UNDERGRADUATE Hand Book 2018-2019 Faculty of Geomatics



SABARAGAMUWA UNIVERSITY OF SRI LANKA







UNDERGRADUATE

Handbook 2018-2019 Faculty of Geomatics



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The Faculty of Geomatics, reserves the right at any time, with the approval of the Senate, to change or modify any aspect of any course or programme whenever, in its judgment, it becomes necessary or advisable to do so.

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UNDERGRADUATE Handbook 2018 - 2019

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1. SABARAGAMUWA UNIVERSITY OF SRI LANKA

The Sabaragamuwa University of Sri Lanka was established under the Universities Act Number 16 of 1978 on 07th November 1995 and ceremonially inaugurated on 02nd February 1996. Assigned to the university are the faculties of Agricultural Sciences, Applied Sciences, Geomatics, Management Studies, Technology, Medicine and Social Sciences and Languages set up at Belihuloya in Ratnapura District of Sabaragamuwa Province.

SUSL has nine study centres/units viz. Centre for Computer Studies, Staff Development Centre, Centre for Research and Knowledge Dissemination, The Career Guidance Unit, Centre for Open and Distance Learning, Centre for Indigenous Knowledge and Community Studies, Centre for Gender Equity and Equality, Internal Quality Assurance Centre, and University Business Linkage Cell established within the university.



1.1 Vision

"To be an internationally acclaimed centre of excellence in higher learning producing dynamic leaders and nation builders to guide the destiny of Sri Lanka".

1.2 Mission

"To search for and disseminate knowledge, promote learning, research and training to produce men and women proficient in their respective disciplines possessing practical skills and positive attitudes enabling them to contribute towards the manpower requirements of the nation. The university will be a centre of excellence for research and development for Sri Lanka in general and the Sabaragamuwa Province in Sri Lanka".

1.3 The faculties and degree programs

The Sabaragamuwa University of Sri Lanka offers following degree programmes through its eight faculties.

The Faculty of Geomatics offers B.Sc. Degree Programme in Surveying Sciences, through its two departments, the Department of Surveying and Geodesy and the Department of Remote Sensing and Geographic Information Systems (GIS).

The Faculty of Agricultural Sciences offers B.Sc. Degree Programmes in Agricultural Sciences and Management through its three departments, the Department of Livestock Production, the Department of Export Agriculture and the Department of Agribusiness Management.



The Faculty of Applied Sciences offers four-year B.Sc. (Special) Degree Programmes in Food Science and Technology, Environmental Sciences and Natural Resources Management, Chemical Technology, Computer Science and Technology, Applied Physics, Physical Sciences, Sports Science and Management, Physical Education, Computing and Information Systems through its five departments, the Department of Food Science and Technology, Department of Natural Resources, Department of Physical Sciences and Technology, Department of Computing and Information Systems and the Department of Sports Sciences and Physical Education.

The Faculty of Management Studies offers B.Sc. Degree Programmes in Business, Financial, Banking & Insurance, Marketing, Tourism, Hospitality and EcoBusiness Management through its four departments, the Department of Business Management, Department of Accountancy and Finance, Department of Marketing Management and the Department of Tourism Management.

The Faculty of Social Sciences and Languages offers B.A. Degree Programmes in Social Sciences and Languages through its four Departments, the Department of Social Sciences, the Department of Languages, the Department of Economics and Statistics and the Department of English Language Teaching.







which are dedicated to achieve all as and objectives

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qualifications through the Faculty of Graduate Studies (FGS). The availability of several non-traditional, yet technologically influential courses leading to graduate qualifications have left a positive mark upon the university, highlighting the distinctiveness of FGS-SUSL within the national university system.

Sabaragamuwa University of Sri Lanka (SUSL) offers its graduate

Faculty of Technology is the seventh faculty of the Sabaragamuwa University of Sri Lanka. It has been established in the main university premises at Pambahinna. The faculty comprises of two academic departments, namely, the Department of Biosystems Technology, and the Department of Engineering Technology.

The Faculty of Medicine in Sabaragamuwa University of Sri Lanka is the newest arrival to the chain of Medical Faculties in Sri Lanka. It becomes the 8th Faculty in the Sabaragamuwa University of Sri Lanka. The medical profession caters to one of the most crucial needs of the society. This Faculty comprises of 15 Departments which are dedicated to achieve all aspects of her academic mission and objectives







1.4 University logo



The university logo comprises a traditional oil lamp, rays of light, books, the Samanala (peak wilderness) mountain, gems, and sheaves of paddy, symbolising the region and the people that it serves and the ideas for which they stands. The traditional oil lamp and the rays of light denote the imparting of knowledge and enlightenment; books represent education; the Samanala Mountain and gems stand for the Sabaragamuwa Province and Ratnapura District respectively, and the sheaves of paddy symbols prosperity.

1.5 University flag



University flag comprises two colours maroon and gold, and the logo is in the centre of the flag. The maroon colour in the flag indicates maturity and the gold colour indicates the knowledge.

1.6 Officers and Administrative staff of the University

Chancellor

Officers

Vice Chancellor

Dean/Faculty of Geomatics Dean/Faculty of Agricultural Sciences Dean/Faculty of Applied Sciences Dean/Faculty of Management Studies Dean/Faculty of Social Sciences and Languages Dean/Faculty of Technology Dean/Faculty of Medical Dean/Faculty of Graduate Studies

Librarian Registrar Bursar

Administrative staff

Deputy Registrar/Academic Establishment Deputy Registrar/ General Administration Asst. Bursar/ Payments Asst. Bursar/Supplies Asst. Bursar/Accounts Asst. Bursar/Accounts Asst. Bursar/Revenue Asst. Bursar/EDPESU Senior Asst. Registrar/Academic & Students affairs Senior Asst. Registrar/Capital Works & Planning Most Venerable Prof. KamburugamuweVajiraThero

Prof. M. Sunil Shantha

Dr. H.M.I. Prasanna Dr. M.M.P. Sumith Prof. R.M.U.K. Rathnayake Prof. W.A.K.C. Gnanapala Dr. M. Ariyaratne Dr. A.D. Ampitiyawatte Prof. M.N. Wickramarathne Prof. H.M.S. Priyanath

Mrs. T.N. Neighsoorei Mr. V.D. Kithsiri Mr. K.A.R.S. Jayakody

Mr. Kamal Gunawardana Mr. J.G.P.U. Rathnayake Ms. G.K.N Udeshi Mr. V.K.S Thathumal Miss. N.W.M. Ishara Chamarie Mr. R.M.N.K. Rathnayake Miss. G.K.M. De Silva Ms. N.P. Wijendra Mr. G.A.D.M. Thennakoon Ms. Thamara Ranasinghe Senior Asst. Registrar/ Non -Academic Establishment Asst. Registrar/ EDPESU Asst. Registrar/Examinations Asst. Registrar/Faculty of Social Sciences & Languages Asst. Registrar/Faculty of Technology Asst. Registrar/Faculty of Medical Asst. Registrar/Faculty of Graduate Studies Asst. Registrar/Faculty of Agricultural Sciences Asst. Registrar/Faculty of Applied Sciences Asst. Registrar/Faculty of Geomatics Asst. Registrar/Faculty of Management Studies Asst. Registrar/ Legal & Documentation Asst. Registrar/ Office of the Vice Chancellor Assistant Internal Auditor Curator (Landscape) Works Engineer (Civil) Farm Manager Medical Officer

Ms WNPMNN Karunarathne Mrs. H.K.I.P. Abeysinghe Mr. T.D.A.M. Wijayarathne Ms. Y.S. Chandrasekara Mr DSRC Sawanawadu Mrs. I.U. Wijethungaarachchi Mr A Hisnathas Ms. M.D.N.K. Meddage Ms. A.A.Y Abeysinghe Mrs. H.H.k.N. Dharmasiri Miss. R.N. Neluwapathirana Mrs. P.B.N Fernando Mrs. M.P.G. Silva Mrs.C.H. Pathirana Mr. R.D. Rajapaksha Mr. W.M.L.M.K. Wijesundara Mr. C.N.K. Balasooriya Dr. W.M.A.S. Wijerathne

1.7 Student services and academic facilities

Financial assistance

Bursary and Mahapola Scholarship payments to the eligible students will be made through bank. Exact date of payment is subject to change from month to month, but will be notified in advance. For further information, please contact the Assistant Registrar (Academic & Student Affairs).

Students may open accounts with the Bank of Ceylon's (BOC) University Branch, near the main entrance or any other branch (BOC). They provide nearly all of the services of a regular bank branch office.



Canteen

The university canteen offers breakfast, lunch and dinner as well as tea, soft drinks and various snacks throughout the day. Hours of operation are from 7.00 a.m. to 9.30 p.m. It may be necessary to order main meals in advance. Hostel canteens are available for hostellers.



Libraries

The Lending and Reference Libraries contain large volumes of books and periodicals, including Hansard, Acts, Gazettes and daily newspapers in Sinhala, Tamil and English. The Surveying Section contains books on all the relevant disciplines and other allied subjects. There are also magazines and periodicals dealing with survey topics. The book collection is expanding rapidly.

Open hours are: Weekdays and Saturdays from 8.15 a.m. to 4.30 p.m. otherwise announced.

Books can be borrowed for a period of two weeks from the Lending Section while books in the Reference Section are available for overnight use only; they can be taken after 3.00 p.m. and returned before 10.00 a.m. the following day. Penalties for overdue books are as follows: Lending Section Books, one rupee (Rs.1/=) per day; Reference Library Books two rupees (Rs.2/=) per hour.



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Medical facilities

A student can obtain basic medical care at the University Medical Centre, which is open from 8.00 a.m. to 4.00 p.m. on weekdays. In addition, the Pambahinna Rural Hospital is located close to the university.

Regular mail

Incoming mail is sorted at the Main Office and then kept in student mailboxes in the Departments or at the Student Centre. To ensure that your letters reach you without delay, please request the sender to use the following address, including the postal code.

> Your Name & Registration Number, Relevant Department or Faculty, Sabaragamuwa University of Sri Lanka, P.O. Box 02, Belihuloya, 70140, Sri Lanka.

Regular postal services are available at the Sabaragamuwa University Sub Post Office. Note that to receive a money order from this post office; the sender must indicate the "Sabaragamuwa University Post Office" as the paying office. The post office is located just outside the main gate.

E-mail / Internet

Email and internet facilities are available at the faculty Computer Centres for students.







The career guidance unit

The Career Guidance Unit of Sabaragamuwa University was established in order to guide and facilitate undergraduates to improve qualities that enable them to be employed soon after graduation and to make sure a successful career development in the future.

Sports facilities

The sports facilities include a 25-metre swimming pool, two tennis courts, badminton, squash, volleyball and netball courts, weight lifting and exercise equipment. Please contact the Physical Education Department for details (Tel: 045-2280036).

Sith Arana counselling centre

All of us face various issues in our daily life which cannot be solved on our own. Every individual has the potential to face issues pertaining to studies and personal life; breaking up of love affairs, fear or anxiety, physical ailments. In order to get rid of these issues, Sith Arana offers you a very friendly service which would ensure your maximum privacy.

Welfare shop

You can purchase groceries, stationary, toiletries, soft drinks and snacks at the Welfare Shop. Opening Hours are: weekdays from 6.30 a.m. to 7.30 p.m. and Saturdays from 6.30 a.m. to 4.00 p.m.









FACULTY OF GEOMATICS

2. FACULTY OF GEOMATICS



2.1 Geomatics

The branch of science that deals with the collection, analysis, and interpretation of data relating to the Earth's surface.

Postal address:

Faculty of Geomatics Sabaragamuwa University of Sri Lanka P.O. Box 02, Belihuloya, 70140 Sri Lanka.

Telephone:

General 045-2280014

Dean/ AR / Faculty of Geomatics 045-3453009

Head/ Department of Surveying & Geodesy 045-3453071

Head/ Department of Remote Sensing & GIS 045-3453019

Fax:

045-2280015 (Registrar)

E-mail:

dean@geo.sab.ac.lk

2.2 History and present situation of the Faculty of Geomatics

The Faculty of Geomatics is one of the five faculties of the Sabaragamuwa University of Sri Lanka and was established in 2004. It is the successor to the Department of Surveying Sciences, which introduced the B.Sc. (Surveying Sciences) Degree Programme in 1997. This was the first time in the history of the university system in Sri Lanka that such a degree programme was introduced by a university fulfilling a much felt need of the country. The Degree Programme is a four-year course leading to a special degree. The first batch of students admitted to the degree programme in 1997 and graduated in 2002. Presently, the faculty has a student population of about 400 with the aim of producing 100 graduates annually.

The Faculty, with its predecessor, Department of Surveying Sciences, has a history of over 17 years with a total of about 900 students graduating since 2002.

The present faculty consists of two departments:

- (a) Department of Surveying and Geodesy
- (b) Department of Remote Sensing and GIS

The two departments jointly conduct the first five semesters of the degree programme as a Foundation Course, and within the next three semesters, offer five areas of specialization as (i) Surveying and Geodesy, (ii) Land Management, (iii) Hydrographic Surveying, (iv) Remote Sensing, and (v) GIS.

The four-year degree programme will cover principles of Surveying Sciences, Geodesy, Adjustment Theory, Cartography, Photogrammetry, Remote Sensing, GIS, Cadastre, Hydrographic Surveying as well as Mathematics, Physics, Computer Applications, Economics, Management, Environmental Science etc. The course has been designed with a greater emphasis for the enhancement in the proficiency in English.

The objective of the programme of studies is to make the recipient graduate a person with academic qualifications and technical expertise to practice the sciences of Earth and Space measurements. The degree programme will include an Industrial Training component to enhance the practical skills to assemble and assess land and geographic related information, to use that information for the purpose of planning and implementation for the efficient management of the land, the sea and the structures thereon.

The courses are designed not only with a view to provide qualified Professional Surveyors to the public, private sector and foreign employment but also to provide personnel to handle all land related aspects of Land Development, Land Settlement, Land Reclamation, Irrigation, Hydrography, Town and Country Planning, Forestry, Environment and all phases connected to the establishment of the Cadastre. There is greater emphasis on practical work using up-to-date equipment, computers and latest software. The course will include most of the modern technologies in the field of Surveying Sciences.

There is a high demand for graduates of Surveying Sciences with job opportunities in the government sector, private sector as well as overseas. The Faculty is proud to state that the employment rate among the past graduates is 100%.

The Faculty of Geomatics commenced the Master of Science in Surveying Sciences as of 2017. This qualification is at SLQF Exit Level 10.

2.3 Vision of the Faculty of Geomatics

To be the Centre of Excellence for teaching, training, research and application of Geo-spatial Sciences for the sustainable development of Sri Lanka.

2.4 Mission of the Faculty of Geomatics

To produce graduates in Surveying Sciences competent in Geodesy, Hydrography and Geographic Information Sciences, and dedicated to the management of land and ocean resources for national development.

2.5 Accreditations

The degree programme offered by the Faculty of Geomatics is recognized nationally and internationally through different world leading professional bodies in Surveying and Geomatics. This degree program fulfils the academic requirements to become a Registered Surveyor in Sri Lanka. Internationally, it is accredited by the Royal Institution of Chartered Surveyors (RICS) from 2015. Additionally, the specialisation degree in Hydrographic Surveying has also been recognised by the International Board on Standards of Competence (IBSC) for Hydrographic Surveyors and Nautical Cartographers in Category B level (FIG/IHO/ICA-Cat B). Moreover, the faculty is an academic member of the International Federation of Surveyors (FIG).

This reflects the quality of the degree programme offered by the faculty of Geomatics. Currently, our degree program is the one and only world class bachelors' degree relevant to Geomatics within the entire South Asian Region.



2.6 Industrial Links

The Bachelor of Science Honours in Surveying Sciences degree is a professional degree programme and it maintains very strong links with the industry. Currently, the faculty is having a very close cooperation with the Survey Department of Sri Lanka and National Hydrographic Office-NARA in conducting field visits and providing the industrial training opportunities to the undergraduates. With the later institution faculty has already made a memorandum of understanding (MOU) while expecting to make more MOU's with other institutions such as DMC, IWMI etc. In addition to that, the faculty is reaching out for much closer ties with the other government, semi-government and also with private sector institutes related to Geomatics field.

Students training, student exchange programs, possible staff exchange programs, etc. and also to recruit some foreign undergraduate students in due cause.

Further to that, The University Business Linkage Cell of Sabaragamuwa University of Sri Lanka was established with reference to the University Grants Commission Circular No.10/2016 from May 2018. The University Business Linkage Cell has taken the responsibility to link the University research and innovation activities with external business stake holders, This can be considered as promoting the faculty, as a service to the nation and on the other way, the faculty can generate extra income out of it for its' sustainability. The undergraduate students participate for these activities (especially the final year research students). Generally, these activities are organised in a way that they do not hinder the ongoing academic programme in a particular period. The experience and the exposure gained over these activities may invariably benefit the students. Furthermore, these activities enhance the quality of the degree programme and the university ranking as well.

2.7 Career opportunities

Graduates have a range of exciting career opportunities in area as land surveyors, land administrators, site managers or site engineers in many different areas in the government or in the private sectors including the surveying and property development, engineering and construction, cadastral, mining industries, hydrographic surveying and any other remote sensing and GIS related disciplines. Knowledge in geospatial and remote sensing would enable graduates to work as GIS analyst, image analyst, image interpreter and in other roles in the geospatial industry. Graduates of the program can readily assume useful roles in surveying profession. They may have career flexibility either to work outdoors or in the office.

Examples of potential employers include the Survey Department of Sri Lanka, National Hydrographic Office, various Land Surveying related firms, Construction companies, Local Councils, Hydrographic firms, Remote Sensing and GIS firms, Development and Planning agencies, etc. Graduate may also further their studies in the Postgraduate Programmes, in Surveying Sciences by the FOG and also various other related programmes offered either locally or internationally.

3. DEGREE PROGRAM

3.1 Graduate Profile

The graduate will act upon the social & physical development of the nation, using his knowledge in geospatial sciences in practice & research and taking necessary steps to sharpen his knowledge & skills continuously, and improve his interpersonal attitudes to act adequately to fulfil the requirements in his profession.

3.2 Program Learning Outcomes (PLOs)

The basic learning outcomes that must be demonstrated by the students at the end of the programme are summarised as follows.

Description of the Learning Programme

(a) Knowledge

- An adequate theoretical knowledge to plan and conduct Geomatics related projects
- Ability to use techniques, skills & modern tools to solve Geomatics related problems effectively & creatively
- To manage geo-spatial data effectively

(b) Skills

- Ability to apply his knowledge and skills to enhance the management of the natural and anthropogenic resources for the sustainable development of the nation
- Ability to think critically and solve problems efficiently
- Ability to lead a team effectively to achieve a common goal
- Ability to communicate effectively
- Ability to apply skills in financial, operational and human resource management
- Ability to apply entrepreneurial skills effectively

(c) Attitudes

- Ability to work independently & in collaboration with others
- Care of instruments and other resources
- Intellectual integrity, respect for truth & for the ethics of research & scholarly activities
- An ability to lead the community and the willingness to accept social & civic responsibilities
- Respect the values of the other individuals and groups, and an appreciation of human and cultural diversity
- Continuous professional and personal development

3.3 Duration of study and methods

The duration of the study is:

- (a) Minimum 8 semesters (4 years)
- (b) Maximum 16 semesters (8 years)

The methods of teaching and learning are as shown;

Directed Learning

Lectures	Power point presentation/Conventional delivery methods
Practical	Laboratory/Field/Demonstrations
Tutorial	Discussing and solving problems/questions with students
Student Centred	Students presenting certain topics in the curriculum, debates, homework,
Learning (SCL)	group/individual presentations
Seminar	Knowledge imparted by a resource person/expert to a 'class' with minimum or no practical component
Workshop	Knowledge imparted by a resource person/expert to a 'class' with the major portion comprising of hands-on experience

Independent Learning

SCL activities	Preparation for SCL activities in class
Assignments	Questions/Quizzes/Presentations/Demonstrations/Debates
Projects	Individual/Group activities involving a certain topic/activity
e-Learning	Use of electronic media, commonly the internet for education
Homework	Studies that a student has to do out of the class hours
Field visit	Report/ Presentations/ Viva
Revision	Working through the entire curriculum by oneself (before the final examination)

3.3.1 Type of study

This Bachelor of Science Honours in Surveying Sciences degree is offered as a full time course by the Faculty of Geomatics, Sabaragamuwa University of Sri Lanka at the main campus situated at Belihuloya. Further the medium of conduct of this course is English language.

3.4 Program Structure

The faculty offers BSc Surveying Sciences degree in five areas of Specialization. They are:

- 1) Bachelor of Science Honours in Surveying Sciences in Surveying & Geodesy
- 2) Bachelor of Science Honours in Surveying Sciences in Land Management
- 3) Bachelor of Science Honours in Surveying Sciences in Hydrographic Surveying
- 4) Bachelor of Science Honours in Surveying Sciences in Remote Sensing
- 5) Bachelor of Science Honours in Surveying Sciences in Geographic Information System

All students entering the faculty must follow the core courses (see Section 3.5) during the first five semesters. Selection for the specialization is done at the end of 3rd year 1st semester, based on personal preference and merit. According to the Sri Lanka Qualification Framework (SLQF) guidelines, a Bachelor of Science Honours degree needs to offer a minimum of 120 credits. However, as the BScHons (Surveying Sciences) degree is at

exit level 7 (SLQF - Sep. 2015), a student needs to complete a minimum of 150 credits to be eligible for graduation.

Of these 150 credits, 113 credits come from the common but compulsory core of the programme, with the rest from selected specialization courses.



Flow chart of the structure of the degree programme

Above figure shows that the core of the programme contains five (05) semesters, with two (02) semesters of taught specialization and one (01) semester for industrial training.

3.4.1 Selection Criteria for the Specialisation

The student should apply for specialization, indicating the preferences at the end of the 5th semester. However, if there are more applicants for a course than viable, examination results of the core programme will be considered. Additionally, a student needs to pass (i.e. at least "C" grades) all relevant pre-requisite courses from the core programme to be eligible for his/her choice of specialization. Following pre-requisite subjects have been decided by each Department.

Specialization	Pre-requisite Subjects
Surveying & Geodesy	FC 11218, FC 12243, FC 21114, FC 22130
Land Management	FC 31234
Hydrographic Surveying	FC 11216, FC11218, FC 11221, FC11319, FC 11322, FC 11544, FC 11249, FC 12217, FC 12120, FC 12323, FC 12325, FC 12243, FC 12545, FC 12260, FC 12361, FC 21212, FC 21114, FC 21324, FC 21328, FC 21129, FC 21241, FC 21342, FC 21546, FC 21248, FC 22211, FC 22213, FC 22226, FC 22130, FC 22238, FC 22239, FC 22547, FC 22351, FC 22362, FC 31327, FC 31133, FC 31234, FC 31335, FC 31236, FC 31337, FC 31140, FC 31254, FC 31465
Remote Sensing	(FC 22351 or FC 31327) and FC 31337
GIS	FC 11319, FC 31335

The student has to apply for his/her choice of optional courses, from the courses offered by each Department, before the commencement of the new semester. Then, he/she is allowed to add or drop courses until the end of the first week of the semester, if necessary.

At the same time, a student can apply for a greater number of courses than the number of courses required to earn the prescribed minimum number of credits. In this case, the student must choose and specify the courses that are to be counted for the Final Grade Point (FGP), and the grades of the rest of the optional courses will be recorded in the detailed transcript but not counted towards the calculation of the FGP. However, all decisions are subject to discussion and approval by the Faculty Board of the Faculty of Geomatics.

Section 3.5 and 3.6 contain the relevant courses for each semester, with the appropriate number of credits per course. This further includes detailed course outlines for each course, synopses, and course contents.

3.5 Foundation course

3.5.1 Course outlines

Year I – Semester I

Subject Code	Subject	Credit
FC 11216	Analytic Geometry and Linear Algebra	2
FC 11218	Basics in Land Surveying	2
FC 11319	Basics in Cartography	3
FC 11221	Calculus	2
FC 11322	Computer Applications	3
FC 11231	English I **	2
FC 11544	Land Surveying Practical I	5
FC 11249	Mechanics	2
FC 11150	Occupational Health and Safety	1
FC 11055	Sinhala I	Non credited
FC 11057	Tamil I	Non credited
TOTAL CRE	TOTAL CREDITS FOR YEAR I SEMESTER I	

**Compulsory, credited and non-GPA subjects.

Year I – Semester II

Subject Code	Subject	Credit
FC 12217	Basic CAD for surveyors	2
FC 12120	Basics in Environmental Sciences	1
FC 12323	Computer Programming	3
FC 12325	Descriptive Statistics and Probability Distribution	3
FC 12232	English II**	2
FC 12243	Land Surveying	2
FC 12545	Land Surveying Practical II	5
FC 12152	Personality Development and Conflict Resolution	1
FC 12056	Sinhala II	Non credited
FC 12058	Tamil II	Non credited
FC 12260	Vector Calculus and Spherical Trigonometry	2
FC 12361	Waves and Vibrations	3
TOTAL CRE	DITS FOR YEAR I SEMESTER II	24

**Compulsory, credited and non-GPA subjects.

Year II – Semester I

Subject Code	Subject	Credit
FC 21212	Adjustment Computations	2
FC 21114	Advanced Land Surveying	1
FC 21324	Database Management Systems	3
FC 21328	Electricity and Magnetism	3
FC 21129	Electronic Distance Measurement	1
FC 21241	Geometric Geodesy	2
FC 21342	Inferential Statistics and Numerical Methods	3
FC 21546	Land Surveying Practical III	5
FC 21248	Management	2
FC 21159	Technical Communication	1
TOTAL CREDITS FOR YEAR II SEMESTER I		23

Year II – Semester II

Subject Code	Subject	Credit
FC 22211	AC Theory and Circuits	2
FC 22213	Advanced CAD for Surveyors	2
FC 22226	Differential Equations and Mathematical Methods	2
FC 22130	Engineering Surveying	1
FC 22238	Fundamentals of Satellite Based Positioning and Navigation	2
FC 22239	Geodetic Astronomy	2
FC 22547	Land Surveying Practical IV	5
FC 22351	Optical Remote Sensing	3
FC 22153	Philosophy and Critical Thinking	1
FC 22362	Web Based Developing Techniques	3
TOTAL CREDITS FOR YEAR II SEMESTER II		23

Year III - Semester I

Subject Code	Subject	Credit
FC 31327	Digital Image Processing	3
FC 31133	Entrepreneurship Skills	1
FC 31234	Fundamentals of Cadastre & Land Management	2
FC 31335	Fundamentals of GIS	3
FC 31236	Fundamentals of Hydrographic Surveying	2
FC 31337	Fundamentals of Photogrammetry	3
FC 31140	Geodetic Computations	1
FC 31254	Professional Practice	2
FC 31465	Survey Camp	4
TOTAL CRE	DITS FOR YEAR III SEMESTER I	21

Total number of credits in the Foundation Course is 113 credits.

3.5.2 Course Description

FC 11216 - Analytical Geometry and Linear Algebra

Synopsis

The course is

- To provide an understanding of fundamental concepts of plane and analytic geometry
- To familiarize students with the concept of linear algebra and its algebraic properties and the manipulative techniques necessary to use matrices in solving problems in Geomatics

Contents

Co-ordinates Geometry, Analytic Geometry, Matrices Algebra, System of Linear Equations, Eigen values vectors, Linear Transformations

FC 11218 – Basics in Land Surveying

Synopsis

This course introduces students to fundamental aspects of Land Surveying. The principle of surveying, definitions, introduction to conventional surveying and mapping techniques will be provided.

Contents

Introduction to Surveying, Units of measurements, Linear and angular measurements, Chain Survey, Chain survey applications, Plane Table Survey, Compass Survey, Introduction to Height Measurements, Levelling Measurements and Computations



FC 11221 - Calculus

Synopsis

This course is,

- To provide an understanding of fundamental concepts of calculus and real analysis
- To familiarize students with the concept of Mathematical Logic

Contents

Mathematical Logic, Function, Sequence and series, Limits and Continuity, Differentiation, Functions of Several Variables, Integration

FC 11319 – Basics in Cartography

Synopsis

This course provides a fundamental overview of cartography and its aspects

Contents

Introduction to Cartography and Maps, Data conversion techniques, Generalization& symbolization process, Contents of the map and layouts, Map reproduction

Practical Tasks - Draftsmanship

Line works, Lettering works, Symbolization, Plan drawing, Name placement

FC 11322 – Computer Applications

Synopsis

This course introduces students to fundamental aspects of Computer Techniques. Program Design and Basic programming techniques will be explained.

Contents

Introduction to computer system, Dos, Windows and Linux, Introduction of data, logic and arithmetic operation, Input output argument, Arrays, looping, flow controls, and sub function, Coding and Debugging, Communication Devices, Graphic Handling and problem solving

Including relevant practical tasks

FC 11249 – Mechanics

Synopsis

This course introduces students to fundamental aspects of Laws of Mechanics to predict forces in and motions of physical world.

Contents

Introductions and basics, Newton's laws of motion, Motion under gravity, Elastic and inelastic collisions, Work, energy, power, Introduction to Earth's gravity, Circular motion, Kinematics and non-uniform acceleration, Introduction to planetary motion, Introduction to space physics

FC 11544 – Land Surveying Practical - I

Synopsis

In this course, the students are introduced to the practical aspects of conventional land surveying. This includes the application of chain surveying, plane table surveying and compass surveying techniques in surveying of a small block and preparation of a survey plan. Additionally, they are exposed to sprit levelling, including the adjustments of a level instrument & computation of reduced level. Apart from that, various precautions for the errors and computations of corrections for error sources and adjustments procedures of the obtained missclosure are also included.

Practical Tasks

Chain Surveying, Plane Table Surveying, Compass Surveying, Adjustment of a Level, Levelling

FC 11150 – Occupational Health and Safety

Synopsis

This course will provide an overview of the occupational health and safety (OHS) management, especial concern on the construction site. This mainly concentrates on the development of knowledge and understanding towards the requirements and management of construction safety. This course will run as a two-day full-time seminar with collaboration of industry pioneers in OHS

Seminar contents

Introduction to Occupational Health and Safety (OHS), Workplace accidents and occupational safety, Legislations, Prevention and control hazards, Personal protective equipment, Safety signs and signals, First aid and work regulations, OHS standards and interpretations, OHS Management and policy

Safety First

FC 12217 – Basic CAD for Surveyors

Synopsis

This course provides both theoretical and practical introduction to computer aided designing for surveying applications. The primary goal of this course is to nurture and develop student's ability to use computer modelling applications to present and analyse spatial data electronically. The CAD software that is being taught is ZWCAD.

Contents

Introduction to CAD (using ZW CAD software), Basic drawing tools, Editing, Survey Plan Designing with CAD, Data merging, Familiarization with working parameters, Drawing file management, Coordinate input, Output

Including relevant practical tasks



FC 12120 – Basics in Environmental Sciences

Synopsis

This course provides a complete overview of the basic concepts of the environment and the science behind the various environmental activities.

Contents

Introduction to the Environment, Atmosphere, Water, Soils, Agro ecosystems and food production, Environmental hazards and hazardous chemicals, Forests, Energy, Environmental Impact Assessment (EIA)

FC 12243 – Land Surveying

Synopsis

This course is designed to introduce surveying techniques in land surveying using theodolite and tachometric techniques. Various angle measurement techniques, adjustment of a theodolite, theodolite traversing, error sources in theodolite survey and basic tacheometric techniques are included. Additionally, contouring and their applications are also discussed

Contents

Angle measurements & Sextant, Theodolite, Theodolite Survey, Tacheometric Survey, Contouring

Field visit on land surveying (ISM-Diyathalawa)

FC 12152 – Personality Development and Conflict Resolution

Synopsis

This course will provide an overview on personality development and conflict resolution skills. This aimed at the promotion of the strategies for the personality development of the undergraduates and conflict management. This will run as a two-day full-time workshop with collaboration of external resource personals and this is jointly organized by the faculty of Geomatics and the Carrier Guidance Unit of Sabaragamuwa University.
Workshop contents

1. Personality developments and Etiquettes

Know yourself, Time management, Goal setting, Motivation techniques, Observation skills, Effective listening, Public speaking, Leadership, Decision making, Self-grooming (confidence, social etiquettes, dressing)

2. Conflict Resolution

Understanding conflict & cooperation, Introduction to negotiation, Introduction to mediation, Introduction to conflict resolution

FC 12260 – Vector Calculus and Spherical Trigonometry

Synopsis

This course is,

- To provide an understanding of fundamental concepts of vector algebra, vector calculus and differential geometry.
- To provide an understanding of fundamental concepts of Spherical trigonometry and its application in *Geomatics*.

Contents

Spherical Geometry, Spherical Trigonometry, Vector Algebra, Lines and Planes in 3D Space, Deferential Geometry, Vector integration

FC 12325 – Descriptive Statistics and Probability Distributions

Synopsis

This course is,

• To enable the student to understand the basic concepts of statistics and the important role of mathematics in understanding them and utilize the descriptive statistical methods to analysis the Geostatistical data using standard statistical software

• To enable the student to understand the concepts of probability, random variables, and their distributions in application

Contents

Presenting Data, Measures of Location, Measures of Spread, Studying Relationships, Introduction to Probability, Random Variables and their Distributions, Probability Distributions, Checking for Normality

FC-12323 – Computer Programming

Synopsis

This course provides a complete overview of C++ programming, from idea to design and develop applications where it focuses on execution via the key functions of the programming

Contents

Introduction to C++ language, Introduction to Fundamental of C++ language, Flow control statements change the order of execution, Parameters and arguments, Arrays, Object Oriented Programming, Reference & Pointers

Including relevant practical tasks

FC 12545 – Land Surveying practical - II

Synopsis

In this course, the students are introduced to the practical aspects of theodolite and tacheometric surveying. Students will use these techniques in surveying of a small block and preparation of a survey plan. Additionally, they are introduced to various adjustments of a theodolite instrument, tacheometric constant determination, various errors in these techniques and computation of the traverse adjustment.



Practical tasks

Theodolite Surveying, Tacheometric Surveying

FC 12361 – Waves and Vibrations

Synopsis

This course introduces students to detailed behaviour of oscillating and vibrating systems and waves from fundamental concepts to real examples in physics and Geomatics

Contents

Simple Harmonic Motion (SHM), Damped-Harmonic motion, Fourier Theorem and applications, Propagation of SH waves in strings and extended media, Waves, Acoustics waves, Production and detection of Ultra-sonic waves, Distance measurements, Ray and wave aspects of light, Refraction and reflection from plane surface, Refraction a reflection from curved surfaces, Optical instruments



FC 21114 – Advanced Land Surveying

Synopsis

This course provides the theoretical knowledge on advanced survey techniques. The effect of curvature and refraction on survey measurements, precise traversing and levelling methods and curve ranging techniques are included.

Contents

Curvature & Refraction, Precise levelling, Precise Traversing, Curve Ranging

FC 21212 – Adjustment Computations

Synopsis

The main goal of this course is to convey the knowledge necessary to perform an optimal adjustment of redundant data. In order to keep mathematical derivations, brief and elegant, matrix notations have been used exclusively throughout the course. To help for better understand the theoretical concepts, a number of numerical examples (mostly originating from Geodesy and Surveying) are provided. Some parts of the content must be used for the techniques in "Students Cantered Learning" system.

Contents

Type of errors & error propagation, Optimal estimation, Least Square Adjustment, Detection of Gross & Systematic Errors

FC 21328 - Electricity and Magnetism

Synopsis

This course introduces students to facts, principles and concepts of Physics comprising topic of Electricity, Magnetism and Electronics to understand the real examples in physics and Geomatics.

Contents

Electrostatics, Capacitance, Magnetism, Electromagnetic (EM) waves

FC 21324 – Database Management Systems

Synopsis

This course provides a complete overview of Database Management. Database Design and Database Concepts will be explained.

Contents

Introduction to Database, Database Environment, Relational Model, Relational Algebra, Draw ER modelling, Normalization, SQL practice

Including relevant practical tasks

FC 21342 – Inferential Statistics and Numerical Methods

Synopsis

This course is,

- To enable the student to understand the theoretical and practical aspects of the foundation of statistical inference
- To enable the student to project the findings from a sample to the population and communicating the results to the general public
- To introduce numerical techniques implemented in MATLAB for the solution of in problems in Geomatics, topics covered include an introduction to MATLAB, error analysis, interpolation and curve-fitting, and numerical solutions to systems of linear equations.

Contents

Random Variables, Properties of estimators, Methods of point estimation, Interval estimation, Testing statistical hypotheses, Applications, Introduction and Error Analysis, Solving system of linear equations, Solutions of non-linear equations, Curve and Surface fitting by Approximating functions, Numerical differentiation and integration

FC 21129 – Electronic Distance Measurements

Synopsis

This course provides knowledge on electronic distance measurements techniques for surveying. This includes the basic principles, components of the EDM instruments, testing & calibration, measurement procedures & accuracies, data collection & processing via CAD software. The modern EDM instruments enable the automation of data collection, processing and analysis.

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Contents

Introduction, EDM Measurement Technique & Applications, Propagation of Electro Magnetic Waves & Errors, EDM Calibration, EDM in Surveying Applications

FC 21241 – Geometric Geodesy

Synopsis

This course provides basic concepts and knowledge of geodesy. This will include the history on determination of size and shape of the earth, fundamental principles of the geoid, sphere, ellipsoidal geometry, computation of geodetic coordinates, datum transformations and map projections.

Contents

Introduction to Geodesy, Figure of the Earth, Calculation of geographical coordinates, Datum transformations and map, Geodetic Triangulation and Computations

FC 21546 – Land Surveying Practical – III

Synopsis

In this course, the students are introduced to the practical aspects of precise traversing with theodolite, precise levelling, survey of a moderate block and blocking out survey. The data collection in moderate block survey will be done using the total station instrument. Establishment of the controls and detail traverses will be introduced. Additionally, simple circular curve setting out exercise will be provided.

Practical Tasks

Precise Traversing, Survey of a Moderate block, Curve Ranging, Precise Levelling



FC 21248 – Management

Synopsis

Management is an integral part of any organization and besides it is a part of everyone's personal and professional life, irrespective of the profession. Thus, having a basic understanding of the principles and practices of management adds a considerable value to the richness of the content of any degree programme. Accordingly, this course unit has been designed to provide the students with a basic level understanding of the theoretical and practical aspects of management.

Contents

Introduction, who is a manager? Overview of School of thoughts in Management, Managerial Functions, Overview of the functional areas of Management, Applications

FC 21159 – Technical Communication

Synopsis

This course will provide the skills needed to perform academic tasks, such as taking notes from written and oral texts, producing academic assignments and giving oral presentation related to their academic assignments. Through these tasks, students will practice various skills such as looking for information from various sources, extracting information from different text types, making notes of information obtained, expanding notes into coherent extended texts and presenting information as well as giving viewpoints in an oral presentation. This will run as a two-day full-time workshop with collaboration of external resource personals and this is jointly organized by the faculty of Geomatics and English Language Teaching Department (ELTD).

Workshop contents

Introduction, writing process and writing for a target audience, Clarity and readability, Effective reading and listening, Summarizing and reporting, Mechanics of writing, Types of technical reports, Group discussions, Making effective oral presentations

FC 22130 – Engineering Surveying

Synopsis

This course provides both theoretical and practical knowledge on engineering earthwork computation techniques involved for area and volume computations which are commonly required in various civil engineering projects and construction projects.

Contents

Profile and Gradients, Earthwork Calculations, Volume Computation, Modern methods for volume estimation

FC 22153 – Philosophy and Critical Thinking

Synopsis

This subject is to review the concepts, theories and practices of the philosophy, critical and creative thinking. Techniques on critical and creative thinking help students to be more realistic, innovative and far-sighted in their actions. This will provide a kind of constructive approach to develop student's thinking to be more matured and intellectual. This will run as a two-day full-time seminar with collaboration of external resource personals and this is jointly organized by the faculty of Geomatics and the Carrier Guidance Unit of Sabaragamuwa University.

Seminar

What is Philosophy? What philosophy can do? Introduction to creative thinking, Basic concepts of creativity, Creative thinking and creative personality,

FC 22113 - Advanced CAD for Surveyors

Synopsis

This course provides both theoretical and practical knowledge on custom built CAD software for surveying applications. SD CAD software is used in this course as the CAD software, which is developed by the Survey Department of Sri Lanka. This is widely used in both government and private sector in Sri Lanka.

Contents

Introduction & familiarization, Survey Plot designing, Block out, Surface generation, Route Designing & Earthwork

Including practical tasks and project work

FC 22211 - AC Theory and Circuits

Synopsis

This course introduces students to fundamental aspects of general circuit theory principles and equips them with the basic circuit theory skills needed for Geomatics

Contents

Introduction and Basics, Simple Circuits and Kirchhoff Laws, AC Theory, Circuits, Radio signals (wireless transmission), Uses of radio signals (Audio, Navigation, Radar, etc...), Semiconductors, Transistors, Introduction to digital electronics



FC 22226 – Differential Equations and Mathematical Methods

Synopsis

This course is,

- To provide an introduction in differential equation and their solutions
- To provide understanding of special Mathematical Methods that are use/apply in field of Geomatics

Contents

Introduction and Basic definitions, Order & 1st Degree D.E., Linear Differential Equation, Solutions of Partial Differential equation, Numerical solution of ordinary differential equations (with MATLAB), Fourier series and Transformation, Laplace transformation

FC 22238 – Fundamentals of Satellite-Based Positioning & Navigation

Synopsis

This course introduces students to fundamental aspects of Satellite Based Positioning & Navigation. This module will be explained the theoretical and essential practical understanding of the use of GPS in geodetic and GIS applications.

Contents

Introduction to Satellite Based Positioning & Navigation, Overview of GPS Operations and Design, Receivers and Measurements, Augmentation systems and Differential GPS (DGPS), Introduction to Civil GPS Applications, GPS Modernization

Practical Task

Basic Measurements with GPS, DGPS observations and processing, Realtime Kinematic observations, GIS data collection



Synopsis

This course introduces the principles and procedures of field astronomy for the determination of azimuth and position of control stations used in cadastral and geodetic surveying.

Contents

Introduction to Astronomy, Coordinate systems, Movement of the sun, Concept of Time, Azimuth Determination, Determination of Position, Star Programme & Latitude determination from circum-polar star





FC 22547 - Land Surveying Practical - IV

Synopsis

Here, the students are introduced to conducting of an engineering surveying task. Control survey, grid setting out and detail survey and levelling activities are involved. After the engineering plan preparation, a route designing and setting out task is provided. Apart from that, various documentation and progress presentations are included to provide a realistic scenario as in the real engineering task. This is an out-camped task including astronomical observations.

Practical tasks

Mobilizing & Camping out, General briefing, site reconnaissance, project planning & preparation, Control Survey (GPS/Total station/Levelling), Astronomical observations, Detail survey and levelling, Plan work and drawing (CAD plan), Setting out, Earthwork computation, Report writing & Project presentations

FC 22351 – Optical Remote Sensing

Synopsis

This course introduces students to basic knowledge of remote sensing, errors and corrections related to the satellite images.

Contents

Introduction to Remote Sensing, Definition & Description of Keywords, Formation & Description of an Image, Image interpretation, Image Distortions, Radiometric Corrections, Geometric Corrections, Satellite Systems, Digital Image Processing

Practical Task

Familiarizing to ERDAS Imaging Software, Display an image and view its properties, Visual image interpretation using the software, Applying geometric correction using software



FC 22362 – Web Based Developing Techniques

Synopsis

This course provides a complete overview of Web Base techniques, from idea to design and develop, web base applications where it focuses on web via the key functions of the web techniques.

Contents

Introduction to java language, Introduction to Fundamental of java language, Flow control statements change the order of execution, Parameters and arguments, Arrays and Strings, AWT and GUI applications in Java, Object Oriented Programming (OOP) in Java, Class, Constructors, Methods and Objects, Introduction to PHP and Database connectivity using SQL, Introduction to XML language, Ecommerce technology and Introduction of eLearning Technology

FC 31236 – Fundamentals of Hydrographic Surveying

Synopsis

This course provides Basic theoretical knowledge on Hydrographic Surveying and related disciplines. In brief, this consists of the development of the hydrographic field and its uniqueness, hydrographic positioning technique, conventional bathymetric techniques, introduction to tides and maritime law, various hydrographic applications.

Contents

Introduction and History, Hydrographic Positioning, Fundamentals of Underwater acoustic positioning, Tides and hydrographic datum, Introduction to bathymetric surveying techniques, Introduction to sediments & seabed topography, Introduction to law of the sea, Fundamentals of hydrographic planning & specifications, Introduction to various hydrographic applications



FC 31140 – Geodetic Computations

Synopsis

This course provides basic concepts and properties of ellipsoid for geodetic computations. This also delivers knowledge and experience of geodetic reductions and compute precise coordinates based on ellipsoid.

Contents

Introduction to Geodetic Computations, Computation of precise geodetic coordinates and comparison with astronomical quantities, Geodetic corrections and reduction

FC 31133 – Entrepreneurship Skills

Synopsis

This course will provide basic entrepreneurship skills for the students. This will run as a two-day full-time seminar with collaboration of external resource personals and this is jointly organized by the faculty of Geomatics and the Carrier Guidance Unit of Sabaragamuwa University.

Seminar

What is Entrepreneurship?, Entrepreneurial process and core topics, Theories of Entrepreneurship, Evaluation of Opportunities, Business plan, Resources, Managing an enterprise, Legal aspects, Examples and success stories

FC 31234 – Fundamentals of Cadastre & Land Management

Synopsis

This course provides a basic understanding of cadastre and land management, which includes key concepts, historical overview, national and international initiatives of cadastre and land management.

Contents

Introduction to cadastre and land management,Land as a scare resource, Historical development of cadastre, Systems of land registration, System of Deeds Registration, System of Titles registration, Deeds registration vs. Titles registration, Cadastral System in Sri Lanka, Post Independent land management issues in Sri Lanka, Land tenure, Land tenure reforms

Field visits

District Land Registry Office, BimSaviya Divisional Offices (Survey Office, Land Settlement Office and Registrar Generals Office)

FC 31327 – Digital Image Processing

Synopsis

This course introduces the satellite image enhancement, classification, accuracy assessment and applications.

Contents

Introduction to Image Enhancement, Enhancement Techniques, Stretching, Colour Composite Images, Image Classification, Image Analysis, Filters, Remote Sensing Applications

Practical Tasks

Enhancement using ERDAS software, Stretching using ERDAS software, Histogram Equalization using ERDAS software, Colour composite images using ERDAS software, Unsupervised classification using ERDAS software, Supervised classification using ERDAS software, Post classification using ERDAS software, Principle Component Analysis using ERDAS software, Texture Analysis ERDAS software, PCA using ERDAS software, apply filtering techniques using ERDAS software

FC 31335 – Fundamentals of Geographical Information System

Synopsis

This course provides a comprehensive knowledge and practical experience on Geographical Information Systems and related applications

Contents

Introduction to GIS and GIS Software, Geographic data models, Geo-databases (GDB), Geo-data collection, Digital Elevation Models (DEM), Data analysis, Design a GIS project

Practical Tasks

Displaying map data, navigating a map, looking at feature attributes, Symbolizing and labelling features, creating layouts, Finding, querying and creating graphs, Field calculations and joining tables, Hyper linking, Digitizing, Geo-referencing features, Geo-data analysis tools, GIS mini projects

FC 31337 – Fundamentals of Photogrammetry

Synopsis

This course provides a general overview of Photogrammetry from idea to basic components, measurements, and geometric properties of aerial photography. The course is further designed to provide an understanding of the concepts and methodologies of analytical Photogrammetry. Within the practical, the contents are applied.

Contents

Introduction to Photogrammetry, Aerial Camera Technology, Photographic Measurements, Properties of aerial photographs, Vertical Photographs, Geometric correction (Photographic refinement), Tilted Photographs, Principle of Stereoscopic photogrammetry, Stereoscopic parallax, Aerial Photography

Practical Tasks

Measuring Photographs, Stereoscopic Vision practice, Stereoscopic parallax measurements, Flight Planning



FC 31254 – Professional Practice

Synopsis

This course provides a complete overview of professional background, ethics of surveying profession, and guidelines related to the provision of service.

Contents

Introduction, Concepts of professionalism, Professional surveyor and legitimacy, Practice as a licensed surveyor in Sri Lanka, Organizational management, Project and financial management, Higher education and professional opportunities, Trends in Surveying profession

FC 31465 – Survey Camp

Synopsis

The objective of this survey camp is to provide the students an exposure to a real-world land surveying task. This includes: designing phase of the survey task, layout the necessary horizontal / vertical controls, detail survey including levelling, plan work and setting out work, Drawing LS, CS and earthwork estimation. Progress presentation and reporting, etc. Additionally, astronomical observations are also included. The total time allocation for the task is 4 weeks (20 days) including preparation to final office work and reporting.

3.6 Specialization courses

This section describes the specialization programs, conducted by the Faculty of Geomatics through its two departments.

a) Department of Surveying and Geodesy

- 1. Bachelor of Science Honours in Surveying Sciences in Surveying & Geodesy
- 2. Bachelor of Science Honours in Surveying Sciences in Land Management
- 3. Bachelor of Science Honours in Surveying Sciences in Hydrographic Surveying

b) Department of Remote Sensing and GIS

- 1. Bachelor of Science Honours in Surveying Sciences in Remote Sensing
- 2. Bachelor of Science Honours in Surveying Sciences in Geographic Information System



3.6.1 Specialization in Surveying and Geodesy - Department of Surveying and Geodesy

3.6.1.1 Course Outlines

Year III - Semester II

UP 41899 – Research Project***: 2 credits (proposal)

***the subject will be continued into the following semester (Year IV semester I) and evaluated as a single subject at the end.

Subject Code	Subject	Credit
SG 32211	Advanced Concepts of GNSS	2
SG 32314	Construction Surveying	3
SG 32216	Fundamentals in Physical Geodesy	2
SG 32217	Map Projections	2
Elective Subject*		2
UP 41899	Research Project – Part 1(Proposal)	2
TOTAL CREDITS FOR YEAR III SEMESTER II - Surveying and Geodesy		13

*should cover at least 2 credits from selected courses from other specializations. The selected courses will be given by the Faculty, based on the availability of resources etc. prevailing at any given time.

Year IV - Semester I

UP 41899 - Research Project***: 6 credits (4 – thesis and 2 – research paper)

***The subject is a continuation of the previous semester and will be evaluated as a single subject with a total of 8 credits.

Subject Code	Subject	Credit
SG 41212	Advanced Physical Geodesy	2
SG 41313	Applications of GNSS	3
SG 41215	Deformation monitoring and Analysis	2
SG 41218	Quantity Surveying	2
Elective Subject*		2
UP 41899	Research Project – Part 2 (Final Project with Technical paper)	6
TOTAL CREDITS FOR YEAR IV SEMESTER I - Surveying & Geodesy		17

*should cover at least 2 credits from selected courses from other specializations. The selected courses will be given by the Faculty, based on the availability of resources etc. prevailing at any given time.

Year IV – Semester II

IT 42798 - Industrial Training** : 700 hours – 7 credits.

**Compulsory, credited and non-GPA subjects.

NOTE: Total credits for Surveying & Geodesy specialization are 150 (113+37)

3.6.1.2 Course Description

SG 32211 – Advanced Concepts of GNSS

Synopsis

This course introduces students to advanced concepts of Satellite Based Positioning & Navigation.

Contents

GPS Measurements and Error Sources, Precise Positioning with Carrier Phase, Time and frequency Domain Description of GPS signals, GPS Receivers, and Open source GPS

SG 32314 – Constructing Surveying

Synopsis

This course provides both theoretical and practical knowledge on construction surveying. In particular, the study will emphasize on the understanding of various aspects of setting-out and as-built surveys of various engineering structures. Additionally, students have to familiar with the engineering drawings and industry related terminology.

Contents

Introduction to industrial surveys, Elements of industrial surveying, Computational aspects industrial surveying, building surveys, Bridge Surveys, Road surveys including highways, Tunnel surveys, Surveys for Irrigation Engineering, Pipe and cable laying, Power line surveys, Underground utility surveying

Practical Task

Field practical on construction surveying

Field Visit

Visit to a construction site

SG 32217 - Map Projections

Synopsis

This course provides a complete overview of Spa set-up, from idea to opening and to set up operation where it focuses on operations via the key functions of the Spa Management.

Contents

Definition of Map Projections, Properties of Map Projections, Scale Distortion on a Map, Classification of Map Projections, The First Gaussian Fundamental Quantities (FGQs), Fundamental Transformation Matrix, Theory of Distortion, Stereographic Projections, Orthographic Projections, Gnomonic Projections, Lambert Conical Projection, Transverse Mercator Projection, Choosing a Suitable Map Projection

SG 32216 - Fundamentals in Physical Geodesy

Synopsis

This course deals with physical geodesy. It includes fundamentals in potential theory, gravity measurements and reductions, Earth external gravity field, and various height systems.

Contents

Potential theory, Gravity measurements, Height System



SG 41215 – Deformation Monitoring and Analysis

Synopsis

This course will provide the basic procedures in deformation monitoring and analysis. Implementation of pillar stability analysis, trend analysis and some advanced procedures in deformation analysis are discussed. The least squares estimate post-analysis for deformation analysis are introduced.

Contents

Introduction to deformation monitoring, Basic procedures in deformation analysis, Geodetic deformation analysis, Least square post-analysis for deformation analysis, Pillar stability analysis, Pillar stability analysis procedures by Furrier Analysis, Trend analysis, Deformation modelling, Applications of deformation monitoring, Latest developments in deformation analysis

Project on Deformation Analysis, Field Visit

SG 41212 – Advanced Physical Geodesy

Synopsis

This course deals with advanced concepts of physical geodesy. It includes Earth's external gravity potential with relevant mathematical formulation and global/local geopotential modelling.

Contents

Introduction to Earth's external gravity potential and global geo-potential modelling, Earth's external gravity field, Global and local geo-potential modelling

SG 41218 – Quantity Surveying

Synopsis

This course provides a basic knowledge on the construction industry, role of the quantity surveyor and procurement stage in the aspect of quantity surveying.

Contents

Introduction to construction industry, Role of a quantity surveyor, Pre contract stage of a construction, Building construction technology, Measurement practice, Rate analysis, Preparation of a Bill Of Quantity (BOQ), Post contract stage of a construction

SG 41313 – Applications of GNSS

Synopsis

This course introduces students to the theory and concepts of GNSS integration with other sensors and its applications.

Contents

Introduction to GPS and inertial navigation systems (INS) integration, advanced concepts of GPS surveying, GPS applications, Future of GPS / GNSS applications

Practical Task

GPS surveying for precise positioning, GPS data processing with scientific software, GPS application development

UP 41899 – Research Project

Synopsis

This is the part II of the research project. In this course, the students are exposed to the basic research knowledge and skills in producing a research thesis including the planning and conducting data collection, data processing and analysis to address the project aims and objectives and making conclusions. Finally, formulating a scientific paper based on the research project and presenting it to the audience. This research project must be carried out in individual. The scope of the research must be related to the Surveying and Geodesy.

Contents

Workshops, Research work, Thesis writing, Scientific paper writing, Submission of the seminar paper, Submission of the thesis, Seminar paper presentation, Thesis presentation



IT 42798 – Industrial Training

Synopsis

The training is designed to provide the students the necessary exposure and opportunity to build up the skill and the confident to work in the industry. The respective specialized students are sent to various selected training institutions related to their specialized field of study for a period of a whole semester. Additionally, student must attend two workshops on Industrial training expectations and Effective CV writing & interview facing. Finally, students must produce a report containing the overview of the institution, site operational overview, job specifications and nature of the work, learning experiences and recommendations.

Workshops, implant industrial training, Report writing, Presentation& Viva



3.6.2 Specialization in Land Management – Department of Surveying and Geodesy

3.6.2.1 Course Outlines

Year III - Semester II

UP 41899 – Research Project*** : 2 credits (proposal)

*** the subject will be continued into the following semester (Year IV semester I) and evaluated as a single subject at the end.

Subject Code	Subject	Credit
LM 32321	Applied Project Management	3
LM 32223	Land Administration	2
LM 32226	Land Tenure and Property Rights	2
LM 32227	Land Valuation	2
Elective Subject*		2
UP 41899	Research Project - Part 1 (Proposal)	2
TOTAL CREDITS FOR YEAR III SEMESTER II - Land Management		13

*should cover at least 2 credits from selected courses from other specializations. The selected courses will be given by the Faculty, based on the availability of resources etc. prevailing at any given time.

Year IV - Semester I

UP 41899 - Research Project*** : 6 credits (4 – thesis and 2 – research paper)

***The subject is a continuation of the previous semester and will be evaluated as a single subject with a total of 8 credits.

Subject Code	Subject	Credit
LM 41122	Designing a Land Management Project	1
LM 41224	Land Law	2
LM 41225	Land Policy and Land Management	2
LM 41228	Spatial Data Infrastructure	2
LM 41229	Urban Planning	2
Elective Subject*		2
UP 41899	Research Project – Part 2 (Final Project with Technical paper)	6
TOTAL CREDITS FOR YEAR IV SEMESTER I - Land Management		17

*should cover at least 2 credits from selected courses from other specializations. The selected courses will be given by the Faculty, based on the availability of resources etc. prevailing at any given time.

Year IV – Semester II

IT 42798 - Industrial Training** : 700 hours - 7 credits.

**Compulsory, credited and non-GPA subjects.

NOTE: Total credits for Land Management specialization are 150 (113+37)

3.6.2.2 Course Description

LM 32321 – Applied Project Management

Synopsis

This course introduces students to the discipline of planning, organization, and managing resources to bring about the successful completion of specific goals and objectives in Geomatics project.

Contents

Introduction to project management, Project manager, Project administration, Financial Management, Delivery of project output, Project team in a cooperation

Workshops

Practically apply the concepts and theories of team work, critical decision making, and human resource management

LM 32223 – Land Administration

Synopsis

Land administration has evolved and continues to evolve as part of a wider land management paradigm. This course provides an adequate knowledge about Land Administration Systems (LAS) to undergraduate students. It introduces concepts, components and principles of land administration based on their historical settings. It enables students to understand the role of land administration system in a society and to link land administration with good governance concept. It elaborates the process of land administration and outlook its future.

Contents

Introduction to land administration system, Role of land administration, Land Administration activities worldwide, Future Trends

LM 32226 - Land Tenure and Project Rights

Synopsis

Land tenure plays an important part of social, political and economic structures of any country. Land tenure and property rights play an integral part of any land management activity. This course helps students to understand underlying principles and concepts of land tenure and property rights, which helps them to identify relationship among tenure security and sustainable development. It provides a complete overview of the factors effecting on tenure security and detailed picture of land tenure issues in Sri Lanka.

Contents

Introduction to Land Tenure and Property Rights, Land tenure security, Land tenure security and sustainable development, Land tenure reforms in Sri Lanka, Land tenure issues in Sri Lanka, Land conflict prevention

LM 32227 – Land Valuation

Synopsis

This course provides the students with the basic knowledge of land valuation with specific emphasis on types of valuation works, factors effecting the demand and supply of land, valuation methods and related laws. The course is guiding students through various topics related land valuation. Specially, Sri Lankan situation of land valuation will be discussed and analysed in detail.

Contents

Introduction to Land Valuation, Factors effecting the demand of land, Factors effecting the supply of land, Interest of properties, Methods of valuation, Land acquisition for public purposes, Relationship between cadastre and land valuation, Future trends in land valuation

LM 41122 – Designing a Land Management Project

Synopsis

This course aims to provide the practical experience needed in designing a land management project effectively for a selected area. The students need to identify and analyze the factors and design the project for the sustainability. Further, they have to produce a comprehensive report for the area based on their observations and they have to clearly mention the unique aspects prevailing in that area and making suggestions

Case Study

LM 41224 - Land Law

Synopsis

The course unit aims to impart a sound understanding of the laws in Sri Lanka and principles of Land Law & of the centrality of Land Law to society in an economic system based on the concept of private ownership, give students an understanding of how Land Law operates to regulate relationships between owners of property rights & to develop a critical awareness of law reform issues in Land Law, develop theoretical analysis & legal reasoning skills in the context of property law with a view to providing a foundation for more advanced study.



Contents

History of legal systems of Sri Lanka, the structure of the Constitution of Sri Lanka and special laws, Law of Property, Land partition, registration of documents ordinance, prescription ordinance and land acquisition act., Role of Surveyor in legal matters for different type of Land Surveys, Costs

LM 41225 - Land Policy and Land Management

Synopsis

Land management can be seen to play a coordinating role between land policy and land administration. The objectives of land management are to fulfil the environmental, economic, and social goals of land policy by planning, promoting and controlling efficient land use through the process of land administration. This course further elaborates this relationship by examining how economic, social and environmental drivers guide the development of land policies. The importance of the country context is considered and specifically focuses on Sri Lanka.

Contents

Introduction to Land Policy and Land Management, Land policy reforms in Sri Lanka, Post conflict land policies in Northern and Eastern province of Sri Lanka, Land policy improvements

LM 41228 – Spatial Data Infrastructure

Synopsis

This course provides the students with the basic knowledge of Spatial Data Infrastructure (SDI), with specific emphasize on policy, financial, stakeholders and standards related issues. The course is guiding students through various topics related SDI. Specially, Sri Lankan situation of National Spatial Data Infrastructure (NSDI) will be discussed and analysed in detail.

Contents

Introduction to Spatial Data Infrastructure (SDI), Stakeholders of SDI, Financing NSDI, Policy and legal issues of NSDI, Standards in support of SDI, SDI architectures

LM 41229 - Urban planning

Synopsis

This course is designed to introduce basic concept and theories of urban planning that are related to city planning of Sri Lanka.

Contents

Introduction, Planning Theories, Planning Techniques, Spatial forms of Sri Lankan town, Level Planning, Site planning project

UP 41899 – Research Project

Synopsis

This is the part II of the research project. In this course, the students are exposed to the basic research knowledge and skills in producing a research thesis including the planning and conducting data collection, data processing and analysis to address the project aims and objectives and making conclusions. Finally, formulating a scientific paper based on the research project and presenting it to the audience. This research project must be carried out in individual basis. The scope of the research must be related to the Land Management.

Contents

Workshops, Research work, Thesis writing, Scientific paper writing, Submission of the seminar paper, Submission of the thesis, Seminar paper presentation, Thesis presentation

IT 42798 – Industrial Training

Synopsis

The training is designed to provide the students the necessary exposure and opportunity to build up the skill and the confident to work in the industry. The respective specialized students are sent to various selected training institutions related to their specialized field of study for a period of a whole semester. Additionally, student must attend two workshops on Industrial training expectations and Effective CV writing & interview facing. Finally, students must produce a report containing the overview of the institution, site operational overview, job specifications and nature of the work, learning experiences and recommendations.

Workshops, implant industrial training, Report writing, Presentation& Viva



3.6.3 Specialization in Hydrographic Surveying – Department of Surveying and Geodesy

The specialization degree in Hydrographic Surveying is recognized by the International Board on standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC) for Category-B level in 2015.

3.6.3.1 Course Outlines

Year III – Semester II

UP 41899 – Research Project*** : 2 credits (proposal)

***the subject will be continued into the following semester (Year IV semester I) and evaluated as a single subject at the end.

Subject Code	Subject	Credit
HS 32331	Advanced Hydrographic Surveying	3
HS 32337	Tides	3
HS 32235	Oceanography & Marine Meteorology	2
HS 32236	Seamanship and Navigation	2
SG 32217	Map Projection*	2
UP 41899	Research Project – Part 1 (Proposal)	2
TOTAL CREDITS FOR YEAR III SEMESTER II - Hydrographic Surveying		14

*Compulsory course from the Specialization programme in Surveying and Geodesy.

Year IV - Semester I

UP 41899 - Research Project*** : 6 credits (4 – thesis and 2 – research paper)

***The subject is a continuation of the previous semester and will be evaluated as a single subject with a total of 8 credits.

Subject Code	Subject	Credit
HS 41138	Underwater Acoustics	1
HS 41332	Hydrographic Data Management	3
HS 41134	Law of the Sea	1
HS 41537	Hydrographic Practical	5
UP 41899	Research Project – Part 2 (Final Project with Technical paper)	6
TOTAL CREDITS FOR YEAR IV SEMESTER I - Hydrographic Surveying		16

Year IV – Semester II

IT 42798 - Industrial Training** : 700 hours - 7 credits

**Compulsory, credited and non-GPA subjects.

NOTE: Total credits for Hydrographic Surveying specialization are 150 (113+37)
3.6.3.2 Course Description

HS 32331- Advanced Hydrographic Surveying

Synopsis

This course provides Comprehensive theoretical and Practical knowledge on Hydrographic Surveying and related disciplines such as swath sounding systems, WADGNSS, Side scan sonar and offshore hydrographic surveying.

Contents

Advanced Hydrographic Positioning, Side Scan Sonar, Swath Sounding Systems, Offshore Surveying, Latest Developments

Field visit on Advanced Hydrographic Surveying

HS 32337- Tides

Synopsis

This course provides basic theoretical and practical knowledge on Tides and water level theory. During the lectures, a deeper knowledge of tide and current occurrences is provided and this is the main element that influenced ocean behaviour. This information is highly relevance for safe navigation, prediction services, geoid or vertical datum determination and etc.

Contents

Tidal Fundamentals, Tidal measurements, Tidal streams and currents, Tidal analysis & prediction, Tide tables, Co-tidal charts, Tidal modelling, Non-tidal water movements

Practical Tasks

Tidal Measurements, Tidal Analysis & Prediction, Tidal Products Field visit to Colombo Tide Station

SG 32217 – Map Projections

Synopsis

This is a compulsory subject for al hydrographic specialization students, which is offered under the Surveying and Geodesy specialization from the Department of Surveying and Geodesy.

Contents

Definition of Map Projections, Properties of Map Projections, Scale Distortion on a Map, Classification of Map Projections, The First Gaussian Fundamental Quantities (FGQs), Fundamental Transformation Matrix, Theory of Distortion, Stereographic Projections, Orthographic Projections, Gnomonic Projections, Lambert Conical Projection, Transverse Mercator Projection, Choosing a Suitable Map Projection

HS 32236 – Seamanship and Navigation

Synopsis

This course provides Basic theoretical knowledge on Seamanship & Navigation. Inparticular, the study will emphasize on the understanding of various aspects related to marine navigation & safety. A brief introduction to seamanship is also covered including the pilotage & ships behaviour.

Contents

Navigation, Seamanship, Pilotage, Small vessels

Field Visit on Seamanship & Navigation

HS 32235 - Oceanography & Marine Meteorology

Synopsis

This course provides basic theoretical knowledge on Oceanography & Marine Meteorology. This includes the physical properties of sea water and marine circulation dynamics which based on its types and effect of friction. In addition, this course also provides general circulation of the oceans and wind-waves and swells, oceanographic measurements.

Contents

Introduction to Meteorology, Weather Observations and Recording, Oceanography, Marine Geology and Geophysics

Field Visit on Oceanography to Oceanographic division - NARA

HS 41134 – Law of the Sea

Synopsis

The objective is to provide students a comprehensive knowledge about the aspect of maritime law. Specially, on understanding the nature and effects of the various regimes established by the 1982 United Nations Convention on the Law of the Sea and its implementing agreements. Finally, the boundary dispute resolution and the role of International Court of Justice (ICJ).

Contents

Liability, Law of the Sea, UNCLOS

HS 41138 – Underwater Acoustics

Synopsis

This course provides Basic theoretical knowledge on Underwater Acoustics. Acoustic wave generation, acoustic wave propagation through the water, scattering and refraction effects and various acoustic devices are also included.

Contents

Fundamentals of underwater acoustics, Acoustic wave generation, Propagation of acoustic wave in the water, Sound speed and refraction, Scattering and refraction, Noise and directivity, Echo reception and detection, Acoustic devices

HS 41332 – Hydrographic Data Management

Synopsis

This course provides both theoretical and practical knowledge on Hydrographic data management. In particular, the study will emphasize on the understanding of various aspects of manual & automated hydrographic data collection, marine GIS and SDI concepts, ENC and nautical chart development and updating processes.

Contents

Hydrographic data collection, Data capture, Data thinning & estimation, Hydrographic spatial databases, Marine GIS, Visualization & presentation of hydrographic data, Marine cartography, Charting

Field visit on Hydrographic data management at National Hydrographic office - NARA

HS 41533 - Hydrographic Practical

Synopsis

This is a practical oriented subject and the objective of this practical session is to provide hands on experience on hydrographic surveying and data processing. This will cover areas such as Control survey, shore lining, sounding datum, positioning, installation, integration and calibration of echo-sounders, data collection, log keeping, online data filtering, data post processing, sounding reduction, bathymetric plan. This task will run as an outstation task for continuous four (04) weeks duration. This will arrange towards the last quarter of the semester.



Practical Task

Briefing & System installation, System Testing & verification, Test Run & Calibration, Hydrographic surveying, Hydrographic Data Processing, Hydrographic Data Processing and bathymetric chart preparation, Bathymetric Charting, and Report Writing.

UP 41899 – Research Project

Synopsis

This is the part II of the research project. In this course, the students are exposed to the basic research knowledge and skills in producing a research thesis including the planning and conducting data collection, data processing and analysis to address the project aims and objectives and making conclusions. Finally, formulating a scientific paper based on the research project and presenting it to the audience. This research project must be carried out in individual basis. The scope of the research must be related to the hydrographic surveying.

Contents

Workshops, Research work, Thesis writing, Scientific paper writing, Submission of the seminar paper, Submission of the thesis, Seminar paper presentation, Thesis presentation

IT 42798 – Industrial Training

Synopsis

The training is designed to provide the students the necessary exposure and opportunity to build up the skill and the confident to work in the industry. The respective specialized students are sent to various selected training institutions related to their specialized field of study for a period of a whole semester. Additionally, student must attend two workshops on Industrial training expectations and Effective CV writing & interview facing. Finally, students must produce a report containing the overview of the institution, site operational overview, job specifications and nature of the work, learning experiences and recommendations.

Workshops, implant industrial training, Report writing & Viva

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DEPARTMENT OF REMOTE SENSING & GIS

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3.6.4 Specialization in Remote Sensing - Department of Remote Sensing and GIS

3.6.4.1 Course Outlines

Year III – Semester II

UP 41899 – Research Project*** : 2 credits (proposal)

***the subject will be continued into the following semester (Year IV semester I) and evaluated as a single subject at the end.

Subject Code	Subject	Credit
RS 32241	Advanced Photogrammetry	2
RS 32348	Artificial Neural Networks	3
RS 32243	Digital Elevation Modelling	2
RS 32347 Microwave Remote Sensing		3
Elective Subject*		2
UP 41899 Research Project – Part 1(Proposal)		2
TOTAL CREDITS FOR YEAR III SEMESTER II - Remote Sensing		14

*should cover at least 2 credits from selected courses from the other specializations. The selected courses will be given by the Faculty, based on the availability of resources etc. prevailing at any given time.

Year IV - Semester I

UP 41899 - Research Project*** : 6 credits (4 – thesis and 2 – research paper)

***The subject is a continuation of the previous semester and will be evaluated as a single subject with a total of 8 credits.

Subject Code	Subject	Credit
RS 41342	Advanced Remote Sensing	3
RS 41244	Digital Photogrammetry	2
RS 41245	Fundamentals of Space Science	2
RS 41246	Industrial Photogrammetry	2
RS 41149	Satellite Technology	1
UP 41899	Research Project – Part 2(Final Project with Technical paper)	6
TOTAL CREDITS FOR YEAR IV SEMESTER I - Remote Sensing		16

Year IV – Semester II

IT 42798 - Industrial Training** : 700 hours - 7 credits

**Compulsory, credited and non-GPA subjects.

NOTE: Total Credits for Remote Sensing specialization are 150 (113+37)

3.6.4.2 Course Description

RS 32241 – Advanced Photogrammetry

Synopsis

This course is design as an extension and unification of the mathematical background of the basic lectures, concerning fundamentals of Photogrammetry. This course provides the orientation procedure in analytical photogrammetry, including modelling of the measurement process beyond the collinearity.

Contents

Differential formula for a near vertical photograph, Model deformation, Introduction to analytical Photogrammetry, Analytical plotter, Analytical orientation procedures, Introduction to measurements of digital terrain models, Orthophotography, Ortho-mosaics, Aerial Triangulation, Analytical rectification using 2D projective transformation

RS 32347 – Microwave Remote Sensing

Synopsis

This course introduces students to impart the knowledge of Microwave Remote sensing and its applications, Passive and active microwave system, gain knowledge in the principles of microwave image analysis and interpretation

Contents

Introduction to Microwave Remote Sensing, Passive Microwave System and its Radiometry, Passive microwave interaction with atmospheric constituents, Active Microwave System & Basics, Airborne RADAR system, Space borne RADAR system, Geometric Distortions, Radiometry of RADAR, MRS Platforms and Sensors & Applications, SAR Interferometry (InSAR), Differential Interferometry

RS 32243 – Digital Elevation Modelling

Synopsis

This course provides students to an understanding of the fundamental principles and techniques of digital terrain modelling and visualization. Further course practical training on use of ARCGIS software to generate DEM from different source data, to form different product of DEM, and to use of interpolation techniques to create DEM

Contents

Introduction to DEM, Terrain Descriptors, Sampling Strategies & data collection for DEM, Digital Terrain Surface Modelling, Triangular network formation for surface modelling, Interpolation techniques for terrain surface modelling, Quality control in terrain data acquisition, Accuracy of DEM

RS 32348 – Artificial Neural Networks

Synopsis

This course introduces students to students to neural networks and fuzzy theory from an engineering perspective. In the identification and control of dynamic systems, neural networks and fuzzy systems can be implemented as model-free estimators and/or controllers

Contents

Neural Networks characteristics and History of development in neural networks principles, ANN terminology comparison with Biological Nervous System, Model of a neuron, Basic learning rules and theories, Feed Forward NN using Supervised Learning, Self – Organizing Neural Networks & Learning Vector Quantization Networks using Unsupervised learning, Recurrent Neural Networks, ANN Applications



RS 41149 – Satellite Technology

Synopsis

This course introduces students to fundamental aspects of Satellite Technology. Sub systems, orbital parameters, orbits, launch systems and perturbation forces act on satellite will be explained

Contents

Introduction to satellite technology, Satellite Sub Systems, Satellite orbits and trajectories, Perturbation forces, Satellite Launch, Propulsion system and launch vehicles, Satellite mission analysis, Spacecraft Environment, Satellite system engineering

RS 41244 – Digital Photogrammetry

Synopsis

This course is design to get knowledge about automatic and semi-automatic procedures in Photogrammetry. The course also features how to deal with digital imagery rather than analogy photograph. Working with DPW.

Contents

Introduction, Properties of digital imagery, Acquisition of digital images, Basic operations of digital images, Image matching, Normalized images, Introduction to DPW, Fundamental tasks in digital Photogrammetry, Matching Application, Development of Digital Photogrammetry



Practical Tasks

Introduction to working process of DPW, Automatic Orientation Process, Image matching, Automatic DEM generation, Automatic orthophoto generation, and Visualization, Feature extraction and CAD modelling Project Work

RS 41245 – Fundamentals of Space Sciences

Synopsis

This course introduces students to concepts of space physical science including the space environment and its effects on spacecrafts.

Contents

Introduction to space physical science, Space environment and its effects on spacecraft, Space applications, Space life science and humans in space, Space Management, Space resources and their use

RS 41246 – Industrial Photogrammetry

Synopsis

The course is designed to obtain an extended knowledge of modern photogrammetric instruments (UAV, TLS & etc.) and methods for spatial object models' creation or determination of spatial measurements. Furthermore, the course features to learn about applications of these methods in industry, construction, geology, architecture, medicine and other sectors.

Contents

Introduction to Close Range Photogrammetry, Devices and components, Camera calibrations, Methods and data acquisition, Applications of close-range photogrammetry, Terrestrial Laser Scanning (TLS), Errors and calibration, Data acquisitions, Geo-referencing and co-registering of multiple scans, Applications areas, Unmanned Aerial Vehicle (UAV) for Photogrammetry, Future trends and new application areas

Practical Tasks

Planning and Photography, Familiarizing with PhotoModeler software, working with camera and Calibration of cameras, building a 3D model and 3D measurements, Dense surface creation, Wireframe modelling and Multiphoto texturing a mesh, Individual Project work using close range images

RS 41342 – Advanced Remote Sensing

Synopsis

This course introduces students to concept of thermal remote sensing, SAR Polarimetry, LiDAR systems, Ground Penetration RADAR (GPR) and their applications

Contents

Thermal Imaging System, Introduction to Polarization in RADAR systems, Information on Polarimetric, Data Calibration in Polarimetric, Polarimetric Applications and Polarimetric Interferometry, LiDAR terminology, principles and system components, LiDAR Scanning Patterns, Error Sources and Platforms, Visualization of Point Clouds, Applications and Advantages, Ground Penetrating RADAR (GPR), Applications of GPR

Practical Tasks

Extracting information from thermal remote sensing data, Polarimetry data processing using Polarimetric Tool, LiDAR data processing using LiDAR Tool, Data processing with GPR software

UP 41899 – Research Project

Synopsis

This is the part II of the research project. In this course, the students are exposed to the basic research knowledge and skills in producing a research thesis including the planning and conducting data collection, data processing and analysis to address the project aims and objectives and making conclusions. Finally, formulating a scientific paper based on the research project and presenting it to the audience. This research project must be carried out in individual basis. The scope of the research must be related to the Remote Sensing.

Contents

Workshops, Research work, Thesis writing, Scientific paper writing, Submission of the seminar paper, Submission of the thesis, Seminar paper presentation, Thesis presentation

IT 42798 – Industrial Training

Synopsis

The training is designed to provide the students the necessary exposure and opportunity to build up the skill and the confident to work in the industry. The respective specialized students are sent to various selected training institutions related to their specialized field of study for a period of a whole semester. Additionally, student must attend two workshops on Industrial training expectations and Effective CV writing & interview facing. Finally, students must produce a report containing the overview of the institution, site operational overview, job specifications and nature of the work, learning experiences and recommendations. The industrial training is jointly handled by the industrial training unit (ITU) of the faculty of Geomatics and National Apprentice and Industrial training Authority of Sri Lanka (NAITA)

Workshops, implant industrial training, Report writing, Presentation& Viva

3.6.5 Specialization in GIS – Department of Remote Sensing and GIS

3.6.5.1 Course Outlines

Year III – Semester II

UP 41899 – Research Project*** : 2 credits (proposal)

***the subject will be continued into the following semester (Year IV semester I) and evaluated as a single subject at the end.

Subject Code	Subject	Credit
GS 32351	Advanced GIS	3
GS 32253	Disaster Management	2
GS 32254	Environmental Science	2
GS 32258 GIS Applications and Modelling		2
Elective Subject*		2
UP 41899 Research Project – Part 1(Proposal)		2
TOTAL CREDITS FOR YEAR III SEMESTER II – GIS 13		

*should cover at least 2 credits from selected courses from the other specializations. The selected courses will be given by the Faculty, based on the availability of resources etc. prevailing at any given time.

Year IV - Semester I

UP 41899 - Research Project*** : 6 credits (4 – thesis and 2 – research paper)

***The subject is a continuation of the previous semester and will be evaluated as a single subject with a total of 8 credits.

Subject Code	Subject	Credit
GS 41152	Colours in Cartography	1
GS 41255	Generalization and Symbolization	2
GS 41256	Geo-statistics in GIS	2
GS 41257	GIS Customization and Programming	2
GS 41260	Open Source GIS and Web Mapping	2
Elective Subject*		2
UP 41899	Research Project – Part 2 (Final Project with Technical paper)	6
TOTAL CREDITS FOR YEAR IV SEMESTER I – GIS 17		

* should cover at least 2 credits from selected courses from other specializations. The selected courses will be given by the Faculty, based on the availability of resources etc. prevailing at any given time.

Year IV – Semester II

IT 42798 - Industrial Training** : 700 hours – 7 credits

**Compulsory, credited and non-GPA subjects.

NOTE:

- Total credits for GIS specialization are 150 (113+37)
- Total number of credits in BSc. Hons. Surveying Sciences are 150 credits.

3.6.5.2 Course Description

GS 32351 – Advanced GIS

Synopsis

The course addressed an advanced geo information system such as 3D GIS system and advanced functions of GIS. It provides an overview for spatial data modelling for 3D GIS. Practical component in 3D analysis gives students the confidence to manipulate analysis and display spatial data.

Contents

Data Uncertainty, 3D GIS, Operations on attributes of Geographic objects, Multiple Overlapping Entities in Space, Advanced Analysis, Geo-spatial data modelling, The use of 3D GIS for planning and design



Practical Tasks

Database import and export using SQL, Statistical analysis, Regression analysis of spatial data, Advance data analysis, 3D modelling in GIS, 3D Surface Creation, Utilizing various 3D Visualization Techniques, and Analysis(Image draping, exaggeration, Protrusions and 3D symbols), Analysing surfaces in 3D, Analyst, Virtual reality, Visibility analysis, Landscape and visual impact assessment, Map algebra and cartographic modelling

GS 32253 – Disaster Management

Synopsis

This course covers a basic knowledge on natural and man-made disasters and management of disasters effectively. It is aimed at providing the appropriate skills for disaster management at a national and international level in areas of natural and man-made disaster, climate change, terrorism, etc.

Contents

Introduction to disaster management, Types of disasters, Climate changes and predictions, Reasons for disasters, Assessments of vulnerability to disasters

Practical Task

Disaster management mini project

GS 32254 - Environmental Sciences

Synopsis

This course provides a complete overview of basic concepts of geology and geography, and advanced concepts of the environment and the science behind the various environmental activities.

Contents

Fundamentals of Geology, Fundamental Concepts of Geography, Municipal Solid Waste (MSW), Environmental Physics, Environmental Chemistry, RS/GIS Applications for Environmental Management

GS 32258 - GIS Modelling and Applications

Synopsis

This course module focuses mostly on the concepts of modelling in raster-based GIS, while using some vector data as well. The GIS project design and management are also practiced by work in small groups on a selected modelling project.

Contents

Introduction to GIS models and modelling, Type of Models, Modelling applications, Modelling Automation

Practical Tasks

Perform GIS based modelling for given applications, Apply GIS modelling techniques for real world problem solving (modelling project).

GS 41152 – Colours in Cartography

Synopsis

This course provides a comprehensive knowledge and practical experience about colours and their uses to enhance the visualization aspects in cartography.

Contents

Fundamental aspects of colours, Basic colour theorems, Visual variables of colours, Colour charts, Problems in designing a colour chart, Colour choice for a map, Reasons to use colours on maps, Colours and the computer

GS 41257 – GIS Customization and Programming

Synopsis

This course will provide the necessary skills for building and implementing customized GIS mapping applications and geo-processing functions according to current industry standards. The tools and concepts we will cover comprise an introduction to programming languages and development practices commonly used to integrate, customize, automate and extend desktop GIS technologies to meet the specific needs of end users.

Contents

Introduction to Python Scripting and Programming, Geo-processing with Model Builder and its association with Python scripting in ArcGIS, Integration of Python scripting into GIS software (ArcGIS, QGIS and GRASS), Developing Python add-ins/plug-ins in GIS software (ArcGIS and QGIS)

GS 41255 – Generalization & Symbolization

Synopsis

This course provides a comprehensive knowledge and practical experience on cartographic generalization and symbolization

Contents

Introduction to Cartographic Generalization, Change of Geometry, Practical examples in generalization of different features, Methods of generalization, Introduction to symbolization, Cartographic symbols and their perception properties

GS 41256 - Geo-Statistics in GIS

Synopsis

The course provides a complete overview of Geo-statistics, in order to students who wish to apply spatial and geo statistical computing in research and consulting projects. The main objective is to equip the students to continue learning and applying geo-statistical techniques to own problems.

Contents

Geo-statistical computing, Exploring and visualizing spatial data, modelling spatial structure from point samples, Spatial analysis, Spatial prediction from point samples, Assessing the quality of spatial predictions, Spatial sampling, Interfacing R spatial with GIS, Point pattern analysis

Practical Tasks

Computational statistics with the R environment and the R Commander GUI, univariate descriptive statistics, and univariate exploratory data analysis, Statistical techniques to discover the relation between variables, Exploring and visualizing spatial data, Modelling spatial structure from point samples, Spatial data analysis, both graphical and numerical to find evidence of spatial structure, both over the whole area and locally, Spatial prediction from point samples (use the results of the spatial data analysis to predict over an interpolation grid by different methods), The concept of indicator variable

GS 41260 – Open Source GIS and Web Mapping

Synopsis

An introductory course that describes Open Source software for both desktop and internet GIS applications. Students will learn the concepts of Open Source software, and the leading desktop and web mapping Open Source software packages.

Contents

Introduction to FOSS GIS, Open data standards and SDI, Introduction to Open Source Internet GIS & Mapping, Web Mapping and Applications

Practical Task

Application of FOSS for a given application, Web GIS workshop, Design and implement a Web GIS application (project)

UP 41899 – Research Project

Synopsis

This is the part II of the research project. In this course, the students are exposed to the basic research knowledge and skills in producing a research thesis including the planning and conducting data collection, data processing and analysis to address the project aims and objectives and making conclusions. Finally, formulating a scientific paper based on the research project and presenting it to the audience. This research project must be carried out in individual basis. The scope of the research must be related to the GIS.

Contents

Workshops, Research work, Thesis writing, Scientific paper writing, Submission of the seminar paper, Submission of the thesis, Seminar paper presentation, Thesis presentation

IT 42798 – Industrial Training

Synopsis

The training is designed to provide the students the necessary exposure and opportunity to build up the skill and the confident to work in the industry. The respective specialized students are sent to various selected training institutions related to their specialized field of study for a period of a whole semester. Additionally, student must attend two workshops on Industrial training expectations and Effective CV writing & interview facing. Finally, students must produce a report containing the overview of the institution, site operational overview, job specifications and nature of the work, learning experiences and recommendations. The industrial training is jointly handled by the industrial training unit (ITU) of the faculty of Geomatics and National Apprentice and Industrial training Authority of Sri Lanka (NAITA)

Workshops, implant industrial training, Report writing, Presentation& Viva





EVALUATION CRITERIA

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4. EVALUATION CRITERIA

- A student following the curriculum of the Faculty of Geomatics will obtain 50% of the total mark of a course through continuous assessments including practical components (if any), and 50% through the final written examination.
- The final written exam shall be a One-hour paper for one credit (15 lecture hours) and a two-hour paper for two credits (30 lecture hours).
- The continuous assessments shall have a minimum of five (05) assignments for two-credit course and a minimum of three (03) assignments for one-credit course, at least one of which is a group task.
- A student needs to have **80%** attendance for theory class **and 80%** attendance for practical classes (If there is a practical component in the subject, to be eligible to apply for the written semester examination.
 - \circ 80% attendance is mandatory and only physical presence is counted. Excuses will be entertained (make-up assignments etc. will be given where necessary), but not be counted towards the attendance.
 - Half-Semester attendance will be published during the 8th week of the semester.
 - The attendance will be calculated at the end of the 15 week semester, and sent to the examination branch. At the same time the Faculty will display the eligibility list.
 - If the semester attendance of a student is:
 - Above or equal to 80% eligible to write the semester examination
 - Above or equal to 60% and below 80% the student is given an opportunity to attend the lectures/topics/ sections he/she had missed previously, and make up to the 80% of attendance. He/she can discuss with respective lecturer, and attend classes accordingly. This will be considered as a 'First' attempt
 - Less than 60% All subsequent attempts will be considered as repeat
 - An appeal board will be nominated by the Faculty board for consideration students' appeals in this regard

- A maximum of three (03) make-up CAs for a 2-credit subject and two (02) make-up CAs for a 1-credit subject, will be conducted at the end of the lecture series. Only excused (medical certificate (submitted within 14 days) or a formal letter from university confirming participation in university activities) students are eligible to sit for the make-up CAs. In the case of a funeral, only that of the student's parents, siblings, spouse and/or children is excused. This is the same for both CAs and semester examinations. If a student submits more than 3 medicals/excuses in the case of a 2-credit subject, and 2 in the case of a 1-credit subject, such cases will be open for discussion at the Faculty Board. However, the final decision of the evaluation criteria of a course, if there is a requirement for any change to above, shall be taken by the Faculty Board of Geomatics.
- If the absence to a semester examination is excused (medical certificate or formal letter from university confirming participation in university activities), the student will carry his/her CA marks of the respective theory subject to whenever they sit for the examination. In the case of a subject comprising a practical examination (i.e. Computer Programming etc.), the student carries his/her CA marks, practical marks and/or theory marks of that subject to whenever they face the examination.
- For a repeat (2nd or 3rd attempt) examination, CA or practical marks will not be considered. Instead, in the case where there is no practical component, 100% of the evaluation will be done through the examination paper. In the case of a subject with a practical examination, the student must sit both the practical and theory components, and 70% of the evaluation will be through the theory paper and 30% through the practical paper. Maximum grade for a repeat examination is 'C', that is 50 marks.
- All courses conducted as seminars/workshops are evaluated through attendance, SCL activities, and report.
- The evaluation criteria will be presented to the class by the respective lecturer/instructor as a handout on the very first day of the lecture/practical series.
- However, the final decision of the evaluation criteria of a course, if there is a requirement for any change to above, shall be taken by the Faculty Board.

Evaluation of the Land Surveying Practical Subject

-	Attendance	-	10%
-	Proper attire	-	10%
-	Field procedure	-	30%
-	Spot tests in Field Inspection	-	10%
-	Plan work / Computation	-	25%
-	Report	-	15%
			100%
-	Practical examination/Viva	-	Pass / Fail

• It is mandatory to obtain a PASS mark in the practical examination to obtain the final results.

• The course is evaluated using a Grade Point Average (GPA) system, and the final grade with the corresponding Grade Point (GP) is given in next Table.

Final Grade	Mark Obtained (M)	Grade Point
A +	M ≥ 90	4.0
Α	80 ≤ M 90	4.0
А-	75 ≤ M 80	3.7
B +	70 ≤ M 75	3.3
В	65 ≤ M 70	3.0
B-	60 ≤ M 65	2.7
C+	55 ≤ M 60	2.3
С	50 ≤ M 55	2.0
C-	45 ≤ M 50	1.7
D+	40 ≤ M 45	1.3
D	30 ≤ M 40	1.0
E	M 30	0.0

The final grade and the corresponding GP

• According to the GP obtained by the student, the GPA will be calculated as below;

$$GPA = \frac{\sum_{i} (C_{i} * GP)}{\sum_{i} C_{i}}$$

Where C_i is the credit corresponding to the *i*th subject, and GP the grade point of the final grade of that subject.

The final GPA will be calculated as follows;

$$FGPA = \frac{\sum_{j} (STC_{j} * GPA_{j})}{\sum_{j} STC_{j}}$$

Where STC_j is the total number of credits for the j^{th} semester, and GPA_j the corresponding GPA for that semester.

Any changes to the evaluation will be done by the Faculty Board of the Faculty of Geomatics, as there is a need.

4.1 Award requirements

A student who satisfies the following conditions is eligible for the award/pass of a degree in Bachelor of Science Honours in Surveying Sciences:

- Be registered by the university as a candidate for the degree programme.
- Have completed the programme of studies for each semester to the satisfaction of the Senate.
- A candidate must obtain at least "D" passes for all courses in each semester, securing a minimum FGPA of 2.0.
- Shall have obtained a minimum of 'C' grades for all four Land Surveying Practical subjects.
- Must have at least a 'C' grade for all of the compulsory subjects, including pre-requisites, in his/her area of specialization.
- Must complete within the prescribed course duration (i.e. within 08 years)

4.2 Award of degree and classes

Pass

A student securing a FGPA \geq 2.00, at the end of the degree programme and satisfying all requirements in the Section 4.1 is eligible to award of a degree.

First Class

Pass in Degree and obtain a FGPA not less than 3.70 (i.e. $FGPA \ge 3.70$)

Second Class Upper Division

Pass in Degree and obtain a FGPA between 3.30 (inclusive) and 3.70 (exclusive) (i.e. $3.30 \le FGPA \le 3.70$)

Second Class Lower Division

Pass in Degree and obtain a FGPA between 3.00 (inclusive) and 3.30 (exclusive) (i.e. $3.00 \le FGPA \le 3.30$)

NOTE: To be eligible for Category-B certificate, students who followed the BSc. Hons (Surveying Sciences) (Hydrographic Surveying) must pass all modules specified by IBSC-S5 (Category B).

5. EXAMINATION PROCEDURES, OFFENCES AND PUNISHMENTS

By-law No. 03 of 1996 concerning examinations approved by the Council of the Sabaragamuwa University of Sri Lanka instituted under section 21 of the Universities Act No 16 of 1978.

5.1 Examination Procedure

- 5.1.1 Candidates shall not enter the examination hall until they are requested to do so by the supervisor. On admission to the hall, a candidate shall occupy the seat allocated to him and shall not change it, except on the specific instructions of the supervisor.
- 5.1.2 Once a candidate has entered an examination hall, he/she shall be under the authority of the supervisor/invigilator, and shall carry out all instructions precisely and promptly. A candidate is liable to be expelled from the examination hall for disorderly conduct.
- 5.1.3 No candidate shall be admitted to the examination hall after the expiry of half-an-hour from the commencement of the examination. Nor shall a candidate be allowed to leave the hall until half-an-hour from the commencement of the examination, or during the last fifteen minutes.
- 5.1.4 A candidate shall have his/her student records book, identity card and admission card with him/her, in the examination hall, and must produce these when requested to do so by the supervisor/invigilator. Failure to produce these documents may lead to cancellation of candidature. If a candidate fails to produce the required documents, he/she shall sign a declaration on the form provided and produce the documents to the Registrar following day.
- 5.1.5 The admission cards for each examination shall be signed in the presence of the supervisor/invigilator and handed over to the supervisor/invigilator.
- 5.1.6 Examination stationery (i.e. writing papers, graph papers, drawing papers, ledger papers, precise papers etc.) will be supplied to each candidate as required. Stationary supplied shall not be torn, crumpled, folded or otherwise mutilated. No stationery other than that supplied by the supervisor/invigilator shall be used by candidate. Data tables or other material provided must be used with care and left behind on

the desk. All materials supplied including unused material shall be left behind on the desk. Sheets or books of rough work should be crossed out and attached to the answer book.

- 5.1.7 No candidate shall take into the examination hall any material other than his admission card, student record book/identity card and authorised writing materials. Any material consisting of notes, signs, formula, whether relevant or irrelevant to the examination, should not be taken in. All materials, other than those authorised, should be deposited at a place indicated by the supervisor/invigilator.
- 5.1.8 A candidate who writes on his/her script an index number other than his own is liable to be considered as having attempted to cheat. The supervisor/invigilator has the authority to check the answer scripts of the candidates. A script that bears no index number or an index number, which cannot be identified, is liable to be rejected. No candidate shall write his/her name or any other identifying mark on an answer script.
- 5.1.9 Absolute silence shall be maintained in the examination hall and its premises. A candidate is not permitted, for any reason whatsoever, to communicate or to have any dealings with any person other than the supervisor/invigilator. The attention of the supervisor/invigilator shall be drawn by the candidate by raising his hand from where he is seated.
- 5.1.10 After the examination has commenced, in case of an emergency, the supervisor may grant permission to a candidate to leave the hall, under supervision.
- 5.1.11 Candidates shall stop work promptly, when ordered by the supervisor/invigilator to do so. If this instruction is not followed, the supervisor/invigilator has the authority to make an endorsement to this effect on the answer script.
- 5.1.12 All calculations and rough work shall be done only on paper supplied for the examination, and shall be cancelled and attached to the answer script. Such work should not be done on admission cards, timetables, question papers, record books or on any other paper. Any candidate who disregards these instructions is liable to be considered as having written notes or outlines of answers with the intention of copying.

- 5.1.13 Any answer or part of an answer, which is not to be considered for the purpose of assessment, shall be neatly crossed out. If the same question has been attempted in more than one place the answer or answers that are not to be considered shall be neatly crossed out.
- 5.1.14 Candidate who handed over his/her answer script shall under circumstances be entitled to call it back.
- 5.1.15 No candidate shall remove his/her or any other candidate's answer scripts for the examination hall.
- 5.1.16 No candidate shall copy or attempt to copy from any book or paper or notes or similar materials from the scripts of another candidate, help another candidate or obtain help from another candidate or any other person. No candidate shall conduct himself/herself so negligently that an opportunity is given to any other candidate to read anything written by him. No candidate shall use any other unfair means to obtain or render assistance at an examination.
- 5.1.17 No candidate shall submit a practical or field book or dissertation or project study or answer script which has been done wholly or partly by any other than the candidate himself/herself.
- 5.1.18 No person shall impersonate a candidate at an examination, nor shall any candidate sallow himself/herself to be so impersonated by another person.
- 5.1.19 If circumstances arise which, in the opinion of the supervisor render the cancellation or postponement of the examination necessary, he shall stop the examination, collect the scripts already written and then report the matter as soon as possible to the Vice Chancellor/Registrar.
- 5.1.20 The supervisor/invigilator is empowered to require any candidate to make a statement in writing on any matter which may have arisen during the course of the examination and such statement shall be signed by the candidate and countersigned by the supervisor. No candidate shall refuse to make such statement or to sign.
- 5.1.21 Every candidate who registers for an examination shall be deemed to have sat the examination unless:
 - (a) for a valid reason permitted by the Senate

or



- (b) a medical certificate obtained from a registered medical practitioner is submitted at the earliest possible time, by in any case not later than one week from the last day of the examination and be approved by the Senate.
- or
- (c) on account of a bereavement in the family (death of parent, brother or sister and if married spouse or a child) will be excused if covering approval is obtained from the Senate by submission of death certificate and appropriate proof of relationship.
- 5.1.22 Candidates who are unsuccessful at the first attempt will be given two further attempts to complete the examination except that the Senate shall have the discretion to allow one further attempt.

5.2 Submitting Medical Certificates for absence at examination

- 5.2.1 Internal candidates who absent themselves for the whole or part of an examination due to ill health should report to the Medical Officer of the University about it either before the commencement of the examination or during the examination time
- 5.2.2 Candidates who fail to do so for unavoidable reasons must submit a medical certificate from a District Medical Officer or a Medical Officer attached to a government hospital, within 14 days of the commencement of the relevant examination or part of the examination. Medical certificates issued by private medical officers; Ayurvedic physicians or Homeopaths are not accepted

5.3 Examination malpractices are classified as follows

- 5.3.1 Possession of unauthorized documents.
- 5.3.2 Copying.
- 5.3.3 Cheating.
- 5.3.4 Removal of examination stationery from the examination hall.
- 5.3.5 Inappropriate behaviour.
- 5.3.6 Impersonation.
- 5.3.7 Gaining or attempting to gain unlawful access to the contents of a question paper.

- 5.3.8 Aiding or abetting someone to cheat or receiving assistance from someone to cheat.
- 5.3.9 Using undue influence on supervisors, invigilators and other examination officials.
- 5.3.10 Any other action considered as an examination malpractice by the University Senate.

5.4 Procedure for investigating examination malpractices

The supervisor should report any examination malpractice to the Asst. Registrar (Examinations) who will investigate into the matter and submit a report to the sub-committee appointed by the Senate. On the recommendations submitted by the sub-committee, the Senate will impose appropriate punishment on the offenders.

5.5 Punishment for examination malpractices

5.5.1 **Possession of unauthorised documents.**

Punishment:

Banning examination candidacy for a period of two years or imposing alternative punishment considered appropriate by the Senate

5.5.2 **Copying.**

Penalty:

Invalidating examination candidacy for a period of 3 years or imposing alternative punishment considered appropriate by the Senate

5.5.3 Cheating.

Penalty:

Cancellation of examination candidacy, debarring candidate from sitting for University examinations for a specific period or imposing any other punishment considered appropriate by the Senate.

5.5.4 **Removing examination stationery belonging to the University.** Penalty:

Cancellation of examination candidacy and debarring candidate from sitting for university examinations for a period specified by the Senate.

5.5.5 Inappropriate conduct.

Penalty:

Cancellation of examination candidacy, debarring candidate from sitting for university examinations for
a period not exceeding 05 years and imposing any other punishment considered appropriate by the Senate.

5.5.6 Impersonation.

Penalty:

Annulment of candidacy for a period not less than 05 years and not exceeding 10 years and the imposition of any other punishment considered appropriate by the Senate.

5.5.7 Gaining illegal access or attempting to gain such access to the contents of a question paper. Penalty:

Cancellation of examination candidacy and imposing any other punishment considered appropriate by the Senate.

5.5.8 Aiding and abetting examination malpractices and receiving assistance to commit such malpractices.

Penalty:

Cancellation of examination candidacy and imposing any other punishment considered suitable by the senate.

5.5.9 Attempting to unduly influence examination supervisors and other officials.

Penalty:

Any punishment prescribed by the Senate.

5.5.10 Being guilty of an examination malpractice for the second time.

Penalty:

Cancellation of registration as a student of the University.

5.6 Compulsory punishments

In addition to the punishments listed above, the following will also be imposed on the recommendation of the Senate:

- 5.6.1 Withholding a class for the degree.
- 5.6.2 Limiting the maximum marks obtainable to 40% when re-sitting cancelled question papers.
- 5.6.3 Either cancelling or withholding scholarships and bursaries.
- 5.6.4 Withdraw residential facilities.
- 5.6.5 Withholding invitation to graduation ceremony.
- 5.6.6 Delaying graduation and the release of degree results by one year.

The Senate will decide on the punishments to be imposed for any examination malpractice not mentioned above.

6. CODE OF DISCIPLINE FOR STUDENTS

Section I

General student's discipline – Act of indiscipline and insubordination

- 1. The conduct of every student should at all times be exemplary. Throughout his period of studentship he should at all times behave with the decorum to be expected of a Graduate.
- 2. Every student should apply himself to his academic work in such manner as to satisfy the university. No student may absent himself/herself from lectures or practical work for a period exceeding three weeks in one academic year unless he/she has obtained special permission or has a valid reason for such absence.
- 3. No student should commit any of acts of indiscipline and insubordination listed below:
 - i. Behaving in such manner as to bring into disrepute or endanger the good name of the university; to obstruct the proper functioning of the Education, Examination, or Administrative activities of the university; to prevent or obstruct a member of the Academic/Non-academic staff, or an Employee of the university from carrying out his duties; to ridicule or humiliate such a person.
 - ii. Failure or inability to produce the students record book, which will be issued to students, when called up-on to do so by the Vice-Chancellor, Dean of the Faculty, a member of the academic staff, a member of the administrative staff or by person authorized by the Vice-Chancellor or the Registrar or failure to identify himself/herself.

- iii. Causing damage to university property; removing such property from the university premises, appropriating it to himself/herself or to another; defacing, dirtying or defiling the buildings, walls or roads of the university by scratching, writing, drawing or pasting posters upon them.
- iv. Causing or aiding, abetting, encouraging or sanctioning others to cause injury or harm to the selfrespect or dignity of other students, staff officials, employees or lawful visitors to the university or causing loss, ridicule, danger, mental or physical pain to such person or persons.
- v. Establishing, organizing, conducting or assisting any activity, organization or society within the university, apart from those registered in terms of clauses 112, 114, 115, 116, 117 and 118 of Part II of the Universities Act No.16 of 1978 as amended by the Universities Act No. 7 of 1985.
- vi. Behaving in such manner as to disturb or disrupt, or to gain admittance without permission, or to cause discomfort or harm to participants in any meeting, seminar, festival, procession, exhibition, variety entertainment, play film show or religious, cultural or social event, which may have been organized with prior approval from the Vice-Chancellor or the Dean of the Faculty by a society or organization which has been registered under the provisions laid-out in section (v) above.
- vii. Behaving in such manner as to disturb or disrupt, or to gain admittance without permission, or to cause discomfort or harm to participants in any meeting, seminar, festival, procession, exhibition, variety entertainment, play, film show or religious, cultural or social event, which may have been organized, with prior approval from the Vice-Chancellor of the university by the university administration or by the academic or non-academic staff or by an external organization.
- viii. Organizing staging, encouraging, sanctioning, or participating in any meeting, seminar, festival, procession, exhibition, variety entertainment, play or film show held within the university premises or in its environs without the prior approval of the Vice-Chancellor.
- ix. Holding meetings, picketing, demonstrating participating in processions or sloganizing, performing Satyagraha, Satyakriya of fetes, publishing, drawing, writing, putting or distributing hand bills, notices, or posters or encouraging sanctioning or assisting others to commit such action, whether in favour of a university teacher or an official or an employee of the university or in favour some cause outside the university.

- x. Ragging in any form (N.B. Any person caught ragging is liable to be expelled from the university without any inquiry being held).
- xi. Collecting or encouraging to collect or sanctioning the collection of money or any other items from students of the university, or the retention or disbursement of such funds or items, by any person whether an office bearer of a registered society or not unless it is with the full written consent of the Vice-Chancellor.
- xii. Writing, printing, publishing, distributing, exhibiting or pasting either within the university, or in its vicinity, posters, notices, pamphlets or other writing slanderous to any individual or detrimental to the reputation of the university to discipline or to peace.
- xiii. Publishing, pasting, exhibiting, writing or drawing any notice or poster, in any place other than those authorized for such display, even if such action is in connection with the activities of a society registered with the university in terms of Clause 115 of Part III of the Universities Act. No. 16 of 1978, as amended by the Universities Act. No. 7 of 1985, and even if such notice or posters have been approved by the Vice-Chancellor, Dean of the Faculty or the relevant teacher.
- xiv. Publishing, broadcasting, telecasting or releasing to the mass media, whether by the student on his own responsibility, or on behalf of another student or group of students on or behalf a society, any statement article or notice, detrimental to the reputation of the university or insulting or humiliating the university or insulting/humiliating the university or insulting/humiliating the university, or any official or employee of the university, or any other person connected with the university.
- xv. Consumption, distribution, sale or storage of drugs, liquor, within or bringing such into the university or been under the influence of liquor or drugs within the university or encouraging assisting or sanctioning such action by any other person.
- xvi. Bringing into or keeping or storing within the university, any weapon, explosive or dangerous article or encouraging or assisting in such action.

- xvii. Non-provision or the avoidance of provision of information needed by or requested by the university or the provision of false or distorted information.
- xviii. Abuse or misuse of university buildings, ground equipment or other property belonging to the university or their use for unsuitable, unsanctioned or improper purposes non-observation of the rules for their rules.
- xix. Students will not be provided with residential facilities for remaining within the university premises during times when the university is closed for students (such time may be subjected to periodic changes).
- xx. Any act for which the student could be convicted by a lawfully constituted court of law for an offence against the laws of the republic of Sri Lanka.

Section II

Punishments

- 1. Any student/s found guilty of any offence specified as an act of indiscipline or in subordination in Section (I) above, or of attempting to subvert the provision of this section (Section II Punishment) may receive one or more of the punishments listed below, as deemed sufficient by the Vice-Chancellor acting in accordance with the findings and recommendation of the Disciplinary committee.
 - i. A caution or severe warning
 - ii. A fine, not exceeding Rs.500/-
 - iii. Recovery of any loss sustained by the university.
 - iv. Suspension from classes, examinations and from the use of all university facilities for a specified period.

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- v. Suspension from sitting for examinations of the university for an unspecified period.
- vi. Cancellation, postponement or suspension of the release of examination results for an indefinite period.
- vii. Regard as having relinquished the course and/or the university.

Expulsion from the university (The imposition of any one or more of the above punishments may be suspended. Note that the punishments may be suspended. Note that the punishment for ragging will be expulsion from the university).

- 2. The Vice-Chancellor may impose one or more of the punishments listed in Section II, No. 01 (i) to (vii) above without holding any preliminary inquiry, and without obtaining the sanction of any other person, and so as to take immediate effect, if he has reason to believe that the action or behaviour of any students could lead to a break-down of discipline in the university or render difficulty in the normal running of the university or lead to a breach of the peace.
- 3. Any student disaffected by the imposition upon him of one or more of the punishments listed in Section II No. 01 (i) to (vii) may appeal against the punishments to the Vice-Chancellor within 14 days of being notified of the same.
- 4. The determination that he Vice-Chancellor shall make on such appeal, in consultation with the Council shall be final.
- 5. Apart from the imposition of the punishment listed in Section II No.01 (i) to (viii), if a student has been guilty of any offence referred to in Section I, the university reserves for itself the right to review and reevaluate the conduct of such student/s during his/their period in the university, before conferring upon him any degree, diploma or certificate.

Section III

Interpretation

- 1. "University" means here the Sabaragamuwa University of Sri Lanka.
- 2. "Property" means here university buildings, plantations, library, furniture, equipment, vehicles and all other moveable and immovable property.
- 3. "He", "him", "his", etc., indicate both male and female.
- 4. The interpretation given to any word, phrase or sentence by the Council will be the final interpretation.

(Subjected to revision by the Council)

7. INFORMATION

7.1 Organizational Structure



Flow chart of the course administration



7.2 Faculty Staff

Dean

Dr. H.M. Indika Prasanna

Department of Surveying and Geodesy

Head

Senior Lecturers

Dr. Duminda R. Welikanna

BSc (Hons.) Surveying Sciences, SUSL MSc (Geoinformatics), ITC - The Netherlands PhD (Microwave Remote Sensing), Kyoto, Japan

Research Interest: Image Analysis, Geo-statistics, Markov Random Fields, Remote Sensing and GIS Applications In Urban areas

Dr. M.D. Eranda K. Gunathilake

BSc (Hons.) Surveying Sciences, SUSL MSc (Hydrographic Surveying), UTM, Malaysia PhD (Hydrography), UTM, Malaysia

Research Interest: Swath Bathymetric Systems, Offshore Surface Positioning Tidal Modelling Satellite Altimetry and Sea Level Variation

Dr. Ranmalee Bandara

Dr. Homindra Divithure

BSc (Hons.) Surveying Sciences, SUSL MSc (Geo-information Management), ITC –The Netherlands PhD (Cadastre), The Polytechnic University, Hong Kong

Research Interest: Local Authorities & Geo Information Usage, Geo Information Education in SL

Dr. Ranmalee Bandara

BSc (Hons.) Surveying Sciences, SUSL MSc (Environmental Soil Sciences) PhD (Engineering - Water), Monash University, Australia

Research Interest: Land Surface Modelling, Environmental Science, Optimization, Soil remediation and rehabilitation

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Dr. H.M. Indika Prasanna

BSc (Hons.) Surveying Sciences, SUSL MPhil (Geodesy), SJP PhD (Geodesy), The Polytechnic University, Hong Kong

Research Interest: Earth's gravity field modelling, Internal structure of Earth

Mr. P.G. Vipula Abeyratne

BSc (Hons.) Surveying Sciences, ISMD MSc (Photogrammetry &Geoinformatics), Germany MSI (SL)

Research Interest: Earth Gravity Field, Image Analysis

Dr. N.M.P. Milinda Piyasena

BSc (Hons.) Surveying Sciences, SUSL MSc (Land Management & Land Tenure), Germany PhD (Europian Urban Studies), BUW, Germany

Research Interest: Land Tenure and Property Rights, SDI

Mrs. D. Samanthi Munasinghe

BSc (Hons.) Surveying Sciences, SUSL MSc (Town & Country Planning), MRT

Research Interest: Use of GIS for Land Utilization, Urban Morphology& Climate Change

Dr. A.K.R. Nishamanie Ranasinghe

BSc (Hons.) Surveying Sciences, SUSL MSc (Geoinformatics), ITC - The Netherlands PhD (Remote Sensing), UoM, Sri Lanka

Research Interest: Remote Sensing and GIS for Disaster Management

Mr. T. Darshaka A. Gomesz

BSc (Special) Mathematics, USJP MPhil (Mathematics), PDN

Research Interest: Mathematical Modelling, Industrial Optimization

Mr. A Nihal D. Perera

B.Sc Physical Science M.Sc (Applied Electronics) Hydrographic Surveying CAT B (FIG/IHO) Hydrographic Surveying CAT A (FIG/IHO/ICA)

Research Interest: Data Acquisition Instrumentation Development, Seabed Classification, Satellite derived Bathymetry

Lecturers

Mr K.K.D. Waruna S. Kannangara BSc (Hons.) Surveying Sciences, SUSL

Research Interest: Navigation and Positioning

Department of Remote Sensing and GIS

Head

Senior Lecturers

Mrs. J.A. Swarna Jayakody BSc (Hons.) Surveying Sciences, ISMD M.Phil. (MRT) FSI (SL)

Research Interest: Remote Sensing, Image Analysis, Land Surveying

Dr. Thilantha L. Dammalage

BSc (Hons) Surveying Sciences, SUSL MSc (Remote Sensing & GIS), AIT, Thailand PhD (Remote Sensing & GIS), AIT, Thailand

Research interest: GPS data Processing Techniques Development, GIS & Remote

Sensing Applications

Dr. R.M.K.G.S.P.B. Koswatte

Ms. I.A. Kalani S.Illeperuma BSc (Hons.) Surveying Sciences, ISMD MSc (Remote Sensing & GIS), AIT, Thailand

Research Interest: Remote Sensing & GIS Application, Satellite Technology, Digital Elevation Modelling

Dr. G. Sanka N. Perera

BSc (Hons) Surveying Sciences, SUSL MSc (Geo-informatics), ITC - The Netherlands PhD (Photogrammetry & Remote Sensing), TUD, Germany

Research Interest: Modelling of 3D topographic Objects using LiDAR point clouds, Free/Open Source for Feature Extraction

Dr. H.A. Nalani BSc (Hons) Surveying Sciences, SUSL MSc (Photogrammetry &Geoinformatics), Germany PhD (Photogrammetry), TUD, Germany

Research Interest: 3D Object Extraction using LiDAR Data, GIS & Photogrammetry Base Application in Urban Areas

Mrs. Sunethra D. Wickramasinghe

BSc (Hons) Surveying Sciences, ISMD MPhil, PDN

Research Interest: Cartography, GIS and Natural . Disasters, Astronomy

Dr. K.M. Surangi Bandara

BSc Applied Physics (Special), SUSL PhD (Energy & Environmental Science), Nagaoka University of Technology, Japan

Research Interest: Electronics and Materials

Instructors in Computer Technology

Mr. M.D.C. De S.Jayatilake BSc (Statisticis& Computing) KLN

Research Interest: Image Processing, E-Learning Technology, e-commerce.

Dr. R.M.K.G. Saman P.B. Koswatte

BSc (Hons.) Surveying Sciences, SUSL M.Phil. (Earth Sciences), PDN PhD (GIS), Queensland, Australia

Research Interest: Web GIS, Real-time Mapping, Free and Open Source Software (FOSS) for Mapping

Dr. P.G.R.N. Indika Pussella

BSc (Hons) Surveying Sciences, SUSL MPhil (Earth Sciences), PDN PhD (GIS), Wuhan, PRChina

Research Interest: Land Use Planning, Disaster Management, GIS Applications

Lecturers

Mr. A. Charith N. Atapattu* BSc (Hons) Computer Science, PDN

Research Interest: Artificial Intelligence and Robotics

Instructors in Surveying Sciences

Mr. Charith A. Karandana BSc (Hons) Surveying Sciences, SUSL

Industrial Training Unit

Dr. P.G.R.N. Indika Pussella - Coordinator

Dr. H. Divithure - Member

Dr. R.M.K.G.Saman P.B.Koswatte - Member

Student Counsellors

Senior Student Counsellor

Deputy Senior Student Counsellor

Student Counsellors of Faculty of Geomatics

Mr. Jasinghe

Dr. N.M.P. Milinda Piyasena

Mr. Krishan Thilakarathne

* On study leave

7.3 General

Location

The university is situated about 15 km from Balangoda town along the Badulla-Colombo road. It is located on Samanalawewa road, around500 m from Pambahinna junction, situated 162 km from Colombo and 76 km from Badulla.

Other distances:60 km to Ratnapura / 50 km to Bandarawela

Hospital

Rural Hospital, Pambahinna

Post Office Sabaragamuwa University Sub Post Office

Nearest police post Samanalawewa Police Post

Railway station Haputale 31 km, One hour by bus

Police division Balangoda

Grama Niladhari division Muttettuwegama

Divisional secretariat Imbulpe

District Ratnapura

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Elevation 606 m above MSL

Avg. annual temperature $22 \circ C$

Annual rainfall 1500 mm

Accommodation for visitors

University Guest House Belihuloya Rest House Pearl Inn, Belihuloya River Garden, Belihuloya Water Garden, Belihuloya



Map of Sabaragamuwa University of Sri Lanka w-





- 01 Pambahinna Junction
- 02 Hospital
- 03 Sinharaja Boy's Hostel Complex
- 04 University Main Entrance
- 05 Post Office & BOC
- 06 Registrar's Office
- 07 Examination Branch
- 08 Vice Chancellor's Ofiice
- 09 Welfare Shop
- 10 Medical Centre

- 11 Swimming Pool
- 12 Tennis Court & Gymnasium
- 13 Students' Affairs Branch
- 14 Main Library Complex
- 15 Faculty of Geomatics
- 16 Main Play Ground
- 17 Students' Canteen
- 18 Faculty of Applied Sciences
- 19 Faculty of Management Studies
- 20 Faculty of Social Sciences & Languages



