-5 Eleventh Edition version 11.01.May 2011 Standard.



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# Introduction – HYDRO I



- In early 1990s with the initiative of Canadian International Development Agency (CIDA) under the influence of Mr. Tom McCollugh a professional hydrographic course was planned to be conducted in UTM.
- International Advisory Board was formed for the project that comprised of CIDA, UTM, Royal Malaysia Navy (RMN) and Institute of Surveyors Malaysia (ISM).



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# Introduction – HYDRO I



- In 1995, the International Federation of Surveyors (FIG) and International Hydrographic Organization (IHO) Advisory Board has recognized the HYDRO I course as meeting their Category B standards for the training of hydrographic surveyors and granted UTM a license to run the courses for the next five years.
- In 2007, the UTM-HYDRO I was re-accredited for another six years.
- Again in 2013, the third recognition was obtain from the FIG/IHO to run the HYDRO I Course in UTM.



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# UTM-HYDRO I Course



- UTM-HYDRO I which is equivalent to Category B is recognized by the International Hydrographic Organization (IHO) of the International Federation of Surveyors (FIG).
- 24 weeks of intensive course that covers all related subjects on hydrography.



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# Programme Duration



- This programme contains series of module and formal training sessions as well as additional practices, tutorials and field experiences.
- An intensive course that covers all related subjects on hydrography with total class duration of 30-32 hours per week.
- In total, the programme takes 24 weeks; divided into:
  - Lectures, tutorials, lab exercises, in-campus field exercises and examinations (20 weeks)
  - Hydrographic Field Survey Project (4 weeks)
- 



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# Aim & Objective of the Course



To produce hydrographic surveyors that fulfill the standards of competence for hydrographic surveyors according to the S-5 Standards of the International Hydrographic Organisation.

Each participant should be able to:

- To understand any hydrographic surveying project professionally and efficiently
- Participate effectively and productively in hydrographic surveys



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## Programme Mode, Code, Subjects And Credit Hours



The syllabus and the number of teaching hours that comprise the topics are presented :

NO	Mode	Code	Subject	
1	B	MA	Mathematics	22
2	B	CP	Computer Programming	30
3	B	PT	Physics Theory	30
4	B	PA	Applied Physics	24
5	E	GE	Geodesy	36
6	E	GS	Geodetic Surveys	48
7	E	ES	Hydrographic Positioning	44
8	E	TI	Tides: Theory and Practice	42
9	O	RS	Remote Sensing	16
10	E	HS	Hydrographic Surveys	98
11	E	HI	Hydrographic Information	32
12	E	OS	Dynamic Oceanography and Sedimentology	36
13	O	HP	Port and Coastal Engineering	32
14	E	RM	Marine Meteorology	18
15	E	SN	Seamanship and Navigation	46
16	E	LS	Law of the Sea	12
17	P	FS	Hydrographic Field Survey Project	120



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# Entry Qualification – HYDRO I



- At least Certificate or Diploma in Land Surveying/Geomatic Engineering/Civil Engineering or other related fields,



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# Course Assessment



GROUP I (Weight 1)	GROUP II (Weight 2)	GROUP III (Weight 3)
<ul style="list-style-type: none"> <li>• MA</li> <li>• CP</li> <li>• PT</li> <li>• PA</li> </ul>	<ul style="list-style-type: none"> <li>• RS</li> <li>• SN</li> <li>• LS</li> <li>• RM</li> </ul>	<ul style="list-style-type: none"> <li>• GE2</li> <li>• HS2</li> <li>• HI2</li> <li>• ES2</li> <li>• TI2</li> <li>• OS2</li> <li>• HP2</li> <li>• HFSP</li> </ul>



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# Course Assessment



The student will fail if they obtain :

- i) One grade under 40.0 or more than two grades between 40.0 and 50.0 in the subjects of GROUPS I and II.
- ii) One grade under 50.0 in any subject of GROUP III.
- iii) An average in any group of the subjects under 50.0.
- iv) A final average of the instructions under 50.0.
- v) One grade under 50.0 in the project.



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# UTM-HYDRO II Course



- UTM-HYDRO II course which is equivalent to Category A is recognized by the International Hydrographic Organization (IHO) of the International Federation of Surveyors (FIG).
- Five months of lectures and practical.



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# UTM-HYDRO II Introduction



- In 1998, UTM was first granted recognition to conduct the HYDRO II Course (FIG/IHO Category A) with first HYDRO II course was conducted in 1999.
- UTM was granted re-recognition to conduct the HYDRO II Course (FIG/IHO Category A) in 2008.
- Again in 2014, UTM has been granted to conduct the HYDRO II Course for another 4 years.



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# Entry Requirements



- At least Degree in Land Surveying or Geomatic Engineering or Civil Engineering or other related fields.

OR

- Fully accredited UTM HYDRO I (FIG/IHO/ICA) or Category B (FIG/IHO/ICA) certificate with at least 7 years experience in hydrographic surveying
- *(applicant with this qualification is required to submit a log book for evaluation and consideration by the Organizing Committee)*



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# Programme Duration



The programme contains:

- Series of modules and formal training sessions.
- Additional practices, tutorials and field experience.
- The total class duration per week is between **26 to 30 hours**.



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# Programme Duration



The programme contains:

- In total, the programme duration is **52 weeks** (including mid-semester break and semester break), divided as follows:
- The **38 weeks** of lectures, tutorials, lab exercises and in-campus field exercises, equipment demo or test and examination are equivalent to **1030 class hours** and,
- **8 weeks** of Hydrographic Field Survey Project is equivalent to **240 hours**.



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In summary, the total duration of HYDRO II is **1270** hours that can be divided as follows :

- a. Theory (**663 hours**)
- b. Tutorials, Lab Exercises, In-Campus Field Exercises (**319 hours**)
- c. Examinations (**48 hours**)
- d. Hydrographic Field Survey Project (**240 hours**)

The syllabus and the number of teaching hours that comprise the topics are presented :

NO.	MODE	CODE	SUBJECTS	HOURS
1	B	MA2	Mathematics and Statistic	96
2	B	CP2	Computer Programming	66
3	B	PY2	Physics	82
4	E	GE2	Geodesy	72
5	E	ES2	Hydrographic Positioning	100
6	E	TI2	Tides: Theory and Practice	80
7	O	RS2	Remote Sensing	36
8	E	HS2	Hydrographic Surveys	160
9	E	HI2	Hydrographic Information	70
10	E	OS2	Dynamic Oceanography and Sedimentology	70
11	O	HP2	Port and Coastal Engineering	59
12	E	RM2	Marine Meteorology	42
13	E	SN2	Seamanship and Navigation	57
14	E	LS	Law of the Sea	36
17	P	FS	Hydrographic Field Survey Project	240





# Programme Mode, Code, Subjects And Credit Hours



The syllabus and the number of teaching hours that comprise the topics are presented :

NO.	MODE	CODE	SUBJECTS	HOURS
1	B	MA2	Mathematics and Statistic	98
2	B	CP2	Computer Programming	68
3	B	PY2	Physics	82
4	E	GE2	Geodesy	72
5	E	ES2	Hydrographic Positioning	100
6	E	TI2	Tides: Theory and Practice	80
7	O	RS2	Remote Sensing	36
8	E	HS2	Hydrographic Surveys	160
9	E	HI2	Hydrographic Information	70
10	E	OS2	Dynamic Oceanography and Sedimentology	70
11	O	HP2	Port and Coastal Engineering	59
12	E	RM2	Marine Meteorology	42
13	E	SN2	Seamanship and Navigation	57
14	E	LS	Law of the Sea	36
17	P	FS	Hydrographic Field Survey Project	240



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## Facilities Available in UTM



UTM HYDRO I/II Classroom Room

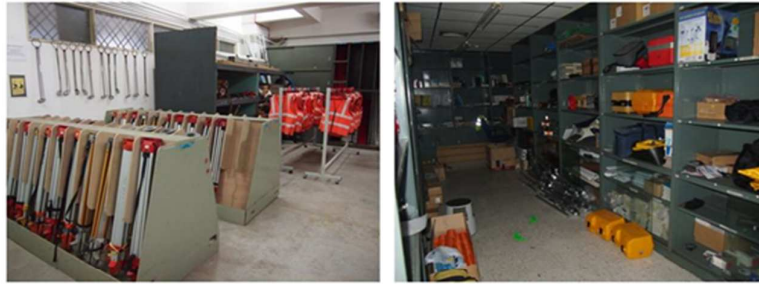


Engineering and Cadastral Survey Laboratory (1)



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Engineering and Cadastral Survey Laboratory (2)



Engineering and Cadastral Survey Laboratory (3)



Hydraulic and Hydrology Laboratory (building and boat) – (1)



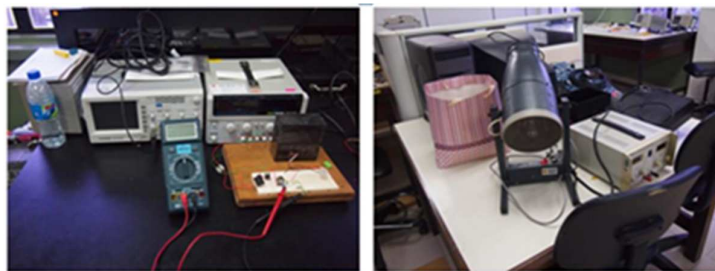
Hydraulic and Hydrology Laboratory (pool) – (2)



Marine Technology Centre (1)



Marine Technology Centre (2)



Physics Laboratory (Fiber Optics Technology Laboratory) (3)



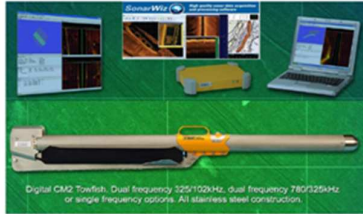
UTM Main Library (Sultanah Zanaiah Library)



UTM Main Library (24 Hours Study Room)



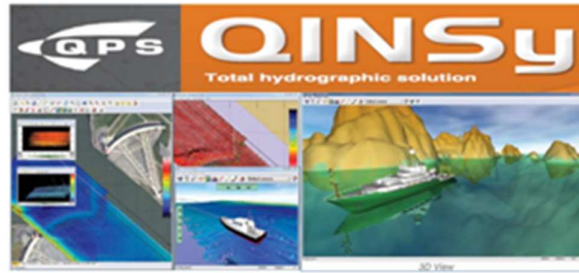
Fig. 2.32., Gyro Compass and Motion Sensor



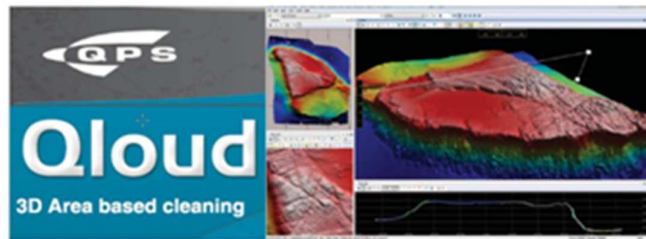
Side Scan Sonar C-MAX CM2 and Software SonarWIZ



Valeport: Tide Gauge and Sound Velocity Profiler



QPS QINSY 8.0 Hydrographic Software



QPS QINSY QLOUD - Data Processing and Validation Software

# Activities in Hydrographic Field Survey Project



Multibeam survey - system onboard



Sound velocity measurement using SVP





# Activities in Hydrographic Field Survey Project



Side Scan Sonar survey - system onboard



Multibeam data processing : patch test calculation



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# Activities in ALAM, Melaka



Training Facilities Survival at Sea, Swimming Pool, ALAM (1)

Seamanship and Navigation Module conducted in ALAM, Melaka



Training Facilities Survival at Sea, Swimming Pool, ALAM (2)



Ship Simulator Laboratory, ALAM (1)



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# Conclusions



- The two HYDRO I and II courses receive continuous demand and support from private and government sectors.
- Many of these agencies that involves in hydrographic works realised the needs of these hydrographic professional courses (HYDRO I and II) in conducting the hydrographic survey.
- Since early 2000, many UTM graduates (Diploma and BSc Geomatic) have been employed by companies in hydrographic surveying.



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# Conclusions



- Due to Oil and Gas activities, more Malaysian currently involves in offshore surveying, working with local and international companies.
- UTM is well known as an established institution conducting HYDRO I and II (FIG/IHO/ICA UTM Category A and B equivalent) hydrography course in South East Asian region.
- 17 UTM-HYDRO I Courses (1995-2014)
- 7 HYDRO II Courses (1999-2013)



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# Conclusions



- UTM is the first academic institution in this part of the region that offers these two professional courses HYDRO I and II to surveying and marine communities in Malaysia and its neighbouring countries like Singapore, India, Maldives, Sri Lanka, Indonesia and Brunei and other countries as far as Oman, UAE and Nigeria.



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# Acknowledgement



- Financial assistance from Malaysian Peninsula Land Surveyors Board (LJT).



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**Thank you for your attention!**

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