

BACHELOR OF GEOMATICS ENGINEERING WITH HONOURS
Faculty of Built Environment & Surveying
UNIVERSITI TEKNOLOGI MALAYSIA

Classification of Courses

Courses offered under this programme are based on the classification scheme shown in the table below:

Classification	Course Group	Credits	Total credit	Percentage
1. Programme Core	A. Survey Camp	3	77	58
	B. Core Courses	69		
	C. Industrial Training	5		
2. Elective Courses	D. Elective Courses	33	33	25
3. General Courses	E. General Courses	23	23	17
Total credit hours to graduate			133	100

Semester 1

Course	Course Group	Prerequisite	Credit	Total Credit
1. SSCE1023 Mathematics for Surveyors I	B		3	15
2. SBEU1032 Physics Theory for Surveyors	B		2	
3. SBEU1013 Fundamental of Survey & Mapping	B		3	
4. SBEU1093 Computer Programming	B		3	
1. UHIS1022 Philosophy and Current Issues (Local & International)	E		2	
2. UHMT1012 Graduate Success Attributes	E		2	

Semester 2

Course	Course Group	Prerequisite	Credit	Total Credit
1. SSCE1053 Mathematic for Surveyors II - Advance Calculus	B		3	17
2. SBEU1132 Applied Physics for Surveyors	B	SBEU1032	2	
3. SBEU1503 Cartography	B		3	
4. SBEU1043 Engineering Surveying	B		3	
5. UHLB1112 English Communication Skills	E		2	
6. UHMS1182 Appreciation of Ethics and Civilisations (Local)		2		
UHLM1012 Malay Language for Communication 2 (International)		2		
7. UBSS1032 Introduction to Entrepreneurship			2	

Semester 3

Course	Course Group	Prerequisite	Credit	Total Credit
1. SSCE2443 Statistic for Surveyors	B		3	16
2. SBEU2113 Mathematic for Surveyors III -Survey Computation	B		3	
3. SBEU2043 Engineering Surveying Technology	B	SBEU1043	3	
4. SBEU2602 Geodesy I	B		2	
5. SBEU2141 Survey Camp I	A		1	
6. UHIT2302 Science and Technology Thinking	E		2	
7. UXXX2XX2 Elective Generic Skills UXXX2XX2 Elective Enrichment of Knowledge		2		

Semester 4

Course	Course Group	Prerequisite	Credit	Total Credit
1. SBEU2412 Introduction to Adjustment Computation	B		2	17
2. SBEU2252 Satellite Positioning I	B		2	
3. SBEU2452 Photogrammetry I	B		2	
4. SBEU2513 Hydrographic Surveying	B		3	
5. SBEU2613 Geodesy II	B		3	
6. SBEU2151 Survey Camp II	A		1	
7. UHLB2122 Academic Communication Skills	E	UHLB1112	2	
8. UKQF2XX2 Co-Curriculum Service Learning			2	

Note: ¹Elective courses to be offered by Co-Curriculum Service Learning Centre

Semester 5

Courses	Course Group	Prerequisite	Credit	Total Credit
1. SBEU3XX3 Elective 1 ¹	E		3	16
2. SBEU3XX3 Elective 2 ¹	E		3	
3. SBEU3XX3 Elective 3 ¹	E		3	
4. SBEU3213 Field Astronomy	B		3	
5. SBEU3313 Cadastral Survey	B		3	
6. SBEU3161 Survey Camp III	A		1	

Note: ¹Elective courses to be offered, choose 9 credits. Elective courses will be advised by Programme Coordinator.

Semester 6

Courses	Course Group	Prerequisite	Credit	Total Credit
1. SBEU3XX3 Elective 4 ¹	D		3	17
2. SBEU3XX3 Elective 5 ¹	D		3	
3. SBEU3XX3 Elective 6 ¹	D		3	
4. SBEU3XX3 Elective 7 ¹	D		3	
5. SBEU3553 Geographical Information System	B		3	
6. SBEU3922 Technical Writing	B		2	

Note: ¹Elective courses to be offered, choose 12 credits. Elective courses will be advised by Programme Coordinator.

Short Semester

Courses	Course Group	Prerequisite	Credit	Total Credit
1. SBEU3905 Industrial Training - Practical & Seminar	C		5	5

Semester 7

Courses	Course Group	Prerequisite	Credit	Total Credit
1. SBEU4XX3 Elective 8 ¹	D		3	15
2. SBEU4XX3 Elective 9 ¹	D		3	
3. SBEU4313 Land Law and Survey Regulation	B		3	
4. SBEU4942 Undergraduate Project I	B		2	
5. UHLB3132 Professional Communication Skills	E	UHLB2122	2	
6. UKQT3001 Extracurricular Experiential Learning (Excel)			2	

Note: ¹Elective courses to be offered, choose 6 credits. Elective courses will be advised by Programme Coordinator.

Semester 8

Courses	Course Group	Prerequisite	Credit	Total Credit
1. SBEU4XX3 Elective 10 ¹	D		3	15
2. SBEU4XX3 Elective 11 ¹	D		3	
3. SBEU4372 Project Management for Surveyors	B		2	
4. SBEU4342 Professional Practice	B		2	
5. SBEU4944 Undergraduate Project II	B		4	
6. UHLX1XX2 Elective Foreign Language	E		1	

Note: ¹Elective courses to be offered, choose 6 credits. Elective courses will be advised by Programme Coordinator.

Elective Courses

No	Course Code	Course Name	Credit
1.	SBEU3253	Satellite Positioning II	3
2.	SBEU3283	Least Squares Adjustment	3
3.	SBEU3453	Photogrammetry II	3
4.	SBEU3403	Remote Sensing	3
5.	SBEU3523	Hydrographic Surveying Technology	3
6.	SBEU3893	Map Projection	3
7.	SBEU3323	Cadastre Survey Practice	3
8.	SBEU4743	Marine Geodesy	3
9.	SBEU4273	Underground Utility Mapping	3
10.	SBEU4803	Deformation Survey	3
11.	SBEU4823	Tidal Processing & Analysis	3
12.	SBEU4833	Terrestrial Laser Scanning	3
13.	SBEU4723	Falak Syarie	3
14.	SBEU4873	Law of the Sea	3
15.	SBEU4853	Geospatial Management & Implementation	3
16.	SBEU4863	Industrial Survey	3
17.	SBEU4913	Marine Cadastre	3
18.	SBEU4923	Geospatial Data Analysis	3
19.	SBEU4933	Airborne Survey	3

Syllabus Synopses

The following syllabus synopses address only the core and elective courses offered in this programme. Syllabus synopses for general courses are listed in the General Courses section. Students are encouraged to take courses offered in other programmes as free elective courses. However, students are advised to consult the programme coordinator before enrolling for any of these elective courses.

Core Courses

SBEU1013 - Fundamental of Survey and Mapping

This course introduces students to fundamental aspects of surveying and mapping. The basic surveying and mapping techniques as well as equipment are introduced and students will get the opportunity to use this equipment.

SBEU1093 - Computer Programming

This course is designed to provide knowledge in computer programming, which is essential for geomatics engineers. This course helps to solve many geomatics related problems such as surveying computation, graphical analysis and multimedia elements that are sometimes not offered by geomatics commercial software. The teaching concentrates on the concept, skills and techniques of problem solving using an appropriate programming language. A commercial programming language is used in this course. The programming exercises are designed to solve problems in geomatics engineering.

SBEU1032 – Physics Theory for Surveyors

This course is designed to provide students with the understanding, knowledge and exposure to the theory and concept of physics related to geomatics engineering and its associated technologies. The course covers topics of Electromagnetics of wave and sounds with its physical interaction, Wave Propagation, Gravity, Thermal and heat transfer, Orbital mechanics and Optics. Strong emphasis is given in relation to state-of-the-art geomatics measurements in retrieving and recording the environmental and geographical information. Students will be exposed to the fundamentals of physics through lectures, short computational experiments and scientific discussion in each topic.

SSCE1023 - Mathematics for Surveyors I

This course introduces students to basic math concepts and principles useful for survey computation and the overview or guide to computation processes unique to surveying and mapping. It provides students with a solid foundation in the fundamental theoretical aspects of the operations of arithmetic, algebra, geometry, and trigonometry, along with a broad range of techniques for applying the theory in survey computation, emphasizing their inter-relationships and applications to surveying and mapping.

SSCE1053 – Mathematics for Surveyors II

This course is designed to develop topics of differential and integral calculus, emphasizing on real numbers, functions, continuity and limits and derivatives. It provides students with the important ideas of calculus but emphasizing its application to surveying and mapping. This course includes the study of functions; limits and continuity; derivatives for functions of one-variable including algebraic, logarithmic, and exponential functions; interpretations of the derivative and its application in survey computation.

SBEU1503 - Cartography

This course focuses on topics such as introduction to cartography: Definition, concept, role of maps to people; Data and information: data sources, data capture, criteria, measurement, data gathering, data selection and processing; Principle, procedure and data transformation techniques for information; Generalisation: principle, data manipulation and processing using manual and computerized technique; Types of map, map element, topographical & thematic maps, charts, plans, large and small-scale maps; Cartographic communication: Introduction to cartographic communication model; Map design: procedures and layout, symbolization and their uses; Map production: principle, process, equipment and planning, photography, duplicating and printing; and Introduction to computer cartography: system and software.

SBEU1043 - Engineering Survey

This course is designed to introduce the theory and principles of different types of engineering surveys by the use of selected surveying projects and problems to enable a basic understanding of each topic to be gained. This course also provides both theory and application of computer assisted drafting/mapping, to develop skills through intensive practical work. Students will possess land survey drawing skills in computer assisted drafting.

SBEU1132 - Applied Physics for Surveyors

This course provides a cohesive understanding on the application of the concepts and related theories of physics in geomatics engineering. Students will be given modules that present the application of electromagnetics wave, microwave and radio frequency signals, Optical spectrum, Sounds wave, and Antenna and other reception

instrumentation in geomatics measurement. This course is anticipated to expose the state-of-the-art geomatics technologies and measurements relevant to the latest physics application. Lectures, computational exercise and scientific discussion through class debates and presentations are carried out in each module according to the course schedule. Students are strongly encouraged to complete the course of SGHU1032 (Physics theory) as a prerequisite to enrol in this course.

SSCE2443 - Statistic for Surveyors

This course is designed for mathematical statistics, emphasizing on summary statistics and statistical inference, histograms and sample statistics, probability, sampling distributions, tests of significance, correlation and regression. It provides students with the important ideas of mathematical statistics but emphasizing its application to surveying and mapping for supporting the need of the Geomatics engineer in geospatial data analysis. The focus is on practical Geomatics problems such as selecting the appropriate analysis, data preparation and input & output interpretation. The course features extensive use of computer software and writing to solve statistical problems related to Geomatics needs.

SBEU2113 - Mathematics for Surveyors III

This course provides some aspects of surveying computation related to various surveying problems. It examines various ways of solving problems, starting from the basic formulae to more advanced algorithms in achieving the results. The learning process is based on two modules; lectures and tutorials. This course encourages group working and students are allowed to discuss with each other to solve the given problems.

SBEU2043 - Engineering Survey Technology

This course provides basic theory of advanced electronic instrumentation in engineering surveys. It comprises of several aspects such as physical laws and frequency spectrum of electromagnetic waves; basic principle of electronic measurement using total station and Electronic Distance Measurement (EDM); Electro Optical and Microwave Distance (EOMD) measurements; propagation of electromagnetic waves in air; corrections of TS/EDM distances, errors in TS/EDM, and baseline configuration and calibration. In practical sessions, the student is exposed to automation data collection, processing, analysis and drawing using geomatics engineering software such as CDS and AutoCAD. In addition, the course also addresses present-day technology on Underground Utility Mapping, Digital Terrain Model (DTM) and road design.

SBEU2602 - Geodesy I

This course deals with the basic concept and knowledge of geodesy. This includes history on the determination of size and shape of the earth, fundamentals and principles of the geoid, sphere, ellipsoidal geometry, curves of the ellipsoid's surface, computation of geodetic coordinates, direct and inverse geodetic problems, geodetic datum (local and global datum) and deflections of the vertical. It also includes the coordinate systems, datum transformation and height system used in Malaysia. Lastly, it provides exposure on geodetic infrastructure and its current practice in Malaysia in order to improve student knowledge and skills on geodesy for positioning, mapping and other geomatics related applications.

SBEU2141 – Survey Camp I

This course provides students with the experience to carry out geomatics related projects such as planimetric and vertical control establishments. This involves field work practical (e.g., project planning and data acquisition via a combination of terrestrial and space observation technologies), laboratory work (e.g., data management and processing), report writing and presentation. Extensive laboratory work training on Digital Elevation Model (DTM), areas, contouring, and volume of earthwork are also provided throughout this course.

SBEU2412 - Introduction to Adjustment Computation

This course provides the principle and methodology for least square estimation (LSE) or/and least square adjustment (LSA). It emphasises on several key elements of LSE that comprises error in measurement, random variables, weight of observation, and observation on linear equations. The course features use of MATLAB software as a computational tool that is conducted via group and individual project works.

SBEU2252 - Satellite Positioning I

This course takes a basic look at student knowledge and skills related to satellite-based technology for positioning, mapping and other geomatics related applications. The contents consider basic theory, methods and data processing techniques for satellite-based positioning on GPS/GNSS.

SBEU2452 - Photogrammetry I

This course provides an understanding of the principles and theory in producing topographic map, plan, digital terrain model (DTM), orthophoto and rectified photo by using aerial photographs. It emphasises on the procedure for producing the map by applying analogue and analytical methods. Extensive laboratory works on the use of photogrammetric instruments and photogrammetry's software are included.

SBEU2513 - Hydrographic Survey

This course provides the concepts and principles of hydrography survey that comprises nautical and hydrographic charts production; ocean tides; seabed's depth and position determination. Students will be exposed to hydrography surveys planning, processing and plotting.

SBEU2613 - Geodesy II

This course provides advanced theory on geodesy that comprises methods and geodetic data processing as being practised in Malaysia. Establishment of horizontal and vertical control using GNSS and precise levelling will be conducted by the student. Details about map projection and coordinate systems in Malaysia will extensively be discussed.

SBEU2151 – Survey Camp II

This course is intended to provide students with experience to carry out field practical hydrographic surveying, photogrammetry survey and GPS survey that comprises data acquisition, processing and presentation. The field practical exposes students to project planning, flight planning, establishment of ground controls and tide gauge station, DGPS technique of positioning, depth measurement using MBES, data processing and chart production. Students will also be exposed to the use of current meter, side scan sonar (SSS) and unmanned aerial vehicle (UAV) during this field practical.

SBEU3213 - Field Astronomy

This course introduces the basic concepts of astronomy and its application in surveying. It exposes students to the concept of the universe, such as the galaxy and solar system that are related to procedures of field astronomy for the determination of astronomical geodetic control (i.e., azimuth, latitude and longitude) for cadastral surveying, geodesy and falak syarie (Islamic astronomy).

SBEU3313 – Cadastral Survey

This course provides information on the 2009 Cadastral Survey Regulations. It covers several topics such as, Role of the Survey Department, Land Office and Land Surveyors Board for Peninsular Malaysia; Coordinate systems and azimuth observations; Use and calibration of equipment; Cadastral classification; Survey datum; Measurement and booking for bearing and distance; Traverse survey and techniques to extend the line; Short lines measurement and Border demarcation; Types of boundary marks; Calculation for the reservation; Traverse bearing adjustment (c and m); Reparation of final calculation sheet; Certified plan drawing and updating for standard sheet or cadastral map; Refixation; and Working procedures at the Survey Department and CALS System.

SBEU3161 – Survey Camp III

The course is designed to execute cadastral survey projects. The standard and practice of cadastral survey will be implemented according to the Department of Survey and Mapping Malaysia guideline.

SBEU3553 - Geographical Information System

The course is designed to give the students a basic understanding of the Geographic Information System. All related philosophies, theories and methodologies of GIS are explained. Terminology, history of GIS, basic concepts, components of GIS, Geospatial database, application and recent issues are covered.

SBEU3922 - Technical Writing

The purpose of this course is to equip students with technical communication skills. With this skill students will be able to explain geomatics technology and related disciplines to technical and non-technical audiences. Effective technical writing clarifies technical jargon; that is, it presents useful information that is clear and easy to understand for the intended audience.

SBEU3905 - Industrial Training - *Practical & Seminar*

The main objective of this course is to equip students with knowledge on land survey according to the National Land Code 1965 (Title Ownership, Subdivision, Partition, Amalgamation, Surrender and re-alienation as well as Stratum Survey), Strata Titles Act 1985 (Party wall survey), Land Acquisition, Reservation of Land, Field to Finish, Engineering Survey, Topography Survey, Hydrography Survey, Utility Mapping Survey, Coordinated Cadastral System, National Digital Cadastral Database, eCadastre and Professional Ethics.

For the seminar program, the students will share their experiences and knowledge learnt throughout their industrial attachment. The seminar will be held 3 weeks after the students have completed their 15 weeks of attachment. Students who have completed their internship program are expected to identify some related case studies, produce a report and the student's analysis of the situation. Students are also required to present their training assessment attributes such as:

- Site and operational overview
- Job content and quality of work
- Supervisor and co-workers
- Learning experience

SBEU4313 - Land Law and Survey Regulation

The main objective of this course is to equip students with knowledge on land laws and land administration such as the National Land Code, Strata Title Act, Group Settlement Act, Malay Reserve Enactment, Survey Regulations and others which are being practiced presently by professional land surveyors in Malaysia.

SBEU4942 - Undergraduate Project I

The main aim of this course is to provide students with an understanding of research and research methods in the various fields of geomatics engineering. Students should be able to acquire skills in performing literature review, design and plan their research projects and write as well as present research findings. Students will also be exposed to the practices of managing research projects.

SBEU4372 - Project Management for Surveyors

This course provides training on project planning, organizing, and managing resources towards a successful completion of specific goals in projects related to geomatics engineering. These include a project's overview; time and cost estimation; project activities and schedule; risk planning; methodology, progress monitoring and sustainability of the operating system. In addition, the course covers an overview of the project manager and his role, project variables, corrective actions identification, risk factors, project output/delivery and cost-benefit analyses.

SBEU4342 - Professional Practice

The main objective of this course is to equip students with knowledge of the laws and regulations pertaining to professional land surveyor practices, registration, professional service contracts and related legal entities.

SBEU4944 - Undergraduate Project II

The main aim of this course is to provide students with an opportunity to apply their knowledge, skills and techniques of geomatics engineering. In this course, students will acquire skills in handling and managing their research project individually and independently with the direct supervision of a supervisor.

Elective Courses**SBEU3253 – Satellite Positioning II**

This course takes a systematic look at the aspects of GPS/GNSS carrier-phase measurement influencing user positioning accuracy. The course contents will consider methods and techniques mitigating the impact of various positioning errors. This includes system augmentation techniques employing real-time correction data links.

SBEU3283 – Least Square Adjustment

This course presents comprehensive principles, methodology and implementation of least square estimation (LSE) (or least square adjustment) of spatial data. In particular, it emphasises on the relevant topics of LSE, which include non-linear LSE, statistical analysis, quality of LSE, traverse adjustment, combined model, pre-analysis, solution of normal equation and sequential LSE. The course features extensive use of MATLAB and STARNET software as computational tools through group as well as individual project works.

SBEU3453 - Photogrammetry II

This course provides concepts and applications of photogrammetry as an extension of Photogrammetry I and the application of digital close-range photogrammetry. The students are exposed to the theory and practical use of relevant instruments and software through group as well as individual project works.

SBEU3403 – Remote Sensing

This subject introduces basic principles of remote sensing, emphasizing on all the basic aspects of the remote sensing process, interaction of electromagnetic radiation with objects of interest on the earth surface and in the atmosphere and platforms for acquisition of remotely sensed data. Students will learn about processing of satellite remotely sensed data with different spectral, spatial and temporal resolution in the laboratory work. At the end of the course, students will have knowledge on the basic principles of remote sensing and digital image processing, which is useful in the field of Geomatics for deriving geospatial information from the remotely sensed data, serving as the key input to the database updating for map production.

SBEU3523 - Hydrographic Surveying Technology

This subject is intended to give additional knowledge to the students concerning various technologies and techniques in support of the hydrography survey and various marine applications. The course emphasises on the principles of the hydrographic measurement, field survey preparation, system configuration and specification, procedures of data acquisition, elements of data processing and data presentation. The course covers several topics such as development in hydrographic surveying, Differential Global Positioning System, automation in hydrographic surveying, electronic chart, side scan sonar survey, multi-beam and multi-transducer seabed mapping, introduction to seismic survey, role of hydrographers in the oil industry, hydrographic survey in port developments and a brief on the law of the sea.

SBEU3893 - Map Projection

This course provides principles and concepts in map projections and its applications in surveying and mapping. The contents of this course cover basic mapping equations for plane (azimuthal), conical and cylindrical projections, geometrical characteristics of the projections, elements of distortions in map projections, and its mathematical functions. The Coordinate system and projections that are being used for surveying and mapping in Malaysia (RSO, Cassini, WGS84, GDM2000) will be introduced. The students will also be exposed on the generation of transformation modules for coordinate systems in 3D to 2D, and vice versa.

SBEU3323 - Cadastre Survey Practice

The main objective of this course is to equip students with knowledge on land survey according to the National Land Code 1965 (Title Ownership, Subdivision, Partition, Amalgamation, Surrender and re-alienation as well as Stratum Survey), Strata Titles Act 1985 (Party wall survey), Land Acquisition, Reservation of Land, Field to Finish, Coordinated Cadastral System, National Digital Cadastral Database, e-Cadastre, Multipurpose Cadastre, Marine Cadastre, Professional Ethic as well as issues and future trend in cadastre survey (3D Cadastre).

SBEU4743 - Marine Geodesy

This course provides basic concepts and knowledge on marine geodesy. The contents cover theory, methods and data processing techniques in terrestrial and satellite geodesy technology for marine geodesy. This course covers several aspects such as physical properties of seawater, marine circulation, wind-wave propagation and marine gravity. Moreover, marine geodetic infrastructure in Malaysia and its applications is also discussed.

SBEU4273 - Underground Utility Mapping

This course provides principals and understanding of underground utility surveying and mapping. The course covers several guidelines and standards that comprises different quality levels and methodology. Several important aspects are also provided such as electromagnetic waves and its propagation to ground-based soil; geophysical detection tools; electromagnetic locator and Ground Penetrating Radar; and utility database and data management. Students will also be exposed to the authority's requirements as well as updated technology in subsurface utilities installation and mapping.

SBEU4803 - Deformation Survey

This course provides principles of geodetic deformation survey and analysis for structural and ground-based deformation (landslide and crustal deformation). The course covers procedures in deformation survey, network adjustment, analysing and interpreting the deformation results. At the end of the course, students will gain experiences with several projects on deformation by applying these concepts and techniques.

SBEU4823 - Tidal Processing & Analysis

This course provides a comprehensive knowledge of tidal processing and analysis. These include exposure on the theory and principles of tidal processing; data acquisition; data management; data processing and tidal data analysis.

SBEU4833 - Terrestrial Laser Scanning

This course provides a new concept and technique of high accuracy of three-dimensional (3D) object measurement using Terrestrial Laser Scanning technology. In the course, students will be exposed to data collection and data processing using a geodetic terrestrial laser scanning technology and related point clouds processing software. At the end of the course, students will gain experiences on several projects such as landslide monitoring, structure deformation study, 3D topographic mapping and other geomatics related projects by applying these concepts and techniques.

SBEU4723 - Falak Syarie

This course provides principles and contemporary astronomical techniques that are being applied by worldwide Islamic countries including the Islamic Religious Authorities. The astronomical technique contributes to several Islamic applications such as Islamic calendar preparation, determination of Islamic daily prayer times, and direction of Qiblah.

SBEU4873 - Law of The Sea

This course provides comprehensive knowledge of the Law of the Sea such as the main legal concepts of the international legal regime governing the use of the oceans; the sea-bed and subsoil thereof; the issues related to regulations and sustainable use of ocean spaces particularly in areas beyond national jurisdiction; and also the different methods of the law of the sea as compared to national law in such matters as formulation and enforcement of the law and dispute resolution.

SBEU4853 - Geospatial Management & Implementation

This course provides guidance in selecting and implementing GIS. It presents descriptions of products offered by the top four GIS software developers. It also discusses the use of a GIS consultant to help you select and implement GIS, as well as GIS staffing issues.

SBEU4863 - Industrial Survey

This course provides students with the introduction and scope of industrial survey. It comprises background and concepts of industrial survey, methodologies and procedures of industrial survey, special instrumentations used in industrial survey and the computational aspect of industrial survey. This course also exposes students to the underground survey, which touches on the concept and its related problems as well as the methodology and instrumentation.

SBEU4913 - Marine Cadastre

The course concerns the fundamentals of marine cadastre and the needs of marine cadastre in the marine spatial planning, development and administration. The course emphasizes on the establishment of the marine cadastre system and the new requirements for sustainable marine records. It also provides an understanding of the current marine cadastre developments in Malaysia and worldwide.

SBEU4923 - Geospatial Data Analysis

This course provides an overview of spatial data analysis in Geographic Information Systems (GIS) for surveyors. Three main important areas in spatial data analysis are emphasized: visualization, exploration; and modelling. In addition, this course aims to develop both a theoretical understanding and a comprehensive practical grounding through the construction and integration of a range of spatial models. This course is roughly divided in to three parts. First is about the nature of the spatial data followed by spatial data analysis, the second part deals with the identification of spatial patterns (e.g., spatial autocorrelation, spatial clustering) and the third section refers to examples of spatial modelling.

SBEU4933 – Airborne Survey

The course provides principles for acquiring high accuracy data surveying and mapping using airborne survey techniques such as unmanned aerial vehicle (UAV), LiDAR and related mapping sensors. Students will be exposed to simulation projects such as mapping and monitoring by utilizing UAV and LiDAR.