TABLE OF CONTENTS

1.	Introduction		1
	1.1	Sabaragamuwa University of Sri Lanka	1
	1.2	Faculty of Applied Sciences	4
2.	Officers and Administrative Staff of the University		11
3.	Academic and Academic Supportive Staff of the Faculty		15
4.	Faculty Board		22
5.	Course Outlines		23
	5.1	Department of Computing & Information Systems	24
	5.2	Department of Food Science & Technology	38
	5.3	Department of Natural Resources	54
	5.4	Department of Physical Sciences & Technology	74
	5.5	Department of Sport Sciences & Physical Education	122
	5.6	Professional English for BSc Degree Programs	165
6.	Student Awards		173
7.	External Programs		175
8.	Examination Criteria		175
	8.1	General	175
	8.2	Grade and Grade Points	176
	8.3	Grade Point Average	176
	8.4	Final GPA	177
	8.5	Pass	178
	8.6	Award of Classes	178
9.	Examination Procedures, Offences and Punishments		179
10.	Code of Disciplines for Students		183

1. INTRODUCTION

1.1. SABARAGAMUWA UNIVERSITY OF SRI LANKA

1.1.1. BACKGROUND

The Sabaragamuwa University of Sri Lanka was established under the Universities Act Number 16 of 1978 on 7th November 1995 and ceremonially inaugurated on 2nd February 1996. Assigned to the University are the Faculties of Agricultural sciences, Applied Sciences, Geomatics, Management Studies and Social Sciences and Languages set up at Belihuloya in Rathnapura District of the Sabaragamuwa Province.

SUSL has eight study centres/units viz. Centre for Computer Studies, Agribusiness Research and Development Centre, Staff Development Centre, Career Guidance unit, External Degree Programs and External Services Unit, English Language Teaching Unit, Centre for Indigenous Community Studies, Sabaragamuwa University Industry Community Interaction Cell (SUICIC) and the Local Technical Secretariat of the HETC project established within the University.

1.1.2. VISION AND MISSION OF THE UNIVERSITY

The University has expressed the vision "to be an internationally acclaimed centre of excellence in higher learning and research, producing dynamic managers, leaders and nation builders to guide the destiny of Sri Lanka".

The mission of the University is "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 to contribute towards sustainable development of the country".

1.1.3. THE FACULTIES AND DEGREE PROGRAMS

The Sabaragamuwa University of Sri Lanka offers the following degree programs through its five faculties.

The Faculty of Agricultural Sciences offers B.Sc. Degree programs in Agricultural Sciences 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 programs in Food Science and Technology, Environmental Sciences and Natural Resource Management, Chemical Technology, Computer Science and Technology, Applied Physics, Sport Sciences and Management, Physical Education, Information Systems through its five departments, The Department of Food Science and Technology, The Department of Natural Resources, The Department of Physical Sciences and Technology, The Department of Computing & Information Systems and The Department of Sport Science & Physical Education. However, there is a possibility to exit at the end of the third year (completing a general degree) for students who enroll for B.Sc. degree programs in Environmental Sciences and Natural Resources Management and Physical Sciences.

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

The Faculty of Management Studies offers B.Sc. degree programs in Business, Financial, Marketing, Tourism and Eco-Business Management through its three departments, the Department of Business Management, the Department of Accounting and Finance and the Department of Accountancy and Finance.

The Faculty of Social Sciences and Languages offers B.A. degree programs in Social Sciences and Languages through its two departments, the Department of Social Sciences and the Department of Languages.

1.1.4. UNIVERSITY LOGO AND THE FLAG

UNIVERSITY LOGO

The University logo comprises a traditional oil lamp, rays of light, books, the Samanala (peak wilderness) mountain, gems, and sheaves of paddy, symbolizing 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 Rathnapura District respectively, and the sheaves of paddy symbols prosperity.

UNIVERSITY FLAG

University flag comprises two colors maroon and gold, and the logo is in the center of the flag. The maroon color in the flag indicates maturity and the gold color indicates the knowledge.

1.2. FACULTY OF APPLIED SCIENCES

1.2.1. INFORMATION AT GLANCE

ADDRESS

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

LOCATION

The university is situated about 18 kilometers from the Balangoda town along the Badulla- Colombo road. It is located on the Samanalawewa road, around 500 metres from the Pambahinna junction, situated 162 km from Colombo and 76 km from Badulla. (*Other distances:* 60 km to Ratnapura, 50 km to Bandarawela)

TELEPHONE

045-2280014 (General)
045-3454512 (Dean/ Faculty of Applied Sciences)
045-3454519 (Head/ Department of Computing & Information Systems)
045-3454514 (Head/ Department of Food Science & Technology)
045-3454528 (Head/ Department of Natural Resources)
045-3454527 (Head/ Department of Physical Sciences & Technology)
045-3609846 (Head/ Department of Sport Science & Physical Education)
045-3454513 (Assistant Registrar/ Faculty of Applied Sciences)

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 SEWA DIVISION	*Muttettuwegama*
DIVISIONAL SECRETARIAT	*Imbulpe*
DISTRICT	*Ratnapura*
PROVINCE	*Sabaragamuwa*
ELEVATION	*606 m above MSL*
AVG. ANNUAL TEMPERATURE	*22 0C*
ANNUAL RAINFALL	*1500 mm*
ACCOMMODATION FOR VISITORS	*University guest House* *Belihuloya Rest House* *Pearl Inn, Belihuloya* *River Garden Hotel, Belihuloya*

1.2.2. THE HISTORY OF THE FACULTY OF APPLIED SCIENCES

The Faculty of Applied Sciences of the Sabaragamuwa University of Sri Lanka was initially started as the Buttala Affiliated University College (BAUC) on 21st June, 1993. The BAUC offered two diploma courses, one in Food Science and Technology and the other in English Language. With the elevation of the Affiliated University Colleges to fully fledged national Universities in early 1996, three Affiliated University Colleges; Sabaragamuwa Affiliated University College, Uva Affiliated University College and Buttala Affiliated University College were amalgamated to form the Sabaragamuwa University of Sri Lanka and the BAUC became the Faculty of Applied Sciences of the Sabaragamuwa University of Sri Lanka. With effect from March 2008, the faculty has been relocated in the main university premises at Belihuloya.

1.2.3. PRESENT SITUATION

The Faculty of Applied Sciences comprises five departments; The Department of Natural Resources, The Department of Physical Sciences & Technology, Department of Food Science & Technology, The Department of Computing & Information Systems and The Department of Sport Science and Physical Education. The Faculty offers B.Sc. (Special) degree programs in Food Science and Technology, Environmental Sciences and Natural Resource Management, Chemical Technology, Computer Science and Technology, Applied Physics, Computing and Information Systems, Sport Sciences and Management and Physical Education for the students who gain direct entry to the Faculty on the basis of their performance at the GCE (Advanced Level) examination. Students for Food Science and Technology degree program are selected through a separate window from the GCE (Advanced Level) Bio Science stream, while students selected from the Applied Sciences Window from the GCE (Advanced Level) bio science stream and GCE (Advanced Level) physical science stream are entitled for degree program on "Environmental Sciences and Natural Resources Management and Physical Sciences and Technology" respectively.

The selection of the students for the B.Sc. degree programs in Computing and Information Systems, Sport Sciences and Management and Physical Education is done on the basis of the G.C.E. (A/L) results as well as the performance at a selection test. The students who wish to get enrolled for the degree programs in Sport Sciences and Management and Physical Education are also required to face an examination for physical fitness in addition to the selection test. Even though the faculty conducts four year (Special) degree programs, students who enroll for B.Sc. Degree programs in Environmental Sciences and Natural Resource Management, and Physical Sciences have an option to exit at the end of the third year. The degree programs are designed to suit the needs of the rapidly changing economic environment while taking into consideration employment opportunities for graduates who pass out from the university. The programs are conducted exclusively in English. The Faculty also contributes to the development of the community and the nation through its extension programs.

1.2.4. VISION AND MISSION OF THE FACULTY OF APPLIED SCIENCES

VISION

"To extend its' facilities and services to develop as a premier centre for higher education and advanced research in the field of technology, thus enabling students following the degree program to obtain a sound knowledge and acquire multi-disciplinary skills"

MISSION

"To search for and disseminate knowledge in the areas of learning that will make a useful contribution to the development of critical manpower requirements of the nation; contribute to education, science and technology and socio economic upliftment of the communities of the nation."

1.2.5. AIMS OF THE FACULTY

- To provide students with an atmosphere that is conducive to successful study and attainment of a degree in their respective field of specialization.
- To offer the people of the nation through community outreach programs by providing facilities and personnel that enable them to begin or continue with their education through seminars, workshops, short courses or programs covering a variety of subjects that serve to the needs of the community.

1.2.6. OBJECTIVES OF DEGREE PROGRAMS

- To ensure that all students who obtain the degree are well acquainted with their fields of study and demonstrate this by the successful completion of examinations in each particular subject area, research as well as projects.
- To ensure that all students who obtain the degree would be readily able to be employed in their chosen field because of the practical experience received in the classroom, laboratory or field through practical training during the course of study.

1.2.7. OBJECTIVES OF COMMUNITY OUTREACH PROGRAMS

- To ensure that programs provided respond to a need expressed by the people of the community.
- To ensure that these needs expressed by the community are fulfilled by the content of the seminars, short courses, workshops and programs provided and that this content is clearly conveyed under the direction of the various project leaders.

1.2.8. STUDENT SERVICES AND ACADEMICS

BANK FACILITIES

Students can open accounts with the Bank of Ceylon's external branch near the main entrance and the People's Bank branch at Pambahinna junction. They provide nearly all of the services of a regular bank branch office.

BURSARY & MAHAPOLA

Bursary and Mahapola Scholarship payments 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 (Student Affairs).

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. Two Hostel canteens are available for hostellers.

LIBRARIES

The Lending and Reference Libraries contain about 70,000 volumes of books and 150 periodicals, including Hansard, Acts, Gazettes and daily newspapers in Sinhala, Tamil and English.

The faculty collection in the library has also been gradually improving. The faculty has a total collection of about 15000 printed materials, which includes textbooks, journals, magazines, final year project reports, bulletins and a reference collection. Lending and Reference book collection has about 9500 and 5000 books respectively. The library consists of a collection of 09 local and international journals as well. In addition it includes gazettes and daily newspapers in Sinhala, Tamil and English. Students are given the opportunity of obtaining photocopies for educational purposes from the library at a reasonable rate. The library also has CD ROM unit where both staff and student can read CDs available at the library as audio visual aids for effective learning. General decisions regarding the library are made by the library committee, which meets once a month. It comprises the Dean, two heads, Senior Assistant Librarian and 07 members appointed by the Faculty board.

Hours are: Weekdays and Saturdays from 8.00 a.m. to 4.00 p.m. unless otherwise announced.

Books can be borrowed for a period of two weeks from the Lending Library: Books in the Reference Library 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 Library books, one rupee (Rs.1) per day; Reference Library, books two rupees (Rs.2) per hour.

REGULAR MAIL

Incoming mail is sorted at the Main Office and then kept in student mailboxes near the department offices or at the Student Centre. To ensure that your letters reach you quickly, please request the sender to use the following address including postal code No.:

Your name,
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 at 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.

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 peripheral hospital is located close to the university.

SPORTS FACILITIES

The sports facilities include 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: 0452280036).

STUDENT CENTRE

The Students Centre building serves as a student recreation hall, with facilities to play table tennis, carom, chess etc.

TELEPHONE CALLS

You can make outgoing telephone calls from the Telephone Operator's Room, located opposite the Main office or from one of the pay phone booths. Messages from incoming calls (Tel: 045-2280014) will be forwarded to you as soon as possible. To help speed up the process, the caller should leave recipient's name and specify which degree programme he or she is following.

WELFARE SHOP

You can purchase groceries, stationery, toiletries, soft drinks and snacks at the Welfare Shop. Opening Hours are: weekdays from 7.00 a.m. to 8.00 p.m. and Sundays from 2.00 p.m. to 8.00 p.m.

LABORATORIES

Fourteen laboratories in the areas of Chemistry, Food Science, Biotechnology & microbiology, Physics, Natural Resources and Computer Science are equipped to cater to practical sessions for the study programmes.

Chemistry laboratories: These are equipped with the necessary instruments and apparatus and the required chemicals for chemistry practical at Bachelor's Degree level.

Chemistry Research laboratory: This is equipped with necessary instruments and apparatus and the required chemicals for research at undergraduate level.

Food science laboratory: This is equipped with chemicals, basic lab-scale instruments and apparatus, which mimic industrial instruments and other items and include the necessary instruments and chemicals for food proximate analysis.

Biotechnology & Microbiology laboratory: This is equipped with facilities for biotechnology and microbiology related practical and includes the necessary chemicals.

Physics laboratory: The physics laboratory has essential instruments and apparatus for physics practical; further development of this laboratory is in progress.

Natural resources laboratories: There are three laboratories namely Earth Science, Soil Science and Biology and Environmental Science which are equipped for practical exercises in relevant fields. Development of an Ecology & Conservation Biology laboratory is in progress.

Computer centres: There are four computer centres in the faculty, having a number of state- of-the-art computers and printers. Ample amounts of application packages are available. Software facilities are available for various types of computer applications. The Local Area Network provides e-mail and Internet facilities through a leased line.

Food Analysis laboratory: This laboratory is equipped with all required instruments, chemicals and other facilities to perform all types of chemical analysis related to Food industry.

Food Microbiology and Biotechnology laboratory: This laboratory is equipped with of the equipments and required chemicals to conduct undergraduate microbiology and Biotechnology practical classes.

Meat and Fish processing laboratory: This laboratory is equipped with all instruments and chemicals which are used in meat and fish processing.

Vegetable processing laboratory: This laboratory is equipped with most of the required equipments and chemicals used in vegetable and grain processing.

ENGLISH LANGUAGE UNIT

The English Language Teaching Unit conducts English programme through out four years including Professional English during the first two years.

1.2.9. EMPLOYMENT OPPORTUNITIES FOR GRADUATES FROM THE FACULTY

Graduates of the Faculty of Applied Sciences are mainly targeted for the local job market in both the private and state sectors. A fair percentage of our graduates are pursuing post-graduate studies with a reported high rate of success. Some of the graduates from the Faculty are employed in industries as well as decision making organizations, as consultants, managers, coordinators, as well as technocrats in Food Science & Technology, Natural Resource Management and Physical Science related professions. Some graduates have represented Sri Lanka in International symposiums, workshops and competitions as well.

According to the results of a tracer study conducted by the Faculty on graduate employment, with a sample of 104 graduates, it was revealed that the relevance of the degree programs to the field of employment is high (73 %) among applied science graduates. 90% of the graduates are employed and six out of them are reading for their post-graduate degrees. Out of the graduates who claimed to be permanent employees, 54% is in the government sector, 46% is in the private sector. The data on waiting period reveals that 40 % have secured employment within the first three months, 70% within the first six months and 93% within the first year. This gives an average of about 6 months of waiting time for applied science graduates. The rate of employment and the waiting period for a graduate for their first employment is satisfactory as expressed by all the respondents, indicating the demand for applied science graduates in job market. Based on the above self-evaluation, the Faculty has taken several steps to further enhance the quality and relevance of undergraduate education, in order to cater the job market.

The three new degree programs introduced from the current academic year are also focused on a wide array of employment opportunities available both locally and internationally.

2. OFFICERS AND ADMINISTRATIVE STAFF OF THE UNIVERSITY

Chancellor

Most Ven. Prof. Kumburugamuwe Vajira Thero

Vice Chancellor

Prof. Chandana P. Udawatte

E-Mail : vc@sab.ac.lk
Phone : +94(0)45 – 2280012
Fax : +94(0)45 - 2280128

Dean, Faculty of Agricultural Sciences

Dr. H.S.R Rosairo

E-Mail : dean@agri.sab.ac.lk
Phone : +94(0)45 - 2280041

Dean, Faculty of Applied Sciences

Prof. Udaya Rathnayaka

E-Mail : dean@appsc.sab.ac.lk
Phone : +94(0)45 - 3454512

Dean, Faculty of Geomatics

Dr. H.M. Indika Prasanna

E-Mail : dean@geo.sab.ac.lk
Phone : +94(0)45 - 2280010

Dean, Faculty of Management Studies

Dr. R.M. Wasantha Rathnayake

E-Mail : dean@mgt.sab.ac.lk
Phone : +94(0)45 - 2280007

Dean, Faculty of Social Sciences & Languages

Dr. W. Manoj Ariyaratne

E-Mail : dean@ssl.sab.ac.lk
Phone : +94(0)45-2280021

Registrar

Mr. M.F. Hibathul Careem

E-Mail : registrar@sab.ac.lk
Phone : +94(0)45- 2280277
Fax : +94(0)45- 2280015

Librarian

Mrs. T.N. Neighsoorei

E-mail : nesu@sab.ac.lk
Phone : +94(0)45-2280045

Bursar

Mr K. A. Rohitha S. Jayakody

E-Mail : kajay@adm.sab.ac.lk
Phone : +94(0)45 - 2280229

Senior Assistant Registrar/Examination

Mr. M. Lalith Warnasooriya

E-Mail : lalithw@adm.sab.ac.lk
Phone : +94(0)45 - 2280033

Assistant Registrar/Academic Service and Student Affairs

Ms. P.D.K.R. Pathirage

E-Mail : kumudinie@adm.sab.ac.lk
Phone : +94(0)45 - 2280019

Assistant Registrar/Faculty of Agricultural Science

Ms. H.M.D.Y. Herath

E-Mail : dilini.herath@hotmail.com
Phone : +94(0)45 - 2280014

Assistant Registrar/Faculty of Applied Sciences

Mrs. A.K.A.S. Amarasinghe

E-Mail : ar@appsc.sab.ac.lk
Phone : +94(0)45 - 2280284

Assistant Registrar /Faculty of Geomatics

Ms. Nagarajah Subbothinie

E-Mail : subbothi@gmail.com
Phone : +94(0)45-3453009

Assistant Registrar/Faculty of Management Studies

Ms.M.L.W.O.M. Karunaratne

E-Mail : omali_karunaratne@yahoo.com
Phone : +94(0)45-2280283

Assistant Registrar/Faculty of Social Sciences and Languages

Mrs. A.A.S. Priyadarshanee

E-Mail :
Phone : +94(0) 45-3463186

Works Engineer

Mr. W.M.L. Manoj K Wijesundara

Phone : +94(0)71 – 8403309
Fax : +94(0)45 - 2280032

Curator (Landscape)

Mr. Ruwan D. Rajapaksha

E-Mail : curator@adm.sab.ac.lk
Phone : +94(0) 45 2280032

Farm Manager

Mr. Champika N.K. Balasooruya

E-Mail : balasooriya@susl.lk
Phone : +94(0)45-3469440

Medical Officer

Dr. W.M. Anoja S Wijerathne

E-Mail : wijerathna@susl.lk
Phone : +94(0)45 - 2280028

3. ACADEMIC & ACADEMIC SUPPORTIVE STAFF OF THE FACULTY

3.1. Dean's Office

Dean		
Prof. Udaya Rathnayaka	E-Mail	: udayar@sab.ac.lk : udayarathnayaka@gmail.com
	Phone	: 0719133808 : 0453454512

3.2. Department of Computing & Information Systems

Head of the Department		
Dr. Senaka Amarakeerthi	E-Mail	: senakahks@appsc.sab.ac.lk
	Phone	: 0453454519

Senior Lecturers		
Mr. S. Vasanthapriyan ***(On study Leave)*** *BSc Special (Hons)(Peradeniya),* *MSc(TU/e - Netherlands)*	E-Mail	: priyan@appsc.sab.ac.lk
	Phone	: 0717851500 : 0453454519
Mr. R.K.A.R. Kariapper *BSc (Hons) (SEUSL),* *MSc (Peradeniya),* *M.Phil (Jayawardenapura)*	E-Mail	: rk@appsc.sab.ac.lk
	Phone	: 0718080883 : 0453454519

Lecturers		
Dr. B.T.G. Samantha Kumara *BSc Special (Hons) (SUSL),* *MSc(Peradeniya),* *PhD (Japan)*	E-Mail	: kumara@appsc.sab.ac.lk
	Phone	: 0714431192 : 0453454519
Mr. Akalanka Galappaththi *BSc (Hons) (Peradeniya)*	E-Mail	: akalanka@appsc.sab.ac.lk
	Phone	: 0712533192 : 0453454519
Mrs. Sugeeswari Lekamge ***(On study Leave)*** *BSc (Hons) (Peradeniya),* *MSc(Japan)*	E-Mail	: sugeeswarilekamge@appsc.sab.ac.lk
	Phone	: 0453454519
Ms. Piumi Ishanka ***(On study Leave)*** *BSc Special (SUSL),* *MSc(Japan)*	E-Mail	: piumisusl@gmail.com
	Phone	: 0453454519

Mrs. Pubudu N. Jayasena ***(On study Leave)*** *BSc Special (Hons) (SLIIT), MSc(China)*	E-Mail Phone	: pubudu@appsc.sab.ac.lk : 0770202169 : 0453454519
Mrs. Sajeewani Karunarathne ***(On study Leave)*** *BSc Special (Hons) (Kelaniya)*	E-Mail Phone	: sajeewani@sab.ac.lk : 0453454519
Mr. R.L. Dangalla ***(On study Leave)*** *BSc Special (SUSL)*	E-Mail Phone	: ravindra.dangalla@appsc.sab.ac.lk : 0453454519
Mr. S. Thusithan *BSc (Hons) (Jaffna)*	E-Mail Phone	: thusithan@gmail.com : 0777535832 : 0453454519
Mrs. C.U. Wimalasooriya *BSc (Hons) (SUSL)*	E-Mail Phone	: u.wimalasooriya@gmail.com : 0714226423 : 0453454519

3.3. Department of Food Science & Technology

Head of the Department

Mr. M.C.N. Jayasooriya	E-Mail Phone	: niroshanmcn@gmail.com : 0453454514

Professors

Prof. Udaya Rathnayaka *BSc Special (Ruhuna), MSc(Peradeniya), PhD (AIT, Thailand)*	E-Mail Phone	: udayar@sab.ac.lk : udayarathnayaka@gmail.com : 0719133808 : 0453454512

Senior Lecturers

Mrs. K.M. Somawathie *BSc (Peradeniya) MSc(Kelaniya)*	E-Mail Phone	: somawathiekm@gmail.com : somawathiekm@appsc.sab.ac.lk : 0718200210 : 0453454514
Mr. M.C.N. Jayasooriya *BSc (SUSL), MSc(Ruhuna)*	E-Mail Phone	: niroshanmcn@gmail.com : 0714453449 : 0453454514
Mr. A.L.C. Janitha Liyanage *BSc Special (Hons) (SUSL), MSc(Sweden)*	E-Mail Phone	: janitha@susl.lk : 0775328854 : 0453454514

Mrs. R.S. Sabaragamuwa ***(On study Leave)*** *BSc Special (Hons)(Peradeniya),* *M.Phil (Peradeniya)*	E-Mail Phone	:rasangi.sabaragamuwa@gmail.com : rasangi@appsc.sab.ac.lk : 0714405086 : 0453454514

Lecturers		
Dr. W.S.M. Senevirathne *BSc (OUSL),* *MSc(South Korea),* *PhD (South Korea)*	E-Mail Phone	: msaraths@yahoo.com : msaraths@appsc.sab.ac.lk : 0778687394 : 0453454514
Mrs. T.C. Kanake ***(On study Leave)*** *BSc (Hons) (Wayamba),* *MSc (Peradeniya)*	E-Mail Phone	: thilini.kanake@yahoo.com : thilinikanake@appsc.sab.ac.lk : 0718360402 : 0453454514
Mrs. J.W. Amanda Sajiwanie *BSc Special (Hons)(SUSL)*	E-Mail Phone	: amandasjk@gmail.com : amanda@appsc.sab.ac.lk : 0718481721 : 0453454514

Temporary Lecturers		
Mrs. Yvonne L. Fernando *BSc Special (SUSL)* *MSc (UK)*	E-Mail Phone	: yvonnelfernando@gmail.com : 0770289835 : 0453454514
Ms. Choshani Dalukdeniya *BSc Special (SUSL)*	E-Mail Phone	: choshanikd@gmail.com : 0772343522 : 0453454514

3.4. Department of Natural Resources

Head of the Department		
Dr.(Mrs.) J.M.C.K. Jayawardene	E-Mail Phone	: jayawardanack@yahoo.com : jayawardanack@appsc.sab.ac.lk : 0715924712 : 0453454328

Senior Lecturers		
Dr.(Mrs.) J.M.C.K. Jayawardene *BSc Sp(Hons)(Jayawardenepura)* *MPhil (Peradeniya)* *PhD (Ballarat, Australia)*	E-Mail Phone	: jayawardanack@yahoo.com : jayawardanack@appsc.sab.ac.lk : 0715924712 : 0453454328
Dr.(Mrs.) S.K. Gunathilake *BSc (Hons)(Ruhuna)* *MSc(Peradeniya)* *PhD (Saga, Japan)*	E-Mail Phone	: sksg@appsc.sab.ac.lk : 0714468764 : 0453454328

Dr. Enoka P. Kudavidanage *BSc Special (Hons)(Colombo)* *MSc(Colombo)* *PhD (NUS, Singapore)*	E-Mail Phone	: enokakudavidanage@gmail.com : 0718221727 : 0453454328
Dr. E.P.N. Udaya Kumara *BSc Special (Hons) (Ruhuna)* *MSc(Jayawardenepura)* *PhD (AIT, Thailand)*	E-Mail Phone	: udaya@appsc.sab.ac.lk : 0718569440 : 0453454328
Dr. Sandun J. Perera *BSc (Hons)(SUSL)* *M.Phil (Kelaniya)* *PhD (UKZN, South Africa)*	E-Mail Phone	: sandun.perera@gmail.com : sandun.perera@appsc.sab.ac.lk : 0714468740 : 0453454328
Dr. L.V. Ranaweera *BSc (Hons)(Peradeniya)* *M.Phil (Peradeniya)* *PhD (Okayama, Japan)*	E-Mail Phone	: laliwr@yahoo.com : laliwr@appsc.sab.ac.lk : 0710931829 : 0453454328

Lecturers

Mrs. Deepchandi Lekamge *BSc Special (Hons)(SUSL)* *M.Phil (SUSL)*	E-Mail Phone	: deepchandi.lekamge@gmail.com : lekamge@appsc.sab.ac.lk : 0718269109 : 0453454328
Dr. R.G. Udeni Jayalal *BSc Special (Peradeniya)* *PhD (Peradeniya)*	E-Mail Phone	: rgujayalal@yahoo.com : jayalal@appsc.sab.ac.lk : 0718480740 : 0453454328

3.5. Department of Physical Sciences & Technology

Head of the Department

Dr. Jayalath B. Ekanayake	E-Mail Phone	: jayalathek@appsc.sab.ac.lk : 0453454527

Professors

Prof. Chandana P. Udawatte *BSc (Hons)(Peradeniya)* *GI Chem(SL), MPhil (Peradeniya)* *PhD (Peradeniya)*	E-Mail Phone	: chand@sab.ac.lk : 0453454527

Senior Lecturers

Dr. M. Nirmali Wickramarathne *GI Chem (SL)* *PhD (USA)*	E-Mail Phone	: nirmaliw@appsc.sab.ac.lk : 0453454527

Dr. G.M. Lasantha P. Aponsu *BSc Special (Hons)(Colombo)* *MPhil(Colombo)* *PhD (Jayawardenepura)*	E-Mail Phone	: aponsu@appsc.sab.ac.lk : 0718098824 : 0453454527
Dr. Senaka Amarakeerthi *BSc (SUSL)* *MSc(Peradeniya)* *PhD (Aizu, Japan)*	E-Mail Phone	: senakahks@appsc.sab.ac.lk : 0712043212 : 0453454527
Dr. Chaminda H. Baduraliya *BSc Sp (Hons)(Jayawardenepura)* *MSc(Peradeniya)* *PhD (UK)*	E-Mail Phone	chamihb@gmail.com : 0714539527

Lecturers

Mr. R.M. Kapila T. Rathnayake ***(On study Leave)*** *BSc Special (Hons)(Ruhuna)* *MSc (Jayawardenepura)* *MSc (China)*	E-Mail Phone	: kapilar@appsc.sab.ac.lk : 0453454527
Mr. S. Malavipathirana *BSc Special (Hons)(Peradeniya)* *MPhil*	E-Mail Phone	: malavisarath@gmail.com : malavi@appsc.sab.ac.lk : 0714433425
Ms. H.N.M. Sarangika *BSc Special (Hons)(Ruhuna)*	E-Mail Phone	: sarangikah@gmail.com : sarangikah@appsc.sab.ac.lk : 0453454527
Ms. H. Sasimali Soysa ***(On study Leave)*** *BSc Special (Hons)(SUSL)*	E-Mail Phone	: shashi_susl@yahoo.com : shashi_susl@appsc.sab.ac.lk : 0453454527
Mr. M.G.A. Namal Perera ***(On study Leave)*** *BSc (Hons)(Colombo)* *MSc (Colombo)*	E-Mail Phone	: perera.namal@gmail.com : perera.namal@appsc.sab.ac.lk : 0718030449 : 0453454527
Mr. W.T. Leon S. Fernando ***(On study Leave)*** *BSc Sp(Hons)(Jayawardenepura)*	E-Mail Phone	: leonroxlk@gmail.com : leonroxlk@appsc.sab.ac.lk : 0773057012 : 0453454527
Ms. Bimali Weththasinghe ***(On study Leave)*** *BSc Special (Hons)(SUSL)*	E-Mail Phone	: bimali.weththasinghe@gmail.com : 0714433425

Temporary Lecturers		
Mr. Darshana Anuradha *BSc Special (SUSL)*	E-Mail Phone	: ngdhanu@gmail.com : 0783587106
Mr. L.M.M. De Silva *BSc Special (SUSL)*	E-Mail Phone	: malithpst@gmail.com : malith@appsc.sab.ac.lk : 0718284064
Ms. D.M.S.D. Diwakara *BSc Special (Hons)(Peradeniya)*	E-Mail Phone	: shashini.diwakara@gmail.com : 0774232062
Mrs. N.R.A.M. Ruwangika *BSc Special (SUSL)*	Phone	: 0767532439

Instructor in Computer Technology		
Ms. C.N. Hettiarachchi *BSc Special (SUSL)*	E-Mail Phone	: chathuraninadeeka@gmail.com : 0773733841

3.6. Department of Sport Sciences & Physical Education

Head of the Department		
Mr. H.A.C.S. Hapuarachchi	E-Mail Phone	: sampathhac@gmail.com : sampathhac@appsc.sab.ac.lk : 0718258263 : 0453609846

Senior Lecturers		
Dr. M.D. Ranaweera *BA (Hons)(Peradeniya)* *MEd in H/PE (Australia)* *Ed.D. in H/PE (Australia)*	E-Mail Phone	: rana@appsc.sab.ac.lk : 0778084139 : 0453609846

Lecturers		
Mr. A.W.S. Chandana ***(On study Leave)*** *BSc Special (Kelaniya)* *BA (Buddhist & Pali)* *MA (Kelaniya), MPhil (Kelaniya)*	E-Mail Phone	: surajchandana1@gmail.com : surajchandana@appsc.sab.ac.lk : 0717524276 : 0453609846
Mrs. L.R.N.D. Weerarathna ***(On study Leave)*** *BSc (Hons)(Peradeniya)*	E-Mail Phone	: deepanjalee@appsc.sab.ac.lk : 0713567984

Mr. S. Joniton ***(On study Leave)*** *B.P.E.S. (India) M.P.Ed. (India)* *MPhil (India)*	E-Mail Phone	: idmchunnakmj@appsc.sab.ac.lk : 0453609845
Mr. J. Luxman ***(On study Leave)*** *B.P.E. (India)* *M.P.E. (India)*	E-Mail Phone	: luxman82@gmail.com : jluxman@appsc.sab.ac.lk : 0779947440
Mr. S. Sriharan *BA (Hons)(Jaffna)* *MA (India)*	E-Mail Phone	: shree@appsc.sab.ac.lk : 0777353546 : 0453609845
Mr. H.A.C.S. Hapuarachchi *BSc (Hons)(Jayawardenepura)* *MSc (Peradeniya)*	E-Mail Phone	: sampathhac@gmail.com : sampathhac@appsc.sab.ac.lk : 0718258263 : 0453609846
Mrs. T.S. Harshani Perera ***(On study Leave)*** *BSc Special (Hons)(SUSL)*	E-Mail Phone	: shalika.harshani@appsc.sab.ac.lk : 0453609845
Mrs. A.A.L. Madhushani ***(On study Leave)*** *BSc Special (Kelaniya)*	E-Mail Phone	lakshikamadhushani@appsc.sab.ac.lk : 0773797558
Mr. Sanjaya Othalawa ***(On study Leave)*** *B.P.Ed. (Cuba)*	E-Mail Phone	: ssothalawa@appsc.sab.ac.lk : 0776777476
Mrs. Thanuja Liyanage *B.Ed. (NIE)* *M.Ed. (Colombo)*	E-Mail Phone	: thanuja@appsc.sab.ac.lk : 0789903014
Mr. S. Jeganenthiran *BSc (Hons)(UK)*	E-Mail Phone	: jeganenthiran@appsc.sab.ac.lk : 0774968263

Temporary Lecturers

Ms. W.A.W.S. Rupasinghe *BSc Special (Hons)(SUSL)*	E-Mail Phone	: warunirupasinghe@appsc.sab.ac.lk : 0717582651

Mr. P.P. Weerakkody *BSc Special (Hons)(SUSL)*	E-Mail Phone	: pathump9@appsc.sab.ac.lk : 0716369580

Ms. D.A. Jayakody *BSc Special (Hons)(SUSL)*	E-Mail Phone	: dilini.tcc@gmail.com : 0773509168

Instructor in Physical Education		
Ms. H.A.S.A. Appuhamy *BSc Special (Hons)(SUSL)*	E-Mail Phone	: shena.anjal@gmail.com : 0775577507

3.7. English Language Teaching Unit

Coordinator		
Mr. Derick C. Silva *BA (Kelaniya), BA (OUSL)* *PG. Dip (Colombo)* *MA (Kelaniya)*	E-Mail Phone	: derick@appsc.sab.ac.lk : 0453454513

4. FACULTY BOARD

The Faculty Board is responsible for recommending and reporting to the Senate on matters relating to teaching, examinations, courses of study and research in departments of the Faculty, for appointing committees (excluding members of the Faculty) to report on any special subjects, and for recommending suitable persons for appointment as examiners.

The Faculty Board of Applied Sciences consists of:

- All permanent senior academic staff members
- Two representatives from the probationary lectures
- Two representatives from academic supportive staff
- Three external members
- Two student representatives

5. COURSE OUTLINES

Degree Programs Offered by the Faculty of Applied Sciences

- Bachelor of Science Special Degree in Information Systems
- Bachelor of Science Special Degree in Food Science and Technology
- Bachelor of Science (Applied Sciences) in Environmental Sciences and Natural Resource Management
- Bachelor of Science Special Degree in Environmental Sciences and Natural Resource Management
- Bachelor of Science (Applied Sciences) in Physical Sciences
- Bachelor of Science Special Degree in Applied Physics
- Bachelor of Science Special Degree in Chemical Technology
- Bachelor of Science Special Degree in Computer Science and Technology
- Bachelor of Science Special Degree in Physical Education
- Bachelor of Science Special Degree in Sport Sciences and Management

Guideline for Course Codes and Credits

A course code contains, abbreviation to the name of degree program, year of study, semester of study, number of credits assigned for the subject and the subject code respectively.

Example: *The course code of FST 12201 denotes the following;*

Degree Program	Year	Semester	No. of Credits	Subject Code
Food **S**cience & **T**echnology	**1**	**2**	**2**	**01**

A Credit will consist of ;

- **15** contact hours of lectures
- **30** to **45** contact hours of laboratory/field practical
- **25** contact hours of lectures with practical (10 lecture hours and 15 practical hours)

5.1. DEPARTMENT OF COMPUTING & INFORMATION SYSTEMS

Degree Program : BACHELOR OF SCIENCE (SPECIAL) IN INFORMATION SYSTEMS

Summary of the course

Year I			
Semester I			
Course Code	Course Title	No of Credits	Compulsory or Elective
IS 11201	Fundamentals of Information Systems	2	Compulsory
IS 11302	Structured Programming Techniques	3	Compulsory
IS 11203	Information Systems and Practice	2	Compulsory
IS 11204	Information System Infrastructure	2	Compulsory
IS 11205	Fundamentals of Mathematics	2	Compulsory
IS 11206	Statistics & Probability Theory	2	Compulsory
CPE 1101	Professional English I		Compulsory
	Total	**13**	

Year I			
Semester II			
Course Code	Course Title	No of Credits	Compulsory or Elective
IS 12307	Object Oriented Programming	3	Compulsory
IS 12308	Database Systems	3	Compulsory
IS 12209	Emerging Technologies for Information Systems	2	Compulsory
IS 12210	Advanced Mathematics	2	Compulsory
IS 12311	Analysis of Algorithms	3	Compulsory
IS 12212	Human Computer Interaction	2	Compulsory
CPE 1201	Professional English II		Compulsory
	Total	**15**	

Year II			
Semester I			
Course Code	Course Title	No of Credits	Compulsory or Elective
IS 21213	Personal Productivity with IS technology	2	Compulsory
IS 21214	Software Project Management	2	Compulsory
IS 21215	Object Oriented Analysis and Design	2	Compulsory
IS 21216	Platform Technologies	2	Compulsory
IS 21217	System Analysis and Design	2	Compulsory
IS 21218	Information Assurance and Security	2	Compulsory
IS 21219	Social and Professional Issues	2	Compulsory
CPE 2101	Professional English III		Compulsory
	Total	**14**	

Year II			
Semester II			
Course Code	Course Title	No of Credits	Compulsory or Elective
IS 22220	System Administration and Maintenance	2	Compulsory
IS 22221	Operating System Concepts	2	Compulsory
IS 22222	System Integration and Architecture	2	Compulsory
IS 22223	IS Risk Management	2	Compulsory
IS 22224	IT Governance	2	Compulsory
IS 22225	Business Intelligence	2	Compulsory
IS 22226	Web Technologies	2	Compulsory
CPE 2201	Professional English IV		
	Total	**14**	

Year III			
Semester I			
Course Code	Course Title	No of Credits	Compulsory or Elective
IS 31227	Rapid Application Development	2	Compulsory
IS 31228	Electronic Business Strategy, Architecture and Design	2	Compulsory
IS 31129	Enterprise Architecture	1	Compulsory
IS 31230	Mini Project	2	Compulsory
IS 31231	Management Information Systems	2	Compulsory
IS 31232	IT Auditing	2	Compulsory
IS 31233	Entrepreneurship and Innovation	2	Compulsory
IS 31234	Software Engineering	2	Elective
IS 31235	Data Communication and Networks	2	Elective
IS 31236	Geographical Information Systems	2	Elective
IS 31237	Advanced Database Systems	2	Elective
IS 31238	Organizational Behavior and Management	2	Elective
IS 31239	Agile Software Development	2	Elective
IS 31240	Software Quality Assurance	2	Elective
IS 31241	Design Patterns and Applications	2	Elective
	Total (Core + Electives) (13 + 10)	**23**	

Year III			
Semester II			
Course Code	Course Title	No of Credits	Compulsory or Elective
IS 32842	Industrial Training	8	Compulsory
	Total	**8**	

Year IV			
Semester I			
Course Code	Course Title	No of Credits	Compulsory or Elective
IS 41243	Introduction to Distributed Systems	2	Compulsory
IS 41244	Information Systems Strategies, Management & Acquisition	2	Compulsory
IS 41245	Business Process Management	2	Compulsory
IS 41246	Enterprise Resource Planning	2	Compulsory
IS 41247	Research Method	2	Compulsory
IS 41248	Cloud Computing	2	Elective
IS 41249	Logistics Systems and Transportation Management	2	Elective
IS 41250	Human Resource Management	2	Elective
IS 41251	Data Mining and Applications	2	Elective
IS 41252	Multimedia and Hypermedia Systems Development	2	Elective
	Total (Core + Electives) (10 + 6)	**16**	

Year IV			
Semester II			
Course Code	Course Title	No of Credits	Compulsory or Elective
IS 42853	Research Project in Information Systems	8	Compulsory
IS 42254	Business/IT Alignment	2	Compulsory
IS 42255	Business Process Simulation	2	Compulsory
IS 42256	Information System Economics	2	Compulsory
IS 42257	Enterprise Modeling Ontologies	2	Compulsory
IS 42258	Enterprise Architecture Framework	2	Elective
IS 42259	Web Service Technologies	2	Elective
IS 42260	Software Architecture	2	Elective
IS 42261	Computer System Security	2	Elective
IS 42262	Mobile Computing	2	Elective
	Total (Core + Electives) (16 + 6)	**22**	

Summary of credits required:

	Semester I	**Semester II**	**Total**
Year I	13	15	28
Year II	14	14	28
Year III	23	08	31
Year IV	16	22	38
	Total		**125**

DETAILED SYLLABUS

N.B.

T - Theory

P - Practical

F - The department organizes field visit relevant to the particular subject area.

TH - Thesis

Year I Semester I				
IS 11201	Fundamentals of Information Systems	T	P	-

Introduction to information concepts: Data vs. Information, Characteristics of information, Cost/value and quality of information, Competitive advantage of information. System and modeling concepts: System components and relationships, Information System (IS) types, System performance and standards, Specification, design and re-engineering of IS. IS development: Application vs. System software, Package software solutions. IS Issues: IS Security, Ethical and social issues in IS.
Practical: Developing macros, designing and implementing user interfaces and reports, developing a solution using database software.

IS 11302	Structured Programming Techniques	T	P	-

Introduction to Structured Programming: Introduction to compilers and interpreters, Data types, Variables, Expressions and Assignment Statements, Console Input/Output, Libraries and Namespaces. Flow Control: Branching Mechanisms, Loops. Function Basics: Predefined Functions, User-Defined Functions, Scope Rules. Parameters: Parameters, Default Arguments, Arrays: Introduction to Arrays, Array manipulation, Multidimensional Arrays, Structures, Pointers. Recursion: Recursive functions. Data Structure: Stacks and Queues, Linked Lists, Trees and graphs, File Organization and Access: Sequential organization, Random Organization, Linked organization, Inverted files, Exception Handling: Testing and Debugging. Application of programming techniques to solve real life problems.

IS 11203	Information Systems and Practice	T	-	-

Information Systems Strategies: Overview of Business Strategy Frameworks, Overview of Organizational Strategies, Overview of Information Systems Strategy, Strategic Use of Information Resource: Competitive Advantages, Knowledge Management, Business Intelligence, Strategic Alliances, Organizational Impacts of Information Systems Deployment: Information Technology and Organizational Design, Information Technology and Management Control Systems, Information Technology and Culture, Information Technology and Communication/Collaboration, Information Technology and Changes in Nature of Work, Information Technology and Changing Business Processes.

IS 11204	Information System Infrastructure	T	-	-

Computer Systems: Types of computer systems, Introduction to personal Computers, networks and internet, CPU, Memory, Input/Output. Software systems: OS, Application software, utility software. Data communication: Communication fundamentals, communication networks and internet based solutions.

IS 11205	Fundamentals of Mathematics	T	-	-

Sequences, Series and Limits: Definition of a sequence, limit of a sequence, definition of the series, Convergence of series, definition of a power series, Convergence radius of a power series, Functions: Functions of a real variable, inverse functions, standard functions, Continuity of a function. **Set Theory & Algebra***:* Sets, Relations, Functions, Groups, Partial Orders, Lattice. Boolean algebra **and mathematical logic***:* Sentential logic, First order logic, The completeness theorem, Computability and decidability, The incompleteness theorem. **Linear Algebra***:* Definition of a matrix, Column and row vectors, scalar product, Matrix addition and multiplication, Determinant of a matrix, Row operations for solving linear equations, Rank, Linear dependence, Inverse matrix, Eigen values and eigenvectors. **Combinatorics:** Permutations, Combinations, Counting; Summation; generating functions; recurrence relations; asymptotic. Differentiation and Integration. Application of learned theoretical concepts using mathematical software.

IS 11206	Statistics & Probability Theory	T	-	-

Introduction to Statistics, Descriptive Statistics: Organization & summarizing data, Summary measures (Measures of Central Tendency, Measures of Variability) and shapes of distributions. Elements of Probability: Laws of Probability & Bayes' Theorem, Random variables & discrete and probability distribution, Discrete (Binomial, Poisson, Geometric), Continuous (Normal, Gamma, Exponential). Statistical Inference: Estimation (point and interval estimation), concept of test of hypothesis, Type I and Type II errors, power of test, one sample test, two sample tests for dependent and independent samples and association test. Familiarize with the use of statistical software.

Year I Semester II				
IS 12307	Object Oriented Programming	T	P	-

Introduction to OO Concepts: Abstraction, Encapsulation, Inheritance and Polymorphism. Introduction to OOP: class, object, interfaces, packages, methods, constructors, objects creation, and method invocation. Encapsulation; class member visibility (private, public, protected, default), static members, abstract classes and abstract methods. Inheritance and Polymorphism: subclasses, inheritance and class hierarchies, dynamic binding. Applications of OO concepts to solve real life problems.

IS 12308	Database Systems	T	P	-

Introduction to Databases: Definition of the database, database system, data models, database applications, database system architecture, characteristics of database approaches, Designing: Conceptual design: ER- diagram: Relational Model, Constraints, ERD Issues, weak entity sets. Logical design: Relational database model, Logical view of data, keys, integrity rules, Normalization. Relational algebra: introduction, Selection and projection, set operations, renaming, Joins, Division, syntax, semantics, Operators, Grouping and ungrouping, relational, Triggers. Database programming: SQL, DDL, DML. Database tuning and indexing.

IS 12209	Emerging Technologies for Information Systems	T	-	-

Development environments and standards; structured, event driven and object oriented application design; testing; software quality assurance; system implementation; User training; system delivery; post implementation review; configuration management; maintenance; multi-tiered architectures and client independent design, Introduction to different computing environments.

IS 12210	Advanced Mathematics	T	-	-

Vectors: Scalars, Vectors, Three Dimensional Vectors. Scalar product and projection, Cross product and applications, Scalar and vector triple products, evaluation as a determinant and applications. Differential Equations: Classification of differential equations, Initial and boundary conditions, Solution of first-order equations, separable equations, integrating factor, Differential operators and linearity, Solution of linear constant-coefficient ODEs, characteristic equation, complementary function, particular integral, Sets of linear constant-coefficient equations. Introduction to Graph Theory.

IS 12311	Analysis of Algorithms	T	-	-

Basic algorithmic analysis, algorithmic strategies and fundamentals of computing algorithms: searching and sorting algorithms, Graph algorithms: Breath first search, depth first search, dynamic programming, divide and conquer algorithms and greedy algorithms. Implementation of algorithms in solving real world problems.

IS 12212	Human Computer Interaction	T	-	-

Foundation of HCI, Usability principles, building a simple GUI, Human abilities, human-centered software development, cultural aspects, human-centered software evaluation, GUI design, GUI programming, HCI aspects of multimedia systems, HCI aspects of collaboration and communication, validation of usability and user experience, Handling errors & help.

Year II Semester I				
IS 21213	Personal Productivity with IS Technology	T	P	-

Knowledge work productivity concepts, advanced software functionality to support personal and group productivity such as templates and macros, reusability, organizational management of data (sorting, filtering) via spread sheets and database tools, accessing organizational and external data, information search strategies, tool use optimization and personalization, professional document design (latex implementation), web page design (HTML, JavaScript) and publishing (form validation), effective presentation design and delivery (Example: formatting tool like Latex implementation).
Practical: HTML, Form validation, formatting documents using standard tools.

IS 21214	Software Project Management	T	-	-

Introduction to Software Project Management: Projects and Processes, The Process Framework, project integration management, Scope management, Time management, project cost management, Quality management, Human Resource Management, Communication management, Risk management, project management tools, advanced life cycle models, testing and maintenance and software project documentation and IT Management.

IS 21215	Object Oriented Analysis and Design	T	-	-

High level overview of Object Oriented (OO) Development Process, Use Case/Responsibility Driven Design: Contract based approach, Responsibility identification, Responsibility allocation, Roles, stereotypes and interfaces, Collaborations, CRC cards, Object-Oriented Principles: Why Object Oriented Design, Structured Engineering and Information Engineering, Encapsulation, Inheritance, Polymorphism, Dynamic Binding, Abstraction, Objects and Classes, Object Relationships, UML Diagramming, Design Patterns, Testing objects.

IS 21216	Platform Technologies	T	-	-

Operating systems: overview, windows and Linux OS, scheduling and dispatch, memory and device management. Architecture and organization: memory-level representation of data, assembly level machine organization, memory system organization architecture, interfacing and communication, functional organization, performance enhancement. Computing infrastructures: power and heat budgets, servers, server farms, hardware and software integration. Enterprise deployment software: middleware frameworks, enterprise deployment and management software, configuration and management, Firmware and Hardware.

IS 21217	System Analysis and Design	T	-	-

System Analysis Fundamentals: Introducing System Analysis and Design (SA&D), SA&D concepts, Roles of system analyst, System development life cycle, depicting system graphically, determining feasibility, activity planning and control. Advanced software development models: Agile, XP, Pair Programming. Information requirements analysis: Sampling and investigating data, interviewing, Using questionnaires, Prototyping. The analysis process: Using data flow diagram, Using data dictionaries, Describing process specifications and structured decisions, the system proposal. The essentials of design: Application Architecture and Modeling, designing output, designing input, Designing the file or database, Designing the user interface, Designing data, Documenting the design phase. Implementation and Testing: Implementing the information system, Quality assurance, Systems Maintenance and Support, Case Study.

IS 21218	Information Assurance and Security	T	-	-

Fundamental aspects: history & terminology, security mindset, design principles, system/security life cycle, Security Implementation Mechanisms (Guards, Gates, Cryptography), Information Assurance Analysis Models (Threats, Vulnerabilities, Attacks, Countermeasures), Disaster Recovery, Forensics. Security Mechanisms: Cryptography, Authentication, Redundancy, Intrusion Detection. Operational Issues: Trends, Auditing, Cost-Benefit analysis, Asset Management, Standards, Enforcements, Legal Issues. Policy: Creation and Maintenance of Policies, Prevention, Avoidance, Domain, Integration. Attacks: Social Engineering, Denial of Service, Protocol Attacks, Active & Passive Attacks, Buffer Overflow Attacks, Malware. Forensics: Legal Systems, Digital Forensics, Rules of Evidence, Search and Seizure, Digital Evidence, Media Analysis.

IS 21219	Social and Professional Issues	T	-	-

History of computing, social context of computing, methods and tools of analysis, professional and ethical responsibility, risks and liability of computer-based systems, intellectual property, privacy and civil liberties, computer crime, customs and law, economical issues in computing, philosophical frameworks.

Year II Semester II				
IS 22220	System Administration and Maintenance	T	-	-

Foundation Elements of System Administration, Operating systems: Installation, configuration, maintenance, server services, client services, support. Administrative activities: content management and deployment, server administration and management, user and group management, backup management, security management, disaster recovery, automation management, user support and education. Administrative domains: web, network, database, OS, support domains. Introducing system administration on cloud computing and hybrid usage. Help desk concepts, System monitoring.

IS 22221	Operating System Concepts	T	-	-

Overview, Operating system principles, Multi-Programming: Processes and threads, system calls, context switching. Managing processor time. Types of scheduling, Scheduling algorithm, concurrency, Memory management, Device management, File systems, Inter-process Communication: pipes, sockets, signals, shared memory, security and protection, real time and embedded systems, fault tolerance, system performance and evaluation. Case study: Linux.

IS 22222	System Integration and Architecture	T	-	-

Enterprise Architecture (EA) and Enterprise Engineering (EE). Balanced Scorecard and Strategy Maps (BSSM). Using Strategy Analysis (SA). Governance Analysis Using EA. EA Methods. Using Business-Driven Data Mapping for Integrated Data. Strategic Modeling for Rapid Delivery of EA. Strategic Alignment, Activity and Workflow Modeling, and Business Rules. Using Business Normalization for Future Business Needs. Menu Design, Screen Design, Performance Analysis, and Process Modeling. Enterprise Application Integration Concepts. Enterprise Portal Technologies for Integration. Web Services for Real-Time Integration. Service-Oriented Architecture for Integration. Managing and Delivering EA. Future Directions in EA and Integration.

IS 22223	IS Risk Management	T	-	-

Introduction to information security: Inspection, Resource inventory, Threat assessment, Identifying vulnerabilities, Assigning safeguards, Protection, Awareness, Access, Identification, Authentication, Authorization, Availability, Accuracy, Confidentiality, Accountability, Administration, Detection: Intruder types, Intrusion methods ,Intrusion process, Detection methods, Monitoring systems, Reaction: Incident determination, Incident notification, Incident containment, Assessing damage, Incident recovery, Automated response, Reflection: Incident documentation, Incident evaluation, Legal prosecution, Risk assessment frameworks: COSO Integrated Control Framework, CoBiT – ISACA, ISO Risk Management – Draft Standard, Security engineering: Protocols, Passwords, Access controls, Cryptography, Physical aspects: Biometrics , Physical tamper resistance, Security printing and seals, Physical aspects: Biometrics, Physical tamper resistance, Security printing and seals.

IS 22224	IT Governance	T	-	-

Foundations of IT Governance, Security and Control Framework: IT Controls and COBIT. IT Strategy and Enterprise Architecture: IT Governance Archetypes for Allocating Decision Rights, Mechanisms for Implementing IT Governance. IT Decision Making: Defining Operating Model. IT Organization, Roles and Policies, IT Policy Development: Practical IT Policies & Procedures and Scisco. QMS and the Management of IT Controls, Resource Management: Portfolio Management, Contracting, Assessing and Managing IT Risk, Maturity Models, Communications & Balanced Scorecards.

IS 22225	Business Intelligence	T	-	-

Introduction to AI. Organizational decision making, functions, and levels: Executive, managerial, and operational levels, Systems to support organizational functions and decision making, Information and knowledge discovery: Reporting sys., OLAP, Data, text, and Web mining, Business analytics: Application systems: Executive, managerial, and operational support sys., DSS, Functional area information sys., Collaboration technologies, Intelligent sys., Knowledge management sys., Information visualization: Visual analytics, Dashboards.

IS 22226	Web Technologies	T	P	-

Web Application Architecture: HTTP, Web servers, Web Browsers, Dynamic Web Applications(architectures, clients, servers, dynamic content) & services (SOA, SOAP, RESTfulness) Modeling Web Data: Data Model: Semi structured data, XML and ebXML, Web Data Management with XML, XPath and XQuery, Typing of semi Structured Data, XML Query Evaluation, Managing an XML DB, Web Data Semantics and Integration: Ontologies, RDF, and OWL, Querying Data through Ontologies, Data Integration, Wrappers and Data Extraction with XSLT, Building Web Scale Applications: Web search, Web Security. Practical: Web applications development using XML, ontology development.

Year III Semester I				
IS 31227	Rapid Application Development	T	-	-

Basis for Rapid Development: Timeboxing, Iterative Dev., Incremental delivery, Principles of agile methods: Adaptation and People-oriented, Rapid Dev.: Real-world tradeoffs, Rapid Development Strategy: Avoiding classic mistakes, Applying software fundamentals, Avoiding the traps of rapid development, Rapid Development Considerations: Risk Management, Documentation: The purpose of documentation, Effective use of artifacts, Change Management: Rapid change management. Agile change management, Rapid Development methods: Agile, Extreme Programming, Storytelling, Prototyping, Storyboarding, Use Case prototyping, Scenarios, CRC Cards, Dynamic prototyping, The Bottom Line: The Culture of Rapid Development, Rapid Development Best Practices, Tools for Team Development.

IS 31228	Electronic Business Strategy, Architecture and Design	T	-	-

E-commerce economics, Business models (B2B, C2C, B2C, G2B), Value chain analysis, Technology architecture for electronic business, Supply chain management, Consumer behavior within electronic environments, Legal and ethical issues, Information privacy and security, Trans-border data flows, Information accuracy and error-handling, Disaster planning and recovery, Solution planning, Implementation and roll-out, Site design, Internet standards and methods, Design of solutions for the Internet, Intranets and extranets, EDI payment systems, Support for inbound and outbound logistics, Introduction to M-Commerce.

IS 31129	Enterprise Architecture	T	-	-

An Introduction to Enterprise Architecture (EA), EA Frameworks, Component Architectures, Enterprise Application Service Delivery, Systems Integration, Content Management, Inter-Organizational Architectures, Processes for Developing EA, Architecture Change Management, Implementing EA, EA and Management Controls.

IS 31230	Mini Project	T	-	-

Supervised Independent Research/Software Development Project on a given topic.

IS 31231	Management Information Systems	T	-	-

Management within the organization: Management activities, Roles and Levels; Management Planning, Controlling and Strategic planning, Decision making and using MIS for decision making: Measurement of MIS performance and capabilities, MIS applications and relationships: Introduction to different types of Information Systems, Databases and data warehouses and their relevance to MIS; Networks, Internet and MIS. Development of MIS: Managing MIS Project, Techniques and methodologies for supporting MIS development.

IS 31232	IT Auditing	T	-	-

IT Audit Overview: Roles of the IS auditor and IS audit functions, IT risks: Business risk, Audit risk, security risk, Continuity risk, Audits vs. Assessments, Information Security goals and Issues, Computer security policies and Frameworks: GAAP, SAS, ITIL, COSO, COBIT, ISO17799, Conducting the IT Audit: IT audit planning, Develop the audit program, Conduct fieldwork, Wrapping-up, Concluding and Reporting, Information Security: Overview, Main audit steps, Information Systems Strategy and Planning, Database Implementation and Support, Business Continuity Planning, Information Systems Operations, Application Systems Implementation and Maintenance, Relationships with Outsourced Providers, Business Process Controls Testing, Network Support: Concept of layering, Introduction to circuit–switched and packet–switched networks, Network protection mechanism in firewall, Proxy servers, Intrusion detection system, SSL, Network attacks.

IS 31233	Entrepreneurship and Innovation	T	-	-

Entrepreneurs, Role of entrepreneurs in national development, Training of entrepreneurs, Essential characteristics of techno-entrepreneurs, Business proposal and assessing criteria, Making business proposals, Technology and innovation: Invention, Commercialization and Diffusion, Technology push and market pull; Business models for innovation.

IS 31234	Software Engineering	T	-	-

Introduction to Software Engineering, Introduction to problems, Software Processes, Requirements and Specification, Software Design, COTS and Reuse, CASE Tools, Metrics and Reliability Assessment, Software Testing and Quality Assurance (Testing, Analysis, QA, Reviews), Implementation Models, Team Organization and People Management, Software and System Safety.

IS 31235	Communication Networks	T	-	-

Fundamental concepts of data communications: Application, Physical, Data Link and Network/Transport layer, Principals of communication and connecting to the network, Network Services, Network Technologies: Local Area Network (LAN) and Wireless LAN, Wireless technologies: Wide Area Network (WAN) and Metropolitan Area Networks (MAN), Internet standards and services, Network Management: Security, Design and Management of the network, Research on data communications and networking issues in real world business settings. Understanding the networking concepts using Packet Tracer.

IS 31236	Geographic Information Systems	T	-	-

Introduction to GIS, History and concepts of GIS, Components of a GIS, Basic data models, Data sources and data input, Scope and application area, Purpose and benefits of GIS, Mapping concept – mapping elements with strong practical background. Introduction to ArcGIS.

IS 31237	Advanced Database Systems	T	-	-

Database Design and Implementation: Relational Database Design, Database Implementation & Tools, Advanced SQL, Database System Catalog, DBMS Advance Features: Query Processing & Evaluation, Transaction Management and Recovery, Database Security & Authorization, Distributed Databases: Enhanced Database Models, Object Oriented Databases, Database and XML, Introduction to Data Warehousing, Introduction to Data Mining, Emerging Trends and Example of DBMS Architecture: Emerging Database Models, Technologies and Applications, Big data.

IS 31238	Organizational Behavior and Management	T	-	-

Fundamental concepts and overview of Organizational Behavior and Management, Understanding Individual Behavior (Attitude, Values, Perception, Learning, Personality, Motivation, Psychological Capital, Multiple Intelligence, Emotional Intelligence), Team dynamics, Planning, Organizing, Leadership, Controlling, Organizational Conflict Management, Stress Management, Interpersonal and Organizational Communication, Organizational Culture and Managing Change.

IS 31239	Agile Software Development	T	-	-

Agile and Lean Software Development: Basics and Fundamentals: Values, principles, stakeholders, Lean Approach, Agile and Scrum Principles, Agile Product Management, Agile Requirements, Agile Architecture, Agile Risk Management, Agile Review, Agile Testing, Scaling Agile for large projects

IS 31240	Software Quality Assurance	T	-	-

Introduction to Quality Assurance, Quality Concepts, Software Quality Assurance Activities, Software Reviews and their importance Statistical SQA, Software Reliability, ISO 9000 approach to SQA, Software testing tools.

IS 31241	Design Patterns and applications	T	-	-

Introduction and History of Design Patterns, Pattern design principles, Notifying objects: Observer Pattern, Decorating Objects: Decorator Pattern, Object Creation: Factory Pattern, Singleton Pattern. Command Pattern, Façade Pattern, Template Method Pattern, Prototyping, Iterator and Composite Patterns, State Pattern, Proxy pattern, Bridge pattern, Mediator pattern, Compound patterns, Chain of responsibility pattern, Concurrency pattern and pattern usage in the real world.

Year III Semester II				
IS 32842	Industrial Training	TH		

Student will be required to conduct either research or training related to Information Systems at a relevant industry or research institution. The duration of the project period should be minimum of 15 weeks. A project report (thesis if it is a research) should be submitted at the end of the semester and should be presented and defended by the respective student in front of an Examination Committee appointed by the department. A guideline for the preparation of report will be given separately.

Year IV Semester I				
IS 41243	Introduction to Distributed Systems	T	P	-

Overview of Distributed System Architecture: Motivation, System structures, Legacy Applications, Architectures, ODP Reference model and distribution transparencies, Design issues. Distributed System Models, Networks and Internetworks, Interaction primitives: message passing, Interface definition language, RPC, Remote Method Invocation (RMI). Interaction and Implementation: Message Passing, concurrency and threads, heterogeneity of systems and languages. Time Synchronization, Distributed systems management: SNMP management model & MIBs, Management and Security policy. Ubiquitous Computing: Grand challenges, Engineering issues, Policy-based management. Distributed Transactions.

IS 41244	IS Strategies, Management & Acquisition	T	-	-

The IS function, IS strategic alignment, Strategic use of information, Impact of IS on organizational structure and processes, Introduction to IS economics, IS planning, Role of IS in defining and shaping competition, Managing the IS function: IS leadership, Structuring the IS organization, Hiring, retaining, and managing IS professionals, Managing a mixed set of internal and external resources, Determining staffing skills allocation models, Acquiring IT resources and capabilities: Acquiring infrastructure capabilities, Sourcing information systems services and applications, IS/IT governance frameworks, IS risk management.

IS 41245	Business Process Management	T	-	-

Overview: Challenges in managing business processes, Approaches to business process management & improvement, Understanding organizational processes: Business process definition and classification, Identifying core processes, Modeling processes, Documenting processes, Process assessment: Measuring performance, Benchmarking, Statistical techniques for process measurement, Process improvement: Process design guidelines and principles. Introduction to BPM standards, Standard notations: BPMN, activity diagrams, EPC. Developing Individual Projects.

IS 41246	Enterprise Resource Planning	T	-	-

Introduction to ERP, Examples of ERP – SAP, ERP Technology, ERP and Business Process Reengineering, ERP Life Cycle: Planning and Package Selection, Procurement Process, Production Process, Accounting, ERP Sales, Customer Relationship Management and Knowledge Management, Integrated Processes and the Supply Chain, Emerging Trends in Enterprise Systems.

IS 41247	Research Method	T	-	-

Some reflections on the theory of evolution of knowledge, Inductive and deductive methods in research, Research design: identifying issues and problems, defining research problem(s) and objectives, Identifying data requirements, sources, and instruments for data gathering, Introduction to design science.

IS 41248	Cloud Computing	T	-	-

Introduction to cloud computing, Cloud as IaaS, PaaS, SaaS, Setting up your own Cloud, Cloud Domain and scope of work ,Cloud Computing Programming, Cloud readiness, Hybrid computing (Public and Private Clouds) Comparing Virtualization Technologies, Desktop Virtualization, Server Virtualization, Network and Storage Virtualization, Building a Virtual Infrastructure.

IS 41249	Logistics Systems and Transportation Management	T	-	-

Evolution of Logistics, Integrated logistics, Evolution of Supply Chain Management, Supply Chain Overview, Global Supply Chains, Supply Chain Strategy, Supply Chain Planning, Supply Chain Performance Management, Supply Chain Financial Control, Demand and Order Management, Supply Chain Operations Reference model, Networking and Transportation, Shipment Management, Fleet/Container Management, Carrier Management, Freight Management, Reverse Logistics, Outsourcing - Third Party Logistics (3PL) Provider/Lead Logistics Provider (LLP), Import and Export Procedures, Freight forwarding agencies and shipment services, National and international law, Legislation, Regulations, Safety requirements, and Professional standards.

IS 41250	Human Resource Management	T	-	-

Human Resource Management (HRM) and its environment, The importance of effective HRM, HRM goals, HRM Functions: Job Designing, Job Analysis, HR Planning, Recruitment, Selection, Hiring and Contract of Employment, Orientation, Training & Development, Performance Appraisal, Reward Management, Grievance Handling, Disciplinary Management, Labour Manager Relations, Termination of Employment, HRIS, Role of HRM in IT industry.

IS 41251	Data Mining and Applications	T	-	-

Introduction: Data Mining, Machine learning, Patterns, Example data sets, Applications, Input, Output, Basic Learning Algorithms: Introduction to big data and analytics, Cube computation and cube operations: Slice, Dice and Pivot, Data marts, data warehouses.

IS 41252	Multimedia and Hypermedia System Development	T	-	-

Definitions for multimedia, Usage of multimedia, Delivering multimedia, Fonts and faces, Using text in multimedia, Font editing and design tools, Hypermedia and Hypertext, Making still images, Bitmaps, Vector-drawing, 3-D drawing and rendering, Understanding natural light, Computerized color, Color palettes. Introduction to image processing, Introduction to audio and video processing and streaming, Practical use of multimedia processing tools.

Year IV Semester II				
IS 42853	Research Project in Information Systems	TH		

Each student is assigned on a research problem by the department in the field of Information Systems. The topics assigned are directly relevant to a current topic of Information Systems and the students are expected to apply the knowledge gained throughout the study program.

IS 42254	Business/IT alignment	T	-	-

Introduction to Enterprise Architecture, Organizational Alignment & EA, Planning for EA: Six Sigma, Lean and Quality Management, The EA Governance Process and EA implementation, EA Success Factors/Value and Risk Analysis for Enterprise Architecture.

IS 42255	Business Process Simulation	T	-	-

Simulation in management decision making, Queuing theory, Concepts of discrete-event simulation. Construction of models: Modeling issues, Verification and Validation of models, Development of simulation models using selected software, Analysis of results.

IS 42256	Information System Economics	T	-	-

Introduction: IT, Markets, Organization, Economics of communications, Economics of intellectual property: Mobile and wireless information system, Knowledge management, DB management, Software requirement management, Software quality management, Human resource economics Economic of (Outsourcing) Contract Design, Pricing of Information Goods: Versioning, Bundling, Interactive Marketing: Aggregation, Advertising and targeting, Economics of Information Security, IT and collaborative work, Inter-Organizational Information Systems, Value-Adding Partnerships and Firm Boundaries, Auctions

IS 42257	Enterprise Modeling Ontologies	T	-	-

Introduction to Ontology, Ontology: From philosophy to engineering, Ontology and the semantic web, Overview of ontology projects, Ontology and information engineering in healthcare domain, Use of ontology in tracking systems, Overview of ontology in financial domain, Ontology in manufacturing, Optimization and fusion.

IS 42258	Enterprise Architecture Frameworks	T	-	-
Introduction to EA Frameworks (TOGAF, ASSIMPLER, EAF), EA domains: Business Architecture, Data Architecture, Application Architecture, Technology architecture, Components of Enterprise Architecture Frameworks, Introduction to TOGAF.				

IS 42259	Web Service Technologies	T	-	-
Communication Protocols: RESTFul services, SOAP services (WS-* protocols), Serialization Formats: XML (XML Schema, XPath and XSLT), JSON, Text Encoding Formats, Binary Formats (Protobuf), Security: OAuth, JWT, SWT, Distributed Web applications development using a Java Web Framework.				

IS 42260	Software Architecture	T	-	-
Architectural quality factors (performance, scalability, security, maintainability), Architecture Patterns, Layered architecture, Architectural Views, Cross cutting concerns: Security, Logging, Exception handling, caching, UI Frameworks: Web Frameworks, GUI Frameworks, Dependency injection and aspect oriented programming (case study – Spring), Persistence Frameworks: OR mappers (case study – Hibernate).				

IS 42261	Computer System Security	T	-	-
Introduction to security, Features of security systems, Threats and attacks on security, Introduction to cryptography, Digital Signatures, Program Level Security, Client server security, Introduction to Firewalls, Secure Protocols, Kerberos, VPN, L2TP, PPTP, IPSec, SSL, HTTPS, Secure network design policies, segmentations, isolation, IDS/IPS and firewalls.				

IS 42262	Mobile Computing	T	-	-
Introducing Mobile Computing Concepts, Mobile OS, Java Clients, Mobile Ecosystem, Networking Java clients, Connectivity with mobile to consume services and send data, Data storage on the device, Record Management System, SMS-Databases and other options, Location based services, Bluetooth integration, Business model development and related social and professional issue.				

Rules and Regulations:

1. Students should complete (obtain at least PASS grade) non-credited compulsory course Professional English to obtain the degree.
2. Student should follow at least five (05) Elective subjects out of eight (08) subjects in the semester I of the Year III.
3. Student should go for the Industry Placement in the Year III Semester II. It's compulsory for all.
4. Student should follow at least three (03) Elective subjects out of Five (05) subjects in the semester I of the Year IV.
5. Student should follow at least three (03) Elective subjects out of Five (05) subjects in the semester II of the Year IV.
6. Compulsory non-credited Industrial visit will be organized during the semester I of the Academic Year III.
7. Depend on the availability of the resources elective courses will be conducted in the Year III Semester I, Year IV Semester I and II.
8. Student should submit the Research Proposal for the B. Sc. Research Project during the first part of the Year IV semester I through the course Research Method (IS 41247) and the Research will commence thereafter and there will be regular progress presentations from Year IV Semester I to the end of the Year IV semester II. This is completely a research project not an internship at the industry.

5.2. DEPARTMENT OF FOOD SCIENCE & TECHNOLOGY

Degree Program : BACHELOR OF SCIENCE (SPECIAL) IN FOOD SCIENCE AND TECHNOLOGY

Summary of the course

Year I			
Semester I			
Course Code	Course Title	No of Credits	Compulsory or Optional
FST 11201	Introduction to Food Science and Technology	2	Compulsory
FST 11202	Food Biology	2	Compulsory
FST 11103	Food Biology Practical	1	Compulsory
FST 11204	General Chemistry	2	Compulsory
FST 11205	Fundamentals of Organic Chemistry	2	Compulsory
FST 11106	Elementary Chemistry Laboratory I	1	Compulsory
FST 11207	Computer Fundamentals	2	Compulsory
FST 11108	Computer Practical	1	Compulsory
FST 11209	Mathematics for Food Science and Technology	2	Compulsory
FST 11210	Production of Agricultural Raw Materials for better Food Quality	2	Compulsory
CPE 1101	Professional English I	-	Compulsory
	Total	**17**	

Year I			
Semester II			
Course Code	Course Title	No of Credits	Compulsory or Optional
FST 12201	Fundamentals of Microbiology	2	Compulsory
FST 12202	Biochemistry I	2	Compulsory
FST 12203	Postharvest Technology	2	Compulsory
FST 12204	Postharvest Pest and Disease Control	2	Compulsory
FST 12105	Postharvest Handling of Food Sources Practical	1	Compulsory
FST 12206	Fundamentals of Analytical Chemistry	2	Compulsory
FST 12107	Elementary Chemistry Laboratory II	1	Compulsory
FST 12208	Graphics and Web Design	2	Compulsory
FST 12209	Fundamentals of Statistics	2	Compulsory
FST 12010	Technical /Scientific Writing	-	Compulsory
CPE 1201	Professional English II	-	Compulsory
	Total	**16**	

Year I			
Semester I			
Course Code	Course Title	No of Credits	Compulsory or Optional
FST 21201	Biochemistry II	2	Compulsory
FST 21202	Food Chemistry	2	Compulsory
FST 21103	Biochemistry and Food Chemistry Practical	1	Compulsory
FST 21204	Principles of Human Nutrition	2	Compulsory
FST 21105	Food Process Engineering I	1	Compulsory
FST 21206	Food Preservation	2	Compulsory
FST 21107	Food Preservation Practical	1	Compulsory
FST 21208	Management Process	2	Compulsory
FST 21209	Advanced Statistics I	2	Compulsory
FST 21210	Food Microbiology	2	Compulsory
CPE 2101	Professional English III	-	Compulsory
	Total	**17**	

Year II			
Semester II			
Course Code	Course Title	No of Credits	Compulsory or Optional
FST 22201	Biotechnology f or Food Science	2	Compulsory
FST 22102	Microbiology and Biotechnology Practical	1	Compulsory
FST 22203	Food Process Engineering II	2	Compulsory
FST 22104	Food Process Engineering Practical	1	Compulsory
FST 22205	Food Quality Management	2	Compulsory
FST 22206	Livestock Production and Aquaculture	2	Compulsory
FST 22107	Livestock Production and Aquaculture Practical	1	Compulsory
FST 22108	Food Marketing	1	Compulsory
FST 22209	Advanced Statistics II	2	Compulsory
CPE 2201	Professional English IV	-	Compulsory
	Total	**14**	

Year III			
Semester I			
Course Code	Course Title	No of Credits	Compulsory or Optional
FST 31201	Food Analysis	2	Compulsory
FST 31102	Food Analysis Practical	1	Compulsory
FST 31203	Dairy Science	2	Compulsory
FST 31204	Food Packaging	2	Compulsory
FST 31205	Applied Human Nutrition	2	Compulsory
FST 31106	Human Nutrition Practical	1	Compulsory

FST 31107	Food Regulations	1	Compulsory
FST 31208	Food Safety and Risk Analysis	2	Compulsory
FST 31209	Food Industries and Environmental Management	2	Compulsory
FST 31210	Research Methodology and Scientific Communication	2	Compulsory
	Total	**17**	

Year III			
Semester II			
Course Code	Course Title	No of Credits	Compulsory or Optional
FST 32201	Aquatic Food Processing Technology	2	Compulsory
FST 32202	Dairy Processing Technology	2	Compulsory
FST 32103	Dairy Science and Dairy Processing Technology Practical	1	Compulsory
FST 32204	Sugar and Confectionery Processing Technology	2	Compulsory
FST 32105	Beverage Processing Technology	1	Compulsory
FST 32106	Sensory Evaluation of Foods	1	Compulsory
FST 32107	Sensory Evaluation of Foods Practical	1	Compulsory
FST 32108	Process Control and Automation in Food Industry	1	Compulsory
FST 32209	Human Resource Management	2	Compulsory
FST 32210	Cleaner Production and Green Productivity	2	Compulsory
FST 32111	Food Science and Technology Seminars	1	Compulsory
	Total	**16**	

Year IV			
Semester I			
Course Code	Course Title	No of Credits	Compulsory or Optional
FST 41201	Integrated Project in Food Science and Technology	2	Compulsory
FST 41102	Root Crops Processing Technology	1	Compulsory
FST 41103	Spice Processing Technology	1	Compulsory
FST 41104	Grain Processing Technology	1	Compulsory
FST 41105	Fruit and Vegetable Processing Technology	1	Compulsory
FST 41106	Edible Oil Processing Technology	1	Compulsory
FST 41107	Food Processing Technology Practical (Cereals/Grains, Spices, Root Crops, Tubers and Confectionery)	1	Compulsory
FST 41208	Meat and Egg Processing Technology	2	Compulsory
FST 41109	Meat, Egg and Aquatic Food Processing Technology Practical	1	Compulsory
FST 41210	Advanced Food Quality Management	2	Compulsory
FST 41111	Functional Foods and Nutraceuticals	1	Compulsory
	Total	**14**	

Optional courses (3 credits)			
FST 41212	Entrepreneurship in Food Technology	2	Optional
FST 41113	Technology and Innovation Management	1	Optional
FST 41114	Principles of Industrial Economics	1	Optional
FST 41215	Instrumental Techniques in Food Science	2	Optional
FST 41216	Nanotechnology in Food and Environmental Sciences	2	Optional
	Total	**08**	

Year IV			
Semester II			
Course Code	Course Title	No of Credits	Compulsory or Elective
FST 42801	Research Project in Food Science and Technology	8	Compulsory
	Total	**08**	

Summary of credits offered:

	Semester I	**Semester II**	**Total**
Year I	17	16	33
Year II	17	14	31
Year III	17	16	33
Year IV	17	08	25
Total			**122**

DETAILED SYLLABUS

N.B.

T - Theory

P - Practical

F - The department organizes field visit relevant to the particular subject area.

TH - Thesis

Year I Semester I				
FST 11201	Introduction to Food Science and Technology	T		

Scope and an overview of Food Science and Food Technology: definitions and terms, Food commodities and their composition, Human nutrition and food, Biochemistry and Food chemistry, Food microbiology and Food preservation, Food quality and Food safety, Food packaging, Food analysis/control, Sensory science, Unit operations, Food processing and Food engineering, Food product development, Food laws, Quality assurance and Food regulations, Food business management and Food marketing.

FST 11202	Food Biology	T		

Structure and functions of cell and its organelles, Photosynthesis, Structure of plant food parts, General muscle types of animals, Typical meat composition, Muscle contraction and relaxation, Energy metabolism in postmortem glycolysis, Morphological and physiological characteristics of fish, shrimp and crabs.

FST 11103	Food Biology Practical		P	

General guidelines for Food Science and Technology practicals , Identification of parts of microscope, Osmosis, Absorption spectrum of chlorophyll, Water potential of potato tubers, Structures of plant food parts, Morphological characteristics of fish, shrimp, prawn and crab, Eating quality parameters of meat, Meat processing equipment.

FST 11204	General Chemistry	T		

Review of classical atomic theory (Atoms and molecules, Orbital, Pauli exclusion principle, De Broglie relationship, Heisenberg's uncertainty principle ,Schrodinger equation), Atomic spectra, Sub-Atomic particles, Chemical bonds (Covalent bonds, Inter-molecular and Intra-molecular forces) Lewis theory, Valence bond theory, Molecular orbital theory, Shapes of molecules from VSEPR theory , Hybridisation, Size and energy factors in Chemistry, Born-Haber cycle, Oxidation-reduction reactions, Concepts of acid-base, Redox reactions, Nernst equation and application of electrode potential data, Balancing chemical equations and Half - reactions.

FST 11205	Fundamentals of Organic Chemistry	T		

Inter- and intra-molecular interactions of organic molecules, Principles of resonance, Hybridization, Conjugation, Polar effects, Steric effects, IUPAC Nomenclature of organic compounds, Aliphatic and aromatic compounds, Acidity and basicity of organic compounds, Stereochemistry (Stereoisomerism; Optical and geometrical isomerism, Absolute and relative configurations, Substitution and elimination reactions, Reactions of free radicals, carbocations and carbanions).

FST 11106	Elementary Chemistry Laboratory I	T		

Qualitative analysis: Analysis of inorganic anions, Captions and their mixtures, Quantitative inorganic analysis by volumetric titrations, Apparatus and measurements, Error analysis, Introduction to analytical methods.

FST 11207	Computer Fundamentals	T		

Introduction to computer (Block diagram of main components and their functions, Storage devices, Types of computers and generations), Input/output devices, Office automation (Historical development of office automation, Difference between data and information, Introduction to information systems), Computer etiquette, File privacy, Introduction to computer architecture, Number systems, Compression of each number system, Logic gate design circuit, Introduction to computer network, Introduction to Internet applications.

FST 11108	Computer Practical		P	

Introduction to DOS (Basic commands, File directories), Word processing, Spreadsheet, Database management software, Presentation tools.

FST 11209	Mathematics for Food Science and Technology	T		

Graphs, Quadratic functions, Trigonometric identities, Co-ordinate geometry, Differentiation, Integration, Complex numbers (An Introduction, Real and imaginary numbers, The algebra of complex numbers, Complex roots of quadratic equations, Argon diagram), Vectors(Vectors and scalars, Addition of vectors, Position vectors, Base vectors, Cartesian components, Scalar vector products).

FST 11210	Production of Agricultural Raw Materials for Better Food Quality	T		F

Fruit quality and agro-ecological regions , Effect of agronomic practices on produce quality, Integrated pest and disease management on safe produce, Heavy metal contamination and pesticide residue minimization, Selection of specific varieties for processing, Irrigation management for quality of fresh produce, Use of organic manure for safe food production, Organic crop production, Protected agriculture and quality of produce, Good Agricultural Practices. (Field Excursion)

Year I Semester II

FST 12201	Fundamentals of Microbiology	T		

Introduction to microbial world, History of microbiology, Microbial habitats, Characteristics of different types of microbes including their nutrition, respiration and reproduction.

FST 12202	Bio Chemistry I	T		

Introduction: an overview of biochemistry, Water: significance in biological systems, physical, solvent and ionizing properties, Carbohydrates: monosaccharides, disaccharides, polysaccharides-structure and functional roles, Lipids: fatty acids-structure and functional roles, Proteins: amino acids and peptides, protein structure, protein synthesis and functional roles of proteins, Nucleic acids: DNA, RNA, DNA replication, Vitamins and their biochemical role, Methods of isolation, characterization and quantitative determination of macromolecules.

FST 12203	Postharvest Technology	T		

Introduction to postharvest technology, Postharvest physiology of fruits vegetables, Harvesting harvest handling, Packaging and packing house operations, Modified and controlled atmospheric packaging, Minimal processing of fruits and vegetables, Ethylene in postharvest technology, Postharvest handling perspectives, Postharvest losses and loss assessment.

FST 12204	Postharvest Pest and Disease Control	T		

Definitions, Control of common pests of stored F ood commodities, Concepts of disease, Development of a disease, Common post-harvest diseases of fruits and vegetables, Control measures for post-harvest diseases.

FST 12105	Post-Harvest Handling of Food Sources Practical		P	

Maturity levels (subjective objective types), Ripening of fruits, Insect pests of food commodities, Study on Koch's postulates, Common post-harvest diseases of fruits and vegetables.

FST 12206	Fundamentals of Analytical Chemistry	T		

Introduction to chemical analyses, Sampling methods, Types of errors, Error analysis, Statistical treatment of analytical data, Introduction to classical methods (Titrimetric analysis, (Acid–base, Complexometric, etc.), Gravimetry), Electromagnetic spectrum, Introduction to spectroscopic methods (UV-visible, AAS, Emission spectroscopy), Solvent extraction, Principles of separation techniques(solvent-solvent, solvent-solid, solid-solid, gas-solid/liquid/gas), Calibration methods (External and internal standard methods and standard addition).

FST 12107	Elementary Chemistry Laboratory II	T		

Organic chemistry-Elemental analysis, Functional group analysis

FST 12208	Graphics and Web design	T		

Creating a basic web page using HTML, Cascading style sheets, Web page layout techniques, Web publishing, Content management systems, Graphics design.

FST 12209	Fundamentals of Statistics	T		

Introduction to statistics; Data collection methods and sampling techniques. Descriptive statistics: Data presentation and Summary measures. Elementary Probability: Elements of probability, Different approaches of probability, Elementary properties of Probability, Calculating the probabilities of simple and complex events, Conditional probability and Bayes' theorem, Random variables and Probability Distributions: Properties of Probability distributions. Special Probability Distributions: Discrete; Bernoulli, Binomial, and Poison. Continuous; Uniform, Normal, and Exponential. Introduction to statistical software: Data management and familiarize with the common statistical functionalities; Entering, Summarizing, Presenting and Describing the data.

FST 12010	Technical and Scientific Writing	T		

Introduction: the nature of technical/scientific writing, Writing in academic genres, The writing process (Introduction, pre-writing stage, drafting stage, editing and proof reading stage), Grammar and words (Common problems and how to avoid them, selective grammar, coherence, punctuation, spelling, vocabulary, register and style, dictionaries), Sources and referencing (different kinds of sources, the functions of references, how to give references, reference accuracy, using a reference style, referencing in the digital era, writing acknowledgements), Academic integrity and writing (Plagiarism).

Year II Semester I

FST 21201	Biochemistry II	T		

Enzyme biochemistry: kinetics and inhibition, Regulation of the central metabolic pathways: Glucose metabolism: glycolysis, gluconeogenesis, pentose phosphate pathway, the citric acid cycle, metabolic regulation of glucose, glycogen metabolism, oxidative phosphorylation, Amino acid Metabolism: Essential and non-essential amino acids, biosynthesis of non-essential amino acids, Amino acid catabolism, Urea cycle, Genetic diseases and disorders associated with amino acid metabolism, Lipid metabolism: Lipid transport, biosynthesis of fatty acids, metabolism of odd chain and even chain fatty acids.

FST 21202	Food Chemistry	T		

General chemistry of food constituents, Physical, chemical and biological changes occurring in food during storage and processing, Peptic substances, Food Enzymes, Food aromatization, Food fortification and enrichment, Food adulteration.

FST 21103	Biochemistry and Food Chemistry Practical	T		

Identification and quantitative analysis of proteins, lipids and carbohydrates. Isolation of enzymes, enzyme kinetics, enzyme inhibition, Glycolysis , its inhibitors and enhancers , Effect of heat on color flavor development in sugars, Effect of sugars , amino acids sulfur dioxide on the Millard reaction, Effect of sulfur dioxide, citric acid, ascorbic acid, temperature and pH on enzymatic browning, Physical and chemical properties of fats oils, methods for measuring lipid oxidation.

FST 21204	Principles of Human Nutrition	T		

General nutrition concepts, Mechanism of food digestion, nutrient absorption and utilization, Energy balance, Nutritional significance of different food groups, Food allergies.

FST 21105	Food Process Engineering I	T		

Food processes and Unit operations, Units and dimensions, Physical properties of food and agricultural produce, Material and Energy balance, Flow of fluid in food processing, Rheological properties of food, Surface Properties and emulsion stabilization, Equilibrium Moisture Content and Water Activity, Thermodynamics, Psychrometry.

FST 21206	Food Preservation	T		

Causes of spoilage, Principles of food preservation, Food preservation methods: Thermal preservation, Chemical preservation, Non-thermal preservation, Fermentation, Hurdle technology

FST 21107	Food Preservation Practical		P	

Food additives and their functions, Drying, Dehydration, Sugar preservation, Fermentation, Pickling, Bottling.

FST 21208	Management Process	T		

Organizations, Organizational environment, Basic concepts in management, Roles of a manager, managerial competency, Decision making, Planning, Organizing, Team dynamics, Leadership, Controlling, Communication and motivation.

FST 21209	Advanced Statistics I	T		

Estimation: Point and Interval Estimation for measures of centre (mean) and measures of dispersion (variance). Hypothesis Testing: Concepts of Hypothesis testing, single sample tests, two sample tests (dependent and independent). Introduction to design of experiments: simple and comparative experiments, factors and treatments, randomization, replication, blocking, balanced and unbalanced designs, fixed effects and random effects. Introduction to Analysis of Variance (ANOVA): Assumptions and Basis of F – test, One way ANOVA and two way ANOVA. Special Experimental Designs: Complete Randomized Design (CRD), Randomized Complete Block designs (RCBD) and Latin Square. Mean comparisons methods. Two factor factorial with CRD and RCBD. Analysis of Count Data: Chi-squared test of goodness of fit, Analysis of the real world data by using statistical software and interpret the results.

FST 21210	Food Microbiology	T		

Introduction to food microbiology, factors affecting microbial growth and survival in foods, methods used for the identification of microorganisms in foods, characteristics of food borne microbial pathogens, microbial food poisoning, methods used to control food borne microbial pathogens, uses of different microorganisms in food production.

Year II Semester II

FST 22201	Biotechnology for Food Science	T		

Introduction to Biotechnology, Historical background of Biotechnology, applications of genetic engineering, DNA finger printing method and molecular markers in food industry, Detection of Genetically Modified Foods (GMF), Legal background and public perception related to GMF.

FST 22102	Microbiology and Biotechnology Practical		P	

Introduction to microbiology laboratory, Methods used to obtain microbial samples from foods, Enrichment of microbes at the laboratory, Preparation of dilution series, Media preparation and culturing of microorganisms, Microbial staining techniques, Different microbial colony characteristics, Enumeration of microorganisms by direct methods, Measurement of microbial growth by direct methods, Identification of microorganisms using biochemical tests, Study on the factors affect to the microbial growth and survival, Most Probable Number Method (MPN).

FST22203	Food Process Engineering II	T		

Heat transfer in food processing and principles of thermal processing, mass and heat transfer in food dehydration, microwave processing. Refrigeration, Chilling Freezing, Evaporation in liquid food, Mechanical separation processes, Extrusion technology, Size reduction, Minimal processing technologies (Ohmic heating, Pulsed electric field, radio frequency, High pressure processing, ultrasound irradiation).

FST22104	Food Process Engineering Practical		P	F

Physical characteristics of food materials, Viscometry, Thermal properties and heat transfer, Rheological properties, Equilibrium moisture content and isotherms, Moist air properties, Steam tables, Time temperature profiles in thermal processing, Food process engineering tutorials (Industrial excursion to a pilot plant).

FST22205	Food Quality Management	T		

Concept of Quality and Quality Management (Quality Definitions, Dimensions of Quality and Quality Factors in Food, Total Quality Management), Eight Quality Management Principles, Quality Control and Problem Solving Techniques (Seven tools of Quality Control: Histograms, Pareto Charts, Cause and Effect Diagrams, Check sheets, Scatter Diagrams, Flow Charts/Stratification, Control Charts), Quality Costs/ Quality Losses, Sampling (Introduction to sampling, Sampling Methods, Acceptance Sampling, Variable Sampling Plans, Attribute Sampling Plans), Application of the 5S methodology in food industry, An overview of ISO 9001, ISO 14001 and ISO 22000.

FST22206	Livestock Production and Aquaculture	T		F

Aquaculture and Livestock Industry in Sri Lanka, Livestock and aquaculture related organizations, Physico-chemical, bio chemical properties of eggs and meat, Livestock management practices, Pond culture, Bivalve culture, Shrimp and prawn culture, Quality assessment, Legal aspects of aquaculture sector.

FST 22107	Livestock Production Aquaculture Practical		P	F

Livestock breeds, Livestock farming systems, Gastrointestinal tract of ruminants and monogastric animals, Poultry and eggs, Ration formulation, Fish pond culture, Inland, marine and brackish water fish species, Breeding and postharvest handling of inland fish.
(Field Excursions)

FST 22108	Food Marketing	T		

Marketing concept, Marketing environment, Marketing systems, Price discovery and price theory, Marketing efficiency, Marketing margin, Demand and supply responses, Understanding the customer, Communication delivery, Market segmentation, Market research.

FST 22209	Advanced Statistics II	T		

Simple linear regressions and multiple linear regressions, parameter estimation (OLS) and its properties, tests for regression coefficients, tests for significance of the fitted model (ANOVA), model adequacy checking and remedial measure, Models with Qualitative Independent variables (Dummy variables), and model selection procedures. Non parametric statistical methods: Scale of Measurements. Single sample tests: Sign and Wilcoxon Signed Rank Test. Two Sample tests: Wilcoxon Matched Paired Signed Rank test, Wilcoxon Rank Sum Test. The Kruskal – Wallis One-Way Analysis of Variance by Ranks, and Friedman Two-Way Analysis of Variance by Ranks. Rank Correlations (Spearman's and Kendall Tau).Introduction to time series analysis and Forecasting: Component of Time Series Data, Smoothing Methods, Forecasting methods. Analysis the real world data by using statistical software and interpret the results.

Year III Semester I

FST 31201	Food Analysis	T		

Analytical instrumentation in food analysis, Methods of analysis of food constituents, additives, contaminant and adulterants.

FST 31102	Food Analysis Practical		P	

Proximate analysis (moisture, crude fat, crude protein, crude fiber, ash), Analysis of minerals (phosphorus, calcium, iodine, iron), Determination of pH, titratable acidity and vitamin C, Determination of food additives.

FST 31203	Dairy Science	T		

Introduction (Milk production and milking animals, composition of milk, factors affecting the yield and composition of milk, basic physicochemical properties of milk, Biosynthesis and secretion of milk), Nutritional significance of milk, Composition, chemistry and properties of milk fat, milk proteins (introduction, caseins, whey proteins and enzymes), lactose, minerals and vitamins, Microbiology of milk (General aspects, pathogenic and spoilage microorganisms in milk, biochemical changes in milk during microbial growth, sources of contamination and hygienic measures), General aspects of milk processing (Preservation methods, quality assurance of raw milk, milk collection, storage and transport, changes in milk constituents during storage), Current and emerging trends in dairy science.

FST 31204	Food Packaging	T		F

Introduction to packaging, Levels and functions of food packaging, Food packaging materials (Flexible materials, rigid plastic, metal, glass), Aseptic packaging, Edible packaging, Bio-packaging, Recycling, Smart packaging systems, Advanced food packaging technologies, Economics of packaging, Environmental considerations of food packaging ,Packaging laws and regulations. (Industrial excursion)

FST 31205	Applied Human Nutrition	T		

Nutrition for different life stages, Management of under nutrition and micro nutrient deficiencies, Health and nutrition implications of chronic disease prevention and management, Nutrient losses during processing, Food fortification, Drug and nutrient interactions.

FST 31106	Human Nutrition Practical		P	

Assessment of nutritional status; Anthropometric assessment, Dietary assessment, Vital statistics, Studies on food consumption behavior.

FST 31107	Food Regulations	T		

Food ingredient labeling, Nutrition labeling, Food law, Food Act, Organizations and institutions concerning food standards: (SLSI, ISO, CODEX), GAT (Gap Analysis Tool), TBT (Agreement on Technical Barriers to Trade), SPS (Sanitary and Phytosanitary Agreement).

FST 31208	Food Safety and Risk Analysis	T		

Food safety in the international and local context (principles of the different hazards of food safety, standards, guidelines), Food safety and related hazards (chemical hazard, microbiological hazards, physical hazards, allergens), Risk analysis (Principles and types of risk analysis, chemical risk analysis, microbiological risk analysis, sensitivity analysis, risk management and risk communication), Quality assurance systems to control food safety (Principles of a quality assurance system, prerequisite programmes, principles of HACCP, quality assurance systems for primary production and food processing industry, validation and verification of food safety management systems, traceability and crisis management), Control of food safety in the Agri-food chain (Principles of inspection and auditing).

FST 31209	Food Industries and Environmental Management	T		

Environmental problems related to food industries, Food waste and their utilization, Waste treatment and management in food industries (solid and waste water treatment methods and concepts of cleaner production), Environmental compliance, Energy management in food industry, Environmental Management Systems (EMS), Water footprints, Life Cycle Assessment (LCA) and Eco labeling.

FST 31210	Research Methodology & Scientific Communication	T		

Choosing a Research Problem, Literature Search, Objective Formulation, Research Proposal Preparation, References, Data Analysis and Interpretation, Writing and Presentation of Research Results, Research Management, Personality and Career Development: Social and Interpersonal Skills.

Year III Semester II

FST 32201	Aquatic Food Processing Technology	T		F

Fisheries industry in Sri Lanka, Fish processing plant, Raw fish products, Post-harvest handling, Processed fish products, Traditional fish processing methods, Fish canning, High pressure freezing, By-products and waste utilization of fish plant, Prawn/shrimp and crab processing, Shell fish processing, Edible sea weeds.
(Field excursions)

FST 32202	Dairy Processing Technology	T		F

Introduction: general aspects of processing, Collection, reception and storage of milk, Dairy processing equipment, Fluid milk processing: pasteurized and sterilized milk, Cultured milk product, Butter, ghee and anhydrous milk fat (AMF), Cheese technology, Concentrated milk, Milk powder, Ice cream and frozen desserts, Casein and caseinates, Whey protein based products, Current and emerging trends in dairy processing. (Industrial excursion)

FST 32103	Dairy Science and Dairy Processing Technology Practical		P	F

Clean milk production, Physicochemical properties of raw milk, Dairy equipment, Processed dairy products and their sensory properties, Tests for milk powder (Industrial excursions).

FST 32204	Sugar and Confectionary Processing Technology	T		F

Sugar manufacturing Process, Alternative Sweeteners (Alternative Sugars, Sugar Alcohols, Poly dextrose, Glucose Syrups Starch Hydrolysates), Sugar Products (Technical Aspects of Industrial Sugar Confectionery Manufacture, Hard boiled Sweets, Caramel, Toffee Fudge, Gums and Jellies, Aerated Confectionery, Extrusion Cooking Technology, Sugar Confectionery in the Diet, Packaging of Sugar Confectionery and Quality Control), Chocolate Confectionery (Coco Bean Production, Fermentation, Cleaning, Roasting, Winnowing, Coco mass, Coco butter, Coco powder, Machinery, Recipes Packaging and Quality Control).
(Industrial excursion)

FST 32105	Beverage Processing Technology	T		F

Fermented Beverages (Fermented Non-alcoholic Beverages-(Tea, Coffee, Cocoa), Fermented Alcoholic Beverages-(Beer, Wine, Arrack, Spirits),Non Fermented Beverages(Carbonated Beverages, Fruits Juices)
(Industrial excursion)

FST 32106	Sensory Evaluation of Foods	T		

Concept of sensory evaluation, Physiological and psychological perspective, Sensory attributes of foods and human senses, Reliability of assessment, Analytical tests and affective tests, Scales and techniques of measurement, Analysis and interpretation of sensory data, Sensory panel and testing environment, Applications in food industry research.

FST 32107	Sensory Evaluation of Foods Practical		P	

Sensory attributes and human senses, Basic recognition and ranking of intensity tests, Threshold levels, Product oriented and consumer oriented test methods, Statistical analysis of data.

FST 32108	Process Control and Automation in Food Industry	T		F

Introduction to process control automation, Conceptual framework of an automated system, Process control loops, Computer-based control systems, Robotics and Automation, Emerging and future trends in automation.
(Industrial excursion)

FST 32209	Human Resource Management	T		

Human Resource Management and its environment, The importance of effective HRM, HRM goals, HRM Functions; Job Designing, Job Analysis, HR planning, Recruitment, Selection, Hiring and Contract of Employment, Orientation, Training and Development, Performance Appraisal, Reward Management, Grievance Handling, Disciplinary Management, Labor Manager Relations, Termination of Employment.

FST 32210	Cleaner Production and Green Productivity	T		

Metrics for resource consumption, Principles of Cleaner Production (CP), Management System Elements according to ISO 14001,Management System Documentation, Introduction to CP Auditing, CP Team Motivation, Resource Efficiency indicators, Benchmarking, Eco Design. Chemical management, Introduction to Ergonomics, Introduction to Green Productivity, Tools and Techniques in Green Productivity

FST 32111	Food Science and Technology Seminars	T		

Students will have to conduct two oral presentations based on an individual literature survey on given topics.

Year IV Semester I

FST 41201	Integrated Project in Food Science and Technology	T	P	

The course consists of lectures on the fundamentals of food product development and individual project work. Students will have to conduct two mini projects: One individual mini project and one group mini project (survey-based).The focus of the individual project should be on food product development. Students will be required to research or survey problem/problems related to the application of Food Technology for the group project. The duration of the projects should be 15 weeks. Students will also be required to submit a project proposal prior to the commencement of the project and a report upon the completion of the project, according to the guidelines given. The individual project should be defended in the form of viva voce by the respective student before the Examination Committee appointed by the department. The group project will be examined in the form of an oral presentation.
Fundamentals of Food Product Development (15 hrs): Market Screening/Research; Identifying focus groups; Idea generation; Prototype development ;Ingredient functionality interactions; Recipes to formulation process, Statistical designs for product development; Processing; Packaging; Scale-up of operations; Regulatory issues; Labeling; Physical, chemical, microbiological sensory evaluations; Quality control procedures, Shelf life evaluation rapid test methods.

FST 41102	Root Crops Processing Technology	T		

Introduction to root and tuber crops, Postharvest handling of root and tuber crops, Toxic compounds and anti-nutritional factors present in root and tuber crops, General introduction and processing technologies of cassava, sweet potato, potato, yams and edible aroids, Current researches and research potential of root and tuber crops.

FST 41103	Spice Processing Technology	T		F

Introduction of spices and condiments industry in Sri Lanka, Cinnamon based products, Clove-based products, Cardamom based products, Pepper-based products, Essential oil extraction, Oleo resin production and application, Quality assessment for spices and condiments for foreign market. (Industrial excursion)

FST 41104	Grain Processing Technology	T		F

Paddy drying methods, Parboiling, Rice-based product development, Wheat Milling ,Wheat flour quality assessment, Bakery Technology: Baking process, Ingredients in baking and their roles, Yeast and chemical leavening agents, Bakery products, Yeast dough production, Soft wheat products, Shelf life of baked products, Soybean Processing, Standards for rice and pulse processing. (Industrial excursion)

FST 41105	Fruits and Vegetables Processing Technology	T		

Selecting fruits and vegetables for processing, Processing Technology of jam, jelly, marmalade, Fruit juice processing, Fermented fruits and vegetable products, Canning of fruits and vegetables, Minimal processing of fruit ,vegetable ,Freezing technology of fruit and vegetable, Drying and dehydration of fruits and vegetables, Novel technology in fruit and vegetable processing ,Quality control and quality assurance, Utilization of by-products in fruit and vegetable processing industry.

FST 41106	Edible Oil Processing Technology	T		

Plant sources of edible oil: coconut, soy bean, canola, corn, sunflower, safflower, palm, palm kernel, olive, peanut, cashew nut, cotton seed; Animal fats, Processing and refining of edible fats and oils, Application of fats and oils in food production.

FST 41107	Food Processing Technology Practical (Cereals/Grains, Spices, Root Crops, Tubers and Confectionery)		P	

Fruit and Vegetable Processing Technology: Identification of various processing equipments, Preservation by sugar (marmalade/jelly), Use of fruit processing by-products in processing value-added products
Confectionery technology: Sugar crystallization, Identification and sensory analysis of sugar confectionery products, Production and quality evaluation of confectionery: hard boiled candy, marshmallows, gelatin and gummy candy, traditional Sri Lankan sweets.

FST 41208	Meat and Egg Processing Technology	T		F

Meat industry in Sri Lanka, Construction of Slaughter House, Farm animal slaughtering and butchering, Major meat cuts and characteristics, By-product utilization of slaughter houses and meat processing factories, Processed meat products, Health hazards associated with meat products, Broiler processing, Grading of chicken egg, Processing of chicken eggs, Physiochemical and biological properties of processed egg products, Nutritional and health effects of chicken egg / egg products.

FST 41109	Meat Fish Processing Technology Practical		P	F

Raw Meat and Offals, Market Available Meat Products, Traditional Meat Products, Broiler processing, Natural Casing, Collagen, Evisceration and Filleting of Tuna, Fish Products (Traditional and Value Added), Physiochemical and Biological Properties of Processed Meat and Fish Products, Nutritional Analysis. (Industrial excursions)

FST 41210	Advanced Food Quality Management	T		

HACCP (Introduction, prerequisite programs, Basic principles, Steps in the application of HACCP to food processing), Food Safety Management System (ISO22000) and its elements.

FST 41111	Functional Foods and Neutraceuticals	T		

Definitions and evolution of concept of functional foods and neutraceuticals, Functional foods and health concerns, Role of functional foods in the prevention/management of chronic diseases, Functional foods of plant and animal origin, Bioavailability, safety and efficacy of bioactive compounds, Health claims and regulatory issues, Development and marketing of functional food products, Current and emerging trends.

FST 41212	Entrepreneurship in Food Technology	T		

Introduction to the entrepreneurial process, Opportunity recognition and evaluation of business potential: NABC approach, Industry and market analysis: marketing, market research planning, Market exploitation and resource acquisition: business models and strategic alliances, Presentation of a business idea: writing a viable business plan, Intellectual Property Rights: patenting/licensing, Regulatory aspects, Financing and venture capital
Assignments/projects: the students shall deliver a business idea pitch. A group project shall be conducted to write a business plan based on a real research output/or product development result.

FST 41113	Technology and Innovation Management	T		

An introduction to the management of technological innovations, Organizing for innovation, Technological innovation, Innovation strategy, Networks and communities of innovators, The management of research and development, Managing product innovation, Capturing value from innovation, Challenges and future perspectives.

FST 41114	Principles of Industrial Economics	T		

Introduction, classification of industries, production, cost market structures, determination of optimum firm, scientific location of industries, role of industries in economics development, industrial development in Sri Lanka, industrial policies (import substitution industrial policy, export oriented industrial policy) present state of industrial sector in Sri Lanka, problems of industrialization.

FST411215	Instrumental Techniques in Food Science	T		

Sample preparation, Gravimetry, Volumetry, Conductimetry, Potentiometry, Photometry, Fluorimetry, Chromatography, General considerations in Analysis, Electronic circuitry for analytical instruments.

FST411216	Nanotechnology in Food and Environmental Sciences	T		

Food Processing applications: Nanoprocess foods, Nanocapsueles and their applications, Nanotubes and nanoparticles, Nanoemulsions for better availability and dispersivity of nutrients, Food Packaging applications: detection of food-borne pathogens, Biodegradable nanosensors, Nanoclays and nanofilms, Antimicrobial and antifungal surface coatings with nanoparticles, Food Supplements: Nanosize powders, Cellulose nanocrystals composites, Nanoencapsulated nutraceuticals, Nanocochleates, Nanocoatings on food contact surfaces, Nanosensors for food labeling, Water decontamination, Animal feed applications, Detection and measurement of a given nanomaterial at key time points in the food lifecycle, Potential beneficial or adverse effects from food intercalation, Reduced waste and improved energy efficiency, Waste remediation: Nanoporous polymers and their applications in water purification, Photocatalytic water purification, Energy conversion, Hierarchical self-assembled nano-structures for adsorption of heavy metals, Pollution by nanoparticles.

Year IV Semester II				
FST 42801	Research Project in Food Science and Technology		P	
The Project will have duration of 15 weeks. Students should follow the guidelines provided in the Handbook for Final Year Research Projects.				

Note:

- Students should earn **120 credits** to be eligible for the award of B.Sc. special degree in Food Science and Technology. However, they may take courses up to 122 credits.
- Students should select optional courses, covering **3 credits**. An optional course will only be offered upon the registration of a minimum of 05 students.
- Obtaining a pass for the Professional English Program is also a requirement for the award of the B.Sc. Special Degree in Food Science and Technology.

Students are also required to actively contribute in the following programs organized by the Department.

- Pro Foods Pro Pack annual exhibition - the Department will operate an exhibition stall in the exhibition held annually during July-August.
- World Food Day celebration - the Department will organize events to mark the World Food Day on the 16th of October each year.

5.3. DEPARTMENT OF NATURAL RESOURCES

Degree Program : BACHELOR OF SCIENCE (SPECIAL) IN ENVIRONMENTAL SCIENCES AND NATURAL RESOURCE MANAGEMENT

Summary of the course

Year I			
Semester I			
Course Code	Course Title	No of Credits	Compulsory or Elective
ESNRM 11201	Introduction to Natural Resources	2	Compulsory
ESNRM 11202	Biology I: Fundamentals of Cellular and Organismic Biology	2	Compulsory
ESNRM 11203	Biology II : Fundamentals of Evolution, Systematics and Diversity of Life	2	Compulsory
ESNRM 11204	General Chemistry	2	Compulsory
ESNRM 11205	Fundamental of Organic Chemistry	2	Compulsory
ESNRM 11106	Elementary Chemistry Laboratory I	1	Compulsory
ESNRM 11207	Computer Fundamentals	2	Compulsory
ESNRM 11108	Computer Practical	1	Compulsory
ESNRM 11209	Mathematics for Biological Sciences	2	Compulsory
CPE 1101	Professional English I	-	Compulsory
	Total	**16**	

Year I			
Semester II			
Course Code	Course Title	No of Credits	Compulsory or Elective
ESNRM 12201	Introduction to Environmental Sciences	2	Compulsory
ESNRM 12202	Earth Processes	2	Compulsory
ESNRM 12203	Introduction to Hydrology	2	Compulsory
ESNRM 12204	Concepts of Ecology	2	Compulsory
ESNRM 12205	Fundamentals of Physical Chemistry	2	Compulsory
ESNRM 12206	Fundamentals of Analytical Chemistry	2	Compulsory
ESNRM 12107	Elementary Chemistry Laboratory II	1	Compulsory
ESNRM 12208	Graphics and Web Design	2	Compulsory
ESNRM 12209	Fundamentals of Statistics	2	Compulsory
CPE 1201	Professional English II		Compulsory
	Total	**17**	

Year II			
Semester I			
Course Code	Course Title	No of Credits	Compulsory or Elective
ESNRM 21201	Limnology	2	Compulsory
ESNRM 21202	Microbiology for Natural Resource Studies	2	Compulsory
ESNRM 21203	Biotechnology and Biosafety	2	Compulsory
ESNRM 21204	Mineralogy and Petrology	2	Compulsory
ESNRM 21205	Biodiversity	2	Compulsory
ESNRM 21206	Basic Physics for Natural Resource studies	2	Compulsory
ESNRM 21207	Introduction to Soil Science	2	Compulsory
ESNRM 21208	Management Process	2	Compulsory
ESNRM 21209	Advanced Statistics I	2	Compulsory
CPE 2101	Professional English III	-	Compulsory
	Total	**18**	

Year II			
Semester II			
Course Code	Course Title	No of Credits	Compulsory or Elective
ESNRM 22101	Management of Information Systems	1	Compulsory
ESNRM 22102	Environmental Toxicology	1	Compulsory
ESNRM 22203	Remote Sensing and Geographic Information Systems	2	Compulsory
ESNRM 22104	Practical in Remote Sensing and Geographic Information Systems	1	Compulsory
ESNRM 22205	Introduction to Economics	2	Compulsory
ESNRM 22106	Geomorphology and Geology of Sri Lanka	1	Compulsory
ESNRM 22207	Soil Degradation and Management	2	Compulsory
ESNRM 22108	Earth Science Practical	1	Compulsory
ESNRM 22209	Advanced Statistics II	2	Compulsory
ESNRM 22210	Analytical Techniques for Environmental Sciences and Natural Resources	2	Compulsory
CPE 2201	Professional English IV		Compulsory
	Total	**15**	

Year III			
Semester I			
Course Code	Course Title	No of Credits	Compulsory or Elective
ESNRM 31201	Environmental and Natural Resource Economics	2	Compulsory
ESNRM 31102	Legal Framework for Environmental Management	1	Compulsory
ESNRM 31203	Statistical Application in Natural Resource Studies	2	Compulsory
ESNRM 31204	Industrial Chemistry and Technology	2	Compulsory

ESNRM 31105	Industrial Minerals	1	Compulsory
ESNRM 31106	Practical in Hydrology and Soil Science	1	Compulsory
ESNRM 31107	Field Techniques in Earth Science	1	Compulsory
ESNRM 31208	Waste Management	2	Compulsory
ESNRM 31209	Field Techniques in Ecology and Biodiversity	2	Compulsory
ESNRM 31111	Basic Methods of Surveying Sciences	1	Compulsory
ESNRM 31112	Practical in Surveying	1	Compulsory
	English		
	Total (for Special Degree)	**16**	
*Students, who exit at the end of the 3rd year (after completing a 3 year general degree), should complete the course unit **ESNRM 31210** within the semester I.*			
ESNRM 31210	Research Methodology and Scientific Communication	2	Compulsory
	Total (for General Degree)	**18**	

Year III			
Semester II **(for General Degree only)**			
*Student should select optional course units covering 06 credits from the 09 course units available (from **ESNRM 32201 – ESNRM 32209**).*			
Course Code	Course Title	No of Credits	Compulsory or Elective
ESNRM 32201	Cleaner Production and Green Productivity	2	Elective
ESNRM 32202	Energy Resource Management	2	Elective
ESNRM 32203	Aquatic Resource Management	2	Elective
ESNRM 32204	Coastal and Marine Resource Management	2	Elective
ESNRM 32205	Biogeography	2	Elective
ESNRM 32206	Tools for Environmental Management	2	Elective
ESNRM 32207	Study and Management of Natural Hazards	2	Elective
ESNRM 32208	Biodiversity Conservation and Management	2	Elective
ESNRM 32209	Human Resource Management	2	Elective
ESNRM 32410	B.Sc. Thesis in Environmental Sciences and Natural Resource Management	4	Compulsory
	English		Compulsory
	Total	**10**	

Semester II **(for Special Degree only)**			
Course Code	Course Title	No of Credits	Compulsory or Elective
ESNRM 32201	Cleaner Production and Green Productivity	2	Compulsory
ESNRM 32202	Energy Resource Management	2	Compulsory
ESNRM 32203	Aquatic Resource Management	2	Compulsory
ESNRM 32204	Coastal and Marine Resource Management	2	Compulsory
ESNRM 32105	Introduction to Biogeography	1	Compulsory

ESNRM 32206	Tools for Environmental Management	2	Compulsory
ESNRM 32207	Study and Management of Natural Hazards	2	Compulsory
ESNRM 32208	Biodiversity Conservation and Management	2	Compulsory
ESNRM 32209	Human Resource Management	2	Compulsory
ESNRM 32110	Community Outreach Program /Mini Project	1	Compulsory
	English		Compulsory
	Total	**18**	

Year IV			
Semester I **(for Special Degree only)**			
Course Code	Course Title	No of Credits	Compulsory or Elective
ESNRM 41201	Research Methodology and Scientific Communication	2	Compulsory
ESNRM 41102	Environmental Quality Management	1	Compulsory
ESNRM 41303	Forestry	3	Compulsory
ESNRM 41204	Environmental Governance	2	Compulsory
ESNRM 41105	Undergraduate Seminar Module in Environmental Sciences and Natural Resource Management	1	Compulsory
ESNRM 41206	Environmental Geochemistry	2	Compulsory
Students are given an option to select course units equivalent to 6 credit points from the following elective course units.			
ESNRM 41207	Lichenology	2	Elective
ESNRM 41208	Mineral Exploration	2	Elective
ESNRM 41209	Gemmology	2	Elective
ESNRM 41210	Ground Water Exploration	2	Elective
ESNRM 41211	Applied Hydrology	2	Elective
ESNRM 41212	Climatology and Meteorology	2	Elective
ESNRM 41213	Protected Area Management	2	Elective
ESNRM 41214	Eco Tourism	2	Elective
ESNRM 41215	Oil Exploration	2	Elective
ESNRM 41216	Biogeography and Conservation Planning	2	Elective
ESNRM 41217	Forestry for Rural Development	2	Elective
ESNRM 41218	Environment and Society	2	Elective
	Total	**17**	

Year IV			
Semester II **(for Special Degree only)**			
ESNRM 42801	B.Sc.Thesis in Environmental Sciences and Natural Resource Management and Presentation	8	Compulsory
	Total	**8**	

The minimum numbers of credits required

(for General Degree only)			
	Semester I	**Semester II**	**Total**
Year I	16	17	33
Year II	18	15	33
Year III	18	10	28
	Total		**94**

(for Special Degree only)			
	Semester I	**Semester II**	**Total**
Year I	16	17	33
Year II	18	15	33
Year III	16	18	34
Year IV	17	08	25
	Total		**125**

DETAILED SYLLABUS

N.B.

T - Theory

P - Practical

F - Field visit relevant to the particular subject area.

TH - Thesis

Year I Semester I				
ESNRM 11201	Introduction to Natural Resources	T	–	–

Classification and characteristics of natural resources. Introduction (Basic concepts, global status, current Sri Lankan context, major issues and conservation) to major natural resources of Sri Lanka (Lithospheric resources - land, soil, mineral and energy resources; Hydrospheric resources - water, inland aquatic, and coastal & marine resources; Atmospheric resources; Biospheric resources: wild and cultivated biological resources, forest resources), Introduction to natural resource management.

ESNRM 11202	Biology I: Fundamentals of Cellular and Organismic Biology	T	P	–

Chemicals of life (simple and macromolecules and their significance), Protein synthesis, Enzymes, The cell and tissues, Metabolism, Photosynthesis, Respiration, Nerve transmission, Homeostasis, Excretion and Osmoregulation, Reproduction, Growth and development, Heterotrophy.

ESNRM 11203	Biology II : Fundamentals of Evolution, Systematics and Diversity of Life	T	P	–

Introduction to the origin and evolution of life. The scenario of evolution within the geological time scale. Biosystematics (taxonomy, classification and nomenclature). The diversity of life (lower organisms, fungi, plants and animals).

ESNRM 11204	General Chemistry	T	–	–

Review of Classical atomic theory (Atoms and molecules, Orbital, Pauli exclusion principle, de Broglie relationship, Heisenberg uncertainty principle, Schrödinger Equation), Atomic spectra, sub-atomic particles, Chemical bonds, Lewis theory, Valence bond theory, Molecular orbital theory, Inter-molecular and Intra-molecular forces, Born-Haber cycle, Oxidation-reduction reactions, Concepts of acid-base, Redox reaction, Balancing chemical equations and half-reactions.

ESNRM 11205	Fundamentals of Organic Chemistry	T	–	–

Principles of Chemistry (Covalent bonds, Intra- and inter-molecular forces, Resonance, Hybridisation, conjugation, Polar effects, steric effects), IUPAC nomenclature of organic compounds, Aliphatic and aromatic compounds, Acidity and basicity of organic compounds, Stereochemistry (Stereo isomerism; optical and geometrical isomerism, Absolute and relative configurations, Substitution and elimination reactions, Reactions of free radicals, Carbo-cations and anions).

ESNRM 11106	Elementary Chemistry Laboratory I	–	P	–

Apparatus and Measurements, Error analysis, Introduction to analytical methods, Organic chemistry-elemental analysis, Functional group analysis.

ESNRM 11207	Computer Fundamentals	T	–	–

Introduction to computer (Block diagram of main components and their functions, storage devices, types of computers and generations), input/output device, office automation (historical development of office automation, difference between data and information, introduction to information systems), Computer Etiquette, Safeguarding Etiquette, file privacy; Introduction to computer architecture, number systems, comparison of the each number system; logic gate and design combinational circuit; introduction to computer network, Introduction to internet applications.

ESNRM 11208	Computer Practical	–	P	–

Introduction to DOS (basic commands, file and directories), Word processing, spreadsheet, database management software, presentation tools.

ESNRM 11209	Mathematics for Biological Sciences	T	–	–

Graphs, Quadratic functions, Trigonometric densities, Co-ordinate geometry, Differentiation, Integration, Complex numbers (Introduction, Real and imaginary numbers, The algebra of complex numbers, Complex roots of quadratic equations, Argon diagram), Vectors and scalars, Addition of vectors, Position vectors, Base vectors, Cartesian components, Scalar and vector product.

Year I Semester II

ESNRM 12201	Introduction to Environmental Sciences	T	–	–

History of environmentalism, Environmental issues (global, regional and local), Development and environment, Technology and environment, Chemicals and environmental pollution (air, water, soil, organisms), Environment and health, Introduction to environment and society, Concepts of Sustainable Development.

ESNRM 12202	Earth Processes	T	–	–

The Universe, The solar system, origin, structure and composition of the earth, Earth's surficial processes (water, wind and glacial activities, weathering and erosion, mass movements and deposition), Theory of plate tectonics, Earth's internal processes (volcanism, earthquakes and tsunamis, deformation and metamorphism), Introduction to minerals and rocks, Physical properties of minerals, Rock cycle, Introduction to Historical geology, Geological time scale, Determining absolute and relative age/ time of geological materials/ events.

ESNRM 12203	Introduction to Hydrology	T	–	–

Hydrological cycle, Introduction to basic principles of hydrology Including mathematical, Physical and chemical concepts, Commonly used analytical techniques in understanding the different components of the hydrological cycle, Hydrological parameters (precipitation, evapo- transpiration, run-off, infiltration, permeability etc.), Sources of stream flow, Uniform and steady state flow, Hydrographs and hydrologic routing; basin study and water balance.

ESNRM 12204	Concepts of Ecology	T	–	–

Introduction to environment and ecology, Ecosystem structure, Function and resilience, Productivity and energy dynamics, Population ecology, Community ecology, Concepts of niche and resource partitioning, Introduction to behavioral ecology, Ecological applications.

ESNRM 12205	Fundamentals of Physical Chemistry	T	–	–

States of matter (The perfect gas and associated laws, Real gases and their behavior), Thermodynamics (Basic concepts of work, Heat and energy, First law of thermodynamics, Thermo-chemistry, Introduction to these condlaw), Electrochemistry (conductance of electrolytes, Electrodes, Cells, Nernst equation, Electro-analytical Methods), Phase equilibria.

ESNRM 12206	Fundamental of Analytical Chemistry	T	–	–

Introduction to chemical analyses, Sampling methods, Types of errors, Statistical treatment to analytical data, Spectroscopic methods (UV, Visible, AAS, Emission spectroscopy), Titrimetric analysis (Acid–Base, Complexometric etc.), Gravimetry, Solvent extraction, Chromatographic techniques, Evaluation of significant figures.

ESNRM 12107	Elementary Chemistry Laboratory II	–	P	–

Inorganic chemistry and analytical chemistry, Qualitative analysis (Group analysis-cation and anion analysis), Quantitative analysis, Titrimetry (Acid base, Redox and back titrations, Solubility product, Charles law).

ESNRM 12208	Graphics and Web Design	T	–	–

Creating a basic web design using HTML, Cascading style sheets, web page layout techniques, web publishing, content management systems, graphic design.

ESNRM 12209	Fundamentals of Statistics	T	P	–

Introduction to statistics; Data collection methods and sampling techniques, Descriptive statistics: Data presentation and Summary measures, Elementary Probability: Elements of probability, Different approaches of probability, Elementary properties of Probability, Calculating the probabilities of simple and complex events, Conditional probability and Bayes' theorem, Random variables and Probability Distributions: Properties of Probability distributions, Special Probability Distributions: Discrete; Bernoulli, Binomial, and Poisson, Continuous; Uniform, Normal, and Exponential, Introduction to statistical software: Data management and familiarizing with the common statistical functionalities (Entering, Summarizing, Presenting and Describing the data).

Year II Semester I

ESNRM 21201	Limnology	T	P	–

Introduction to limnology, Structure of aquatic ecosystems, Physical, chemical and biological characteristics of water and aquatic environment, Classification of lentic ecosystems using thermal properties, Trophic relationships in lotic and lentic systems, Nutrient dynamics, Oligotrophy, eutropy and dystrophy in inland ecosystems, Ecological concepts in stream ecology, Animal adaptations to aquatic environment and bio indicators, Human influence on aquatic systems and their consequences. Eutrophication management and pollution control.

ESNRM 21202	Microbiology for Natural Resource Studies	T	–	–

Introduction to microbiology, Microbial habitats, Bacteria and their classification, identification, nutrition and metabolism, Fungal characteristics and classification, Microbial techniques, Structure of microbial communities, Microbial interaction with plants, animals and humans, Role of micro-organisms in ecosystems and industry, Epidemiology of human and zoonotic diseases, Microbial toxins in the environment.

ESNRM 21203	Biotechnology and Biosafety	T	–	–

Introduction to genetics, DNA and RNA, Gene technology, Introduction to plant tissue culture and genetic engineering, Principles and applications of plant tissue culture and genetic engineering, Bio fuels, Bio-safety and bio-piracy.

ESNRM 21204	Mineralogy and Petrology	T	–	–

Introduction to crystallography, Common crystal forms, Habits and twinning, Point group symmetry and classification into crystal systems and classes, Bravais lattices, Introduction to common rock-forming minerals and their composition, Physico-chemical properties, Classification and identification, Optical properties of minerals, Basic petrology (igneous, sedimentary and metamorphic rocks).

ESNRM 21205	Biodiversity	T	P	F

Introduction to biodiversity, Levels of biodiversity: Alpha, Beta and Gamma diversity, Biodiversity of Sri Lanka, Introduction to biodiversity assessment, Ecosystem processes and services, Basic concepts of biodiversity conservation.
Field excursion to explore the biodiversity of a unique protected lowland rain forest and identify characteristic features of the forest reserve through hypothesis testing.

ESNRM 21206	Basic Physics for Natural Resource Studies	T	–	–

Newton's laws of motion, Fluid dynamics, Streamlines, Pascal's Principle, Bernoulli's equation, Concept of temperature and heat, Thermal expansion, Specific heat and latent heat, Vapour pressure, Relative humidity, Elementary geometrical optics (Reflection, Refraction, Mirrors, Lenses etc.), Introduction to physical optics (Interference, Diffraction and Polarization of light), Static electricity, Electric charge, Introduction to Gauss's law, Electric potential, Electric field, Current and resistance, Capacitance, Magnetism, Basics of EM theory (Electromagnetic induction, Radiation and ionization), Noise and wave phenomena (Longitudinal and transverse waves, Propagation of waves).

ESNRM 21207	Introduction to Soil Science	T	–	–

Soil formation and development, Soil composition, Description of soil profile, Soil properties (physical properties and functions: colour, texture, structure, consistency, porosity, bulk density, soil water movement, soil moisture and soil moisture characteristic curves, soil temperature and soil compaction; Chemical properties and functions: composition, colloidal nature, ion exchange, base saturation, organic matter, soil reaction, redox potential; Biological properties and functions).

ESNRM 21208	Management Process	T	–	–

Organizations, Organizational environment, Basic concepts in management, Roles of a manager, Managerial competency, Decision making, Planning, Organizing, Team dynamics, Leadership, Controlling, Communication and Motivation.

ESNRM 21209	Advanced Statistics I	T	P	–

Estimation; Point and interval estimation for measures of center (mean) and measures of dispersion (variance), Hypothesis testing; Concepts of Hypothesis testing, single sample tests, two sample tests (dependent and independent), Introduction to design of experiments; simple and comparative experiments, factors and treatments, randomization, replication, blocking, balanced and unbalanced designs, fixed effects and random effects, Introduction to analysis of Variance (ANOVA); Assumptions and basis of F-test, One way ANOVA and two way ANOVA, Special experimental designs; Complete Randomized Design (CRD), Randomized Complete Block designs (RCBD) and Latin Square, Mean comparisons methods, Two factor factorial with CRD and RCBD, Analysis of count data; Chi-squared test of goodness of fit, Analysis of the real world data by using statistical software and result interpretation.

Year II Semester II

ESNRM 22101	Management of Information Systems	T	–	–

Database concepts, E-R Modeling techniques, Structured Query Language (SQL), Practical implementation of a database using MS - Access and Visual basic.

ESNRM 22102	Environmental Toxicology	T	–	–

Introduction to Environmental toxicology, Classification of toxic agents, Environmental partitioning and transport of toxic substances, Effects of toxic agents on living organisms (humans/ animals and plants), Routes and sites of exposure, Duration and frequency of exposure, Dose and response relationship, Response to toxic chemicals (cellular, subcellular and other target organs; mutagenesis, carcinogenesis, teratogenesis and endocrine disruption), Pesticide toxicity.

ESNRM 22203	Remote Sensing and Geographic Information Systems (GIS)	T	–	–

Overview and concepts of remote sensing technology, Fundamental characteristics of electromagnetic radiation and their interaction, Remote sensing platforms, Satellite system and sensors, Overview of RS applications, Introduction to GIS, Definition, History and concepts of GIS, Functional elements of GIS, Required hardware and software for GIS, Scope, Application areas and benefits of GIS, Data structures (raster and vector data), Input of geospatial data, Sources of data and input devices, Introduction to GPS, Map projections, Coordinate transformations and mapping concept.

ESNRM 22104	Practical in Remote Sensing and Geographic Information Systems (GIS)	–	P	-

Practical uses of aerial photographs in various disciplines, Manipulation and analysis of remote sensing images, Image data handling in computer systems, Data input, linking non-spatial and spatial databases, Data manipulation and preprocessing in GIS, Spatial analysis, Map generation, Conversion of GPS data to GIS, Map production and output generation.

ESNRM 22205	Introduction to Economics	T	–	–

Introduction to economics (resource scarcity, choices, opportunity cost, factors of production), Microeconomics; Theory of consumer behavior, Theory of production and cost, Market structures (perfect competition, monopoly and imperfect competition), Macroeconomics; Circular flow of income and aggregate demand, National income accounting, Consumption, Investment and inflation, Unemployment, Introduction to cost benefit analysis.

ESNRM 22106	Geomorphology and Geology of Sri Lanka	T	–	F

Introduction to Geomorphology, Processes forming landscape, Earth landforms, Landform evolution, Geomorphology of Sri Lanka, Geological and tectonic evolution of Sri Lanka.
Field excursion to selected sites in order to identify geological processes acting on the earth surface, field occurrence of minerals and rocks and to discuss geomorphology and geology of Sri Lanka.

ESNRM 22207	Soil Degradation and Management	T	–	F

Types and nature of soil degradation, Soil and water conservation measures, Management of soils in relation to potentials and limitations for agricultural, engineering and other uses, Economics of land degradation, Assessment of soil degradation (field and model based), Case studies.
Field excursion to soil degraded lands, in order to identify major causes and mitigatory measures for them.

ESNRM 22108	Earth Science Practical	–	P	–

Identification of landforms using topographic maps, Identification of common crystal forms and habits, Their point group symmetry and classification into classes and systems, Identification of common rock forming minerals, Economic minerals on the basis of physico-chemical properties, Study of mineralogy, Texture of igneous, sedimentary and metamorphic rocks, Identification of structures in hand specimens.

ESNRM 22209	Advanced Statistics II:	T	P	–

Simple linear regressions and multiple linear regressions, parameter estimation (OLS) and its properties, tests for regression coefficients, tests for significance of the fitted model (ANOVA), model adequacy checking and remedial measure, Models with qualitative independent variables (Dummy variables) and model selection procedures, Nonparametric statistical methods; Scale of Measurements, Single sample tests; Sign and Wilcoxon Signed Rank Test, Two Sample tests; Wilcoxon Matched Paired Signed Rank test, Wilcoxon Rank Sum Test, The Kruskal-Wallis One-Way Analysis of Variance by Ranks, and Friedman Two-Way Analysis of Variance by Ranks, Rank Correlations (Spearman's and Kendall Tau), Introduction to time series analysis and Forecasting; Components of Time Series data, Smoothing methods, Forecasting methods, Analysis of real world data using statistical software and interpretation of results.

ESNRM 22210	Analytical Techniques for Environmental Sciences and Natural Resources	T	P	–

Instrumental methods in advanced environmental analysis, Global environmental problems; air pollution, water and soil pollution, sampling of air, water and soil for chemical analysis, Measurement of air, water and soil parameters, preservation, monitoring techniques, Trace metal toxicity on soil and water, Extraction of toxic heavy metals from soil.

Year III Semester I

ESNRM 31201	Environmental and Natural Resource Economics	T	–	–

Rationale of Natural resource economics and Environmental economics, Sustainable development, Markets and social welfare, Market failure; Property rights, Externalities, Public good and missing preferences, Resource utility value, Economic principles of managing renewable and non-renewable resources, Potential market economic solutions to mitigate environmental degradation, Project cycle and criteria for project analysis, Introduction to environmental valuation techniques, Role of economics in Environmental Impact Assessment (EIA), Introduction to ecological economics, Introduction to ecosystem market place, Economics of ecosystems and biodiversity.

ESNRM 31102	Legal Framework for Environmental Management	T	–	–

Introduction to legal system of Sri Lanka, Constitution of Sri Lanka, Introduction to environmental law (National environmental act, laws pertaining to the conservation of fauna, flora, forest and wetlands, coastal zone management, protected area management, wildlife trade, pollution control and other related acts), Public nuisance and environmental protection, Relevant case studies.

ESNRM 31203	Statistical Application in Natural Resources Studies	T	P	–

Special sampling methods related to natural resources studies, Introduction to Multivariate Statistics; Multi-normal distribution, Principal Component Analysis (PCA), Factor Analysis and MANOVA, Introduction to Logistic Regression, Repeated measure data analysis, Analysis of real world data using statistical software and interpretation of results.

ESNRM 31204	Industrial Chemistry and Technology	T	P	–

Introduction to the importance of chemical processes used in industry and to the aspects of research and development in the industry, Concepts of Cleaner production, Industrial organic chemistry, Plantation crop industries, Coconut, Tea, Rubber, Sugar Cane, Soap Industry, Edible margarine industry, Detergents, Oils as fats, Petroleum products, Organic dye stuffs, Chemistry of essential oils.

ESNRM 31105	Industrial Minerals	T	–	F

Classification of economic minerals, Economic minerals of Sri Lanka, Mineral based industries; Glass, Silica, Clay, Ceramics, Mineral sands, Cement, Fertilizers (Apatite, Dolomite), Gems and Gem industry.
Field excursion to selected industrial mineral sites and economic mineral deposits in order to identify field occurrence of mineral resources and their exploitation, utilization and management.

ESNRM 31106	Practical in Hydrology and Soil Science	–	P	F

Laboratory based practical in hydrology and soil science, Assessment of soil degradation (field and model based).
Field excursion to obtain hands on experience on hydrology and soil science related applications in the field.

ESNRM 31107	Field Techniques in Earth Sciences	T	P	–

Study and interpretation of geological maps and cross-sections, Use of geological instruments in the field, Methods of field geology, Identification of geological structures in the field, Mapping of rock sequences, Preparation of geological maps and reports.

ESNRM 31208	Waste Management	T	P	F

Introduction to waste; classification, quantification and characterization, biochemical transformations, Hierarchy of waste management and respective techniques for solid, liquid, gaseous, hazardous waste, Solid waste management; Construction of disposal yards, Treatment of solid waste (primary treatment, solid-composting, pyrolysis, incineration, anaerobic digestion, Management techniques for e–waste and hazardous waste), Introduction to wastewater; Constituents and characteristics, Wastewater treatment (physical, chemical and biological treatment methods), Emission control and management of gaseous waste.
Field visit to a central waste treatment plant at an industrial zone to explore different wastewater treatment systems.

ESNRM 31209	Field Techniques in Ecology and Biodiversity	T	P	F

Introduction to biodiversity related field techniques (scientific method, evidence-based conservation, and biodiversity assessment & monitoring). Faunal species identification (The jizz and field identification characters, identification keys, and field data recording). Measuring biodiversity. Biodiversity assessment (Total species listing, time-restricted searches, encounter rates, species discovery curves, MacKinnon lists), Species-area curves. Monitoring of animal populations: sampling and survey designs; relative and absolute abundance; census techniques (Total Counts, Territory Mapping), estimation techniques (transects, point counts, distance sampling, mark and recapture technique, removal technique, indirect sampling methods). Animal behavior study techniques. Plant Identification and Preparation of Herbarium Specimens. Floral sampling techniques. Advanced field techniques and software in biodiversity studies.
Field excursion to gain hands-on practical experience of biodiversity related field techniques.

ESNRM 31111	Basic Methods of Surveying Sciences	T	–	–

Introduction, definitions, principles, divisions of surveying. Applications of Surveying. Introduction to Modes of spatial data collection. Units of Measurements: distance, area and volume. Distance & Direction (angle). Introduction to Coordinate Systems. Working with maps; scale, legend, symbols & measurements on maps. Introduction to Conventional surveying techniques: chain, plane table & compass surveying. Introduction to Theodolite, Leveling & Heights/contours, EDMs and GNSS (GPS). Surveying Applications in NR Management.

ESNRM 31112	Practical in Surveying	–	P	–

Familiarization with conventional surveying techniques; Chain, Plane Table and Compass Surveying. Familiarization with Theodolite. Familiarization with Leveling & Height measurements. Familiarization with Total station/EDM. Familiarization with GNSS(GPS) Mapping Task with Handheld GPS – Project
Fieldwork Documents: Project Report on the Mapping Task and group presentation on the Mapping Task and an Individual oral viva session covering the all field practical aspects.

Year III Semester II

For the General Degree Program

Following guidelines are applicable **only for students, who exit at the end of the 3rd year** (after completing a 3 year general degree);

Students who are following the general degree should select three elective course units (covering 06 credits), out of the 09 elective course units available (from ESNRM 32201 – ESNRM 32209).
Please note that course units ESNRM 32205 and ESNRM 32411 is **offered only for** the general degree program,
Course units ESNRM 32105 and ESNRM 32110 are **not offered** for the general degree program.

** Elective course units will be offered provided a minimum of five (05) of the registered students apply for the given course unit.

For the Special Degree Program

Following guidelines are applicable **only for students, who follow the 4 year special degree programme**;

Students who are following the special degree should follow the following as compulsory course units: ESNRM 32201, ESNRM 32202, ESNRM 32203, ESNRM 32204, ESNRM 32105, ESNRM 32206, ESNRM 32207, ESNRM 32208, ESNRM 32209 and ESNRM 32210.

Pelase note that course units ESNRM 32105 and ESNRM 32210 is **offered only for** the special degree program,

Course units ESNRM 32205 and ESNRM 32411 are **not offered** for the special degree program.

ESNRM 32201	Cleaner Production and Green Productivity	T	–	F

Metrics for resource consumption, Principles of Cleaner Production (CP), Management system elements according to ISO 14001, Management system documentation, Introduction to CP Auditing, CP team and motivation, Resource efficiency indicators, Benchmarking, Eco design, Chemical management, Introduction to ergonomics, Introduction to Green Productivity (GP), Tools and techniques in Green Productivity.
Field visit to industrial sites to gain hands-on experience on tools of environmental management and their applicability.

ESNRM 32202	Energy Resource Management	T	P	F

Energy resources; nonrenewable (oil, hydro, natural gas, coal, dendro, agro waste), Renewable (solar, geothermal, wave, wind), Energy units and tariffs, Energy crisis, Energy efficiency and demand management, Energy and the environment, Energy exploration, ISO 50000 standards, Energy auditing, Current status of energy sector in Sri Lanka.
Field visit to industries/research and development organizations to explore the current trends, issues and new potentials in the energy sector.

ESNRM 32203	Aquatic Resource Management	T	P	F

Water resource management; Water as a resource, Factors affecting surface and ground water availability and quality, Water quality monitoring, Anthropogenic impacts, Policies and institutions that govern water sector and their management, Types of inland water bodies, Introduction to fisheries and aquaculture; Resource potential, Fish biology and yield prediction, Inland fisheries and aquaculture, Issues related to fisheries management, Principles of fisheries management; Fisheries co-management, Ecosystem-based fisheries management.
Field visit to a relevant site to have practical exposure to aquaculture practices

ESNRM 32204	Coastal and Marine Resource Management	T		F

Introduction to coastal and marine resources, Essentials of oceanography (chemical, physical, biological and geological properties), Human impact on coastal and marine systems, Coastal and marine problems related to Sri Lanka, Coastal zone management, Case studies.
Field excursion to explore important coastal ecosystems and to explore issues related to coastal and marine environments.

ESNRM 32205	Biogeography	T	–	–

History of biogeography, Historical and ecological biogeography, Mapping species distributions, Species diversity and endemism patterns, Biogeographic regionalization (Intuitive to numerical methods; global to local scales), Key processes in biogeography (Speciation, Radiation, Refugia, Colonisation, Extinction), Vicarience and Dispersal in biogeography, Introduction to island biogeography, Biogeography of Sri Lanka.

ESNRM 32105	Introduction to Biogeography	T	-	-

History of biogeography. Historical and ecological biogeography. Species diversity and endemism patterns. Key processes in biogeography (Speciation, Radiation, Refugia, Colonisation, Extinction). Vicarience and Dispersal biogeography. Biogeography of Sri Lanka. Biogeography and Conservation.

ESNRM 32206	Tools for Environmental Management	T	–	F

Environmental Impact Assessment (EIA); EIA in project cycle, Legislative and administrative documents in EIA process, Project screening, Scoping, Impact assessment methods, EIA/IEE Reports, Development of TOR, Review processes, Preparation of EIA report, Reviewing and evaluation), Cumulative environmental management, Strategic Environmental Assessments (SEA), Contemporary Economic tools in Environmental management (Carbon crediting), Risk management, Life Cycle Assessment (LCA), Case studies.

Field excursion to sites of large scale development projects to observe project compatibility with sustainable environmental management practices.

ESNRM 32207	Study and Management of Natural Hazards	T	–	F

Introduction to risk, hazard, vulnerability and disaster, Types of natural hazards, Geological hazards, Hydrological hazards, Meteorological hazards, Biological hazards, Applications of GIS and RS in management of natural hazards, Risk and disaster management, Case studies.

Field excursion to selected area/s subjected to a natural hazard/s or prone to natural hazards to study its/their nature, extent and consequences.

ESNRM 32208	Biodiversity Conservation and Management	T	P	F

Values of biodiversity, Loss of biodiversity (causes and mechanisms, In-situ and Ex-situ conservation, Protected Area (PA) network in Sri Lanka, Global and national conservation initiatives, Historical development of forest and wild life conservation in Sri Lanka, Introduction to national and global regulatory mechanisms for the conservation of biodiversity, Principles and approaches of "Conservation Biology".

Field excursion to a national park to explore the biodiversity conservation and management practices.

ESNRM 32209	Human Resource Management	T	–	–

Human resource management (HRM) and its environment, The importance of effective HRM, HRM goals, HRM functions; Job designing, Job analysis, HR planning, Recruitment, Selection, Hiring and contract of employment, Orientation, Training and development, Performance appraisal, Reward management, Grievance handling, Disciplinary management, Labour manager relations, Termination of employment.

ESNRM 32110	Community outreach programs (mini project)	–	P	F

Capacity development on using information, tools and skills to plan a community outreach activity, and conducting a mini project that will produce a quantifiable output. The mini project could be a community based project or a placement at a recognized governmental or non- governmental organization.

ESNRM 32411	B.Sc. Thesis in Environmental Science and Natural Resources Management (*for general degree only*)	TH

Field/ industrial/ laboratory studies on a research problem relevant to natural resources. The thesis should compulsorily consist of the following parts;

1. Introduction to the particular problem
2. Literature review on the problem
3. Materials and methods
4. Results/Observations
5. Discussion
6. Conclusion and recommendations

Both theoretical and practical parts of the thesis should be completed within a given schedule. The topic of the project will be selected through a consensus of the internal and external supervisors and the respective student.

The research project will be evaluated, based on the student's "field/ industrial/ laboratory work, written thesis and presentations.
Students are given a total of 04 credits for the thesis based on the research project carried out throughout the third year (ESNRM 32411).

Total number of credits in the 3 year general Degree Program is **94**.

Obtaining a pass for the Professional English Program (refer to section 5.6) is a requirement for the award of the B.Sc. Degree in Environmental Sciences and Natural Resources Management.

Year IV Semester I

Students who are following a special degree are given an option to select three elective course units (covering 06 credits), out of the 11 elective course units available (from ESNRM 41207 – ESNRM 41218). Other course units in Semester I are compulsory.

** Elective course units will be offered provided a minimum of five (05) of the registered students apply for the given course unit.

ESNRM 41201	Research Methodology and Scientific Communication	T	–	–

Scientific communication and career development, Choosing a research problem, Literature search, Objective formulation and research proposal preparation, References, Data analysis and interpretation, Writing and presentation of research results, Research management, Personality and career development, Social and inter personal skills.

ESNRM 41102	Environmental Quality Management	T	–	–

Performance Measurements, Life cycle thinking, Safety management, Environmental auditing, ISO 19000 Standards and certification, Green accounting, Environmental accounting.

ESNRM 41303	Forestry	T	P	F

Introduction to forestry, Forest types in Sri Lanka, Forest degradation, Principles and practices of silviculture, Nursery establishment and management, Plantation establishment and management, Regeneration types, reproduction methods, Management of forests resources, Forest mensuration, Biomass and carbon sequestration, Principles in wood science and timber technology, Forest management systems.
Field excursion to the Royal Botanic Gardens, Peradeniya in order to learn Herbarium techniques and to gain hands on experiences on ex-situ conservation methods of Flora.

ESNRM 41204	Environmental Governance	T	–	F

Defining "Governance", Components and principles of governance, Issues leading to governance mechanisms; local, global and trans-boundary, Organizations and institutions in global environmental governance, Evolution of Multi-Lateral Environmental Agreements (MEA's; CBD, RAMSAR, CITES, CMS, UNFCC, UNCLOS), Local institutional set up and policy framework, National and local level environmental governance (with case studies). Field visit to observe and experience a selected MEA being put into practice at the local context

ESNRM 41105	Undergraduate Seminar Module in Environmental Science and Natural Resources Management	T	–	–

Consists of guest lectures and student seminars. Lectures in different disciplines in NRM and Environmental Science are conducted by external/internal resource persons. Seminars are conducted by students through critically examining themes from selected research paper published within the last two years in a leading indexed journal, Compulsory use of local and global data bases, other literature sources, key journals, seminar and conference proceedings to produce a standard oral presentation.

ESNRM 41206	Environmental Geochemistry	T	P	–

Fundamentals of Geochemistry, Element mobility and their distribution in the earth systems, Aqueous solutions in geology, Geochemical cycle, Causes and concepts of pollution of water, Groundwater and base flow contamination, Inorganic chemicals and organic compounds in water, Application of geochemical principles to study of natural systems, Application of isotopes, Trace elements related health problems.
Laboratory sessions; Water quality monitoring as an information system, Sample collection, Laboratory analysis, Data handling, Data analysis, Reporting and Information utilization.

ESNRM 41207	Lichenology	T	–	–

Lichen symbiosis, Classification and identification, Sexual and vegetative reproduction, Lichen photobionts, Evolution and ecology of lichens, Field and herbarium techniques, Lichen chemistry, Lichens and (air) pollution, Ecological and economic benefits of lichen, Animal interactions with lichens.

ESNRM 41208	Mineral Exploration	T	–	–

Ores and ore deposits, Tectonics and mineralization, Geological, geophysical and geochemical methods in mineral exploration, Reserve evaluation, Drilling, Bore hole logging, Mining, Mineral mining and environmental problems in Sri Lanka.

ESNRM 41209	Gemmology	T	P	–

Introduction to Gemmology, Formation and Geological setting of Gemstones, Major gem occurrences of the world, Crystallography and mineralogy of gemstones, Physical and optical properties of gemstones, Synthetic gemstones, Fashioning of gemstones, Gemmological instruments, Geology of gem deposits of Sri Lanka, Environmental Management of gem mining.

ESNRM 41210	Ground Water Exploration	T	P	–

Ground water occurrences and aquifers, Geological and geophysical methods in groundwater exploration, Drilling. Bore logging, Pumping tests, Chemical quality of groundwater measurements and remedies, Groundwater exploitation and environmental problems.

ESNRM 41211	Applied Hydrology	T	–	–

Use of Meteorological data, Evaporation and transpiration, Infiltration and percolation, Ground water, Surface runoff, Urban hydrology, Water harvesting, Catchment characteristics and catchment management, Water quality and groundwater contamination, Hydrological forecasting, Applications of hydrology.

ESNRM 41212	Climatology and Meteorology	T	P	–

Elements of weather and climate, Atmosphere, Characteristics of atmosphere and meteorological parameters, Atmospheric circulation, Winds, Synoptic weather charts and weather maps, Weather forecasting, Preparation of weather charts, Weather maps and weather forecasting.

ESNRM 41213	Protected Area Management	T	P	F

Introduction to Protected Area (PA) management, PA Categories (Global and National), Threats to PAs, Habitat management, Species management, Problem based research in PA management, Use of advanced technology in PA management, Sustainable planning and management of PAs (Ecosystem approach, Participatory approach, Incident management, Adaptive management, Tourism and Visitor management), Indigenous people and PAs, Introduction to community-based management and landscape governance, Integrated Community Development Plans (ICDP).
Field excursions to gain experience in Wildlife conservation and PA management.

ESNRM 41214	Ecotourism	T	P	F

Concepts and potential of Ecotourism (guidelines, planning, policies), Structure and market of Ecotourism industry, Interpretation techniques, Assessment of visitor impacts and carrying capacity, Visitor services and management approaches, Ecotourism marketing, Ecotourism for sustainable development, Case Studies.
Field excursion to explore the practical situation of the ecotourism pertaining to Sri Lanka.

ESNRM 41215	Oil Exploration	T	–	–

Nature of oil and gas, Overview of petroleum industry and petroleum engineering, Formation of oil and gas, Petroleum systems, Structure and stratigraphy, Exploration methods, Heat flow analysis, Basic volumetric calculation, Basic concepts related to formations evaluation, Completion and production, Surface facilities, Petroleum law and economics, Health, safety and environmental policy.

ESNRM 41216	Biogeography and Conservation Planning	T	P	F

Mapping species distributions. Biogeographic regionalization (Intuitive to numerical methods; global to local scales). Introduction to island biogeography and conservation biogeography. Diversity vs. endemism (species, phylogenetic) in conservation planning. Global, regional and Sri Lankan practices in setting spatial conservation priorities. Introduction to systematic conservation planning. Introduction to conservation planning software. Field visit to Yala National Park to study spatial conservation planning in practice.

ESNRM 41217	Forestry and Rural Development	T	P	F

Introduction and definitions of agroforestry systems, Forest management systems: Community based and state managed forests, Significance of rural forestry for livelihood development, Preparation of forest inventories, Preparation of a forest management plan.
Field excursion to observe rural forestry in practice and to study the ways in which livelihood development is achieved through rural forestry.

ESNRM 41118	Environment and Society	T	–	–

Structure of the society, Social stratification, Rural communities, Indigenous Knowledge (IK) (Scientific knowledge vs. Indigenous Knowledge, IK in Agriculture and water resource management), Land tenure, Gender and environment, Data collection methods for research on rural society (Rapid Rural Appraisal, Participatory Rural Appraisal), Community development.

Year IV Semester II

ESNRM 42802	B.Sc. Thesis in Environmental Sciences and Natural Resource Management	TH

Student research projects should commence at the first semester of the final year. Students are expected to plan their project, review relevant literature, develop methodologies and establish links with relevant organizations during the first semester. The entire work will be evaluated for Year IV, Semester II.

Field/ industrial/ laboratory studies on a research problem relevant to natural resources. The thesis should compulsorily consist of the following parts;

1. Introduction to the particular problem
2. Literature review on the problem
3. Materials and methods
4. Results/Observations
5. Discussion
6. Conclusion and recommendations

Both theoretical and practical parts of the thesis should be completed within a given schedule. The topic of the project will be selected through a consensus of the internal and external supervisors and the respective student.

The research project will be evaluated, based on the student's field/ industrial/ laboratory work, written thesis and presentations.

Total number of credits in the 4 year special Degree program is 125.

Obtaining a pass for the Professional English Program (refer to section 5.6) is a requirement for the award of the B.Sc. Special Degree in Environmental Sciences and Natural Resources Management.

5.4. DEPARTMENT OF PHYSICAL SCIENCES & TECHNOLOGY

Degree Program : BACHELOR OF SCIENCE IN PHYSICAL SCIENCES & TECHNOLOGY

Summary of courses

Year I			
Semester I –*A student must earn a minimum of 17 credits*			
Course Code	Course Title	No of Credits	Compulsory or Elective
PST 11201	Mechanics and Properties of Matter	2	Compulsory
PST 11202	Introduction to Electricity and Magnetism	2	Compulsory
PST 11103	Physics Laboratory 1-I	1	Compulsory
PST 11204	General Chemistry	2	Compulsory
PST 11205	Fundamentals of Organic Chemistry	2	Compulsory
PST 11106	Elementary Chemistry Laboratory I	1	Compulsory
PST 11207	Structured Programming	2	Compulsory
PST 11208	Computer Hardware and Software	2	Compulsory
PST 11109	Computer Laboratory 1-I	1	Compulsory
PST 11210	Calculus and Differential Equations	2	Compulsory
CPE1101	Professional English I	0	Compulsory
SSM11210	Introduction to Chemistry	0	Compulsory
SSM12107	Basic Chemistry	0	Compulsory
	Total	**17**	

Year I			
Semester II–*A student must earn a minimum of 17 credits*			
Course Code	Course Title	No of Credits	Compulsory or Elective
PST 12201	Physics of Heat and Waves	2	Compulsory
PST 12102	Semi-Conductor Physics	1	Compulsory
PST 12103	AC Theory & Circuits	1	Compulsory
PST 12104	Physics Laboratory 1-II	1	Compulsory
PST 12205	Fundamentals of Physical Chemistry	2	Compulsory
PST 12206	Fundamentals of Analytical Chemistry	2	Compulsory
PST 12107	Elementary Chemistry Laboratory II	1	Compulsory
PST 12208	Object Oriented Programming	2	Compulsory
PST 12209	Fundamentals of Statistics	2	Compulsory
PST 12110	Computer Laboratory 1-II	1	Compulsory
PST 12211	Database Management Systems	2	Compulsory
CPE1201	Professional English II	0	Compulsory
	Total	**17**	

Year II			
Semester I –*A student must earn a minimum of 17 credits*			
Course Code	Course Title	No of Credits	Compulsory or Elective
PST 21201	Electronics	2	Compulsory
PST 21202	Geometrical and Physical Optics	2	Compulsory
PST 21103	Physics Laboratory 2-I	1	Compulsory
PST 21204	Organic Chemistry	2	Compulsory
PST 21205	Industrial Chemistry and Technology I (Organic)	2	Compulsory
PST 21106	Organic Chemistry Laboratory	1	Compulsory
PST 21207	Data Structures & Algorithms	2	Compulsory
PST 21208	Computer Architecture and Assembly Language	2	Compulsory
PST 21209	Advanced Statistics I	2	Compulsory
PST 21110	Computer Laboratory 2-I	1	Compulsory
CPE 2101	Professional English III	0	Compulsory
	Total	**17**	

Year II			
Semester II–*A student must earn a minimum of 18 credits*			
Course Code	Course Title	No of Credits	Compulsory or Elective
PST 22201	Physics of Electromagnetic Radiation and Introduction to the Laser	2	Compulsory
PST 22202	Quantum Physics, Atomic & Nuclear Physics	2	Compulsory
PST 22103	Physics Laboratory 2-II	1	Compulsory
PST 22204	Chemistry of Elements	2	Compulsory
PST 22205	Physical Chemistry	2	Compulsory
PST 22106	Inorganic Chemistry Laboratory	1	Compulsory
PST 22207	Biochemistry I	2	Compulsory
PST 22208	Software Engineering	2	Compulsory
PST 22209	Advanced Statistics II	2	Optional
PST 22110	Computer Laboratory 2-II	1	Compulsory
PST 22211	Operating Systems	2	Compulsory
PST 22112	Leadership and Communication	1	Optional
PST 22213	Biology for Physical Sciences	2	Optional
PST 22114	Soft Skill Development	1	Optional
PST 22215	Mathematical Methods	2	Optional
CPE 2201	Professional English IV	0	Compulsory
	Total	**25**	

GENERAL DEGREE COURSE

B. Sc. (GENERAL) IN PHYSICAL SCIENCES

Year III			
Semester I –*A student must earn a minimum of 18 credits*			
Course Code	Course Title	No of Credits	Compulsory or Elective
For B.Sc. General Degree in Physical Sciences (Majoring in Physics)			
PST 31201	Solid State Physics	2	Compulsory
PST 31202	Atmospheric Physics	2	Compulsory
PST 31203	Quantum Mechanics	2	Compulsory
PST 31104	Material Physics	1	Compulsory
PST 31105	Special Relativity	1	Compulsory
PST 31206	Optical Fiber & Telecommunication	2	Optional
PST 31107	Introduction to Nanotechnology	1	Compulsory
PST 31108	Physics Laboratory 3-I	1	Compulsory
PST 31209	Multimedia and Hypermedia Systems Development	2	Optional
PST 31010	Research Methodology and Scientific Communication	0	Non credited Compulsory
PST 31211	Mathematical Programming	2	Optional
PST 31112	Numerical Methods	1	Optional
PST 31213	Economics	2	Optional
PST 31014	Industrial Visit	0	Non credited Compulsory
	Total	**19**	
For B.Sc. General Degree in Physical Sciences (Majoring Chemical Technology)			
PST 31215	Biochemistry II	2	Compulsory
PST 31216	Molecular Spectroscopy	2	Compulsory
PST 31217	Electroanalytical Techniques	2	Compulsory
PST 31218	Industrial Chemistry and Technology II (Inorganic)	2	Compulsory
PST 31219	Environmental Chemistry	2	Compulsory
PST 31120	Coordination Chemistry	1	Compulsory
PST 31121	Laboratory Quality Control and Assurance	1	Compulsory
PST 31122	Physical Chemistry Laboratory	1	Compulsory
PST 31107	Introduction to Nanotechnology	1	Optional
PST 31010	Research Methodology and Scientific Communication	0	Non credited Compulsory
PST 31211	Mathematical Programming	2	Optional
PST 31112	Numerical Methods	1	Optional
PST 31213	Economics	2	Optional

PST 31014	Industrial Visit	0	Non credited Compulsory
	Total	**19**	
For B.Sc. General Degree in Physical Sciences (Majoring Computer Science and Technology)			
PST 31223	Artificial Intelligence	2	Compulsory
PST 31209	Multimedia and Hypermedia Systems Development	2	Compulsory
PST 31224	Software Project Management	2	Compulsory
PST 31225	Software Quality Assurances	2	Compulsory
PST 31226	Management Information Systems	2	Compulsory
PST 31227	Object Oriented Analysis and Design	2	Compulsory
PST 31228	Social and Professional Issues	2	Optional
PST 31229	Agile Software Development	2	Optional
PST 31130	Computer Laboratory 3-I	1	Compulsory
PST 31206	Optical Fiber & Telecommunication	2	Optional
PST 31010	Research Methodology and Scientific Communication	0	Non credited Compulsory
PST 31211	Mathematical Programming	2	Optional
PST 31112	Numerical Methods	1	Optional
PST 31213	Economics	2	Optional
PST 31014	Industrial Visit	0	Non credited Compulsory
	Total	**24**	

Year III			
Semester II–*A student must earn a minimum of 08 credits*			
Course Code	Course Title	No of Credits	Compulsory or Elective
PST 32801	Project Work: B.Sc. Thesis in Physical Sciences	8	Compulsory
	Total	**8**	

SPECIAL DEGREE COURSE

B. Sc. (SPECIAL) DEGREE IN APPLIED PHYSICS/ CHEMICAL TECHNOLOGY/ COMPUTER SCIENCE & TECHNOLOGY

Year III			
Semester I – *A student must earn a minimum of sixteen (16) credits including the number of credits specified under each special degree program*			
Course Code	Course Title	No of Credits	Compulsory or Elective
APPLIED PHYSICS			
PST 31201	Solid State Physics	2	Compulsory
PST 31202	Atmospheric Physics	2	Compulsory

PST 31203	Quantum Mechanics	2	Compulsory
PST 31104	Material Physics	1	Compulsory
PST 31105	Special Relativity	1	Compulsory
PST 31206	Optical Fiber & Telecommunication	2	Compulsory
PST 31107	Introduction to Nanotechnology	1	Compulsory
PST 31108	Physics Laboratory 3-I	1	Compulsory
PST 31209	Multimedia and Hypermedia Systems Development	2	Optional
PST 31211	Mathematical Programming	2	Compulsory
PST 31112	Numerical Methods	1	Optional
PST 31213	Economics	2	Optional
PST 31014	Industrial Visit	0	Compulsory
	Total	**19**	
CHEMICAL TECHNOLOGY			
PST 31215	Biochemistry II	2	Compulsory
PST 31216	Molecular Spectroscopy	2	Compulsory
PST 31217	Electroanalytical Techniques	2	Compulsory
PST 31218	Industrial Chemistry and Technology II (Inorganic)	2	Compulsory
PST 31219	Environmental Chemistry	2	Compulsory
PST 31120	Coordination Chemistry	1	Compulsory
PST 31121	Laboratory Quality Control and Assurance	1	Compulsory
PST 31122	Physical Chemistry Laboratory	1	Compulsory
PST 31107	Introduction to Nanotechnology	1	Optional
PST 31211	Mathematical Programming	2	Optional
PST 31112	Numerical Methods	1	Optional
PST 31213	Economics	2	Optional
PST 31014	Industrial Visit	0	Compulsory
	Total	**19**	
COMPUTER SCIENCE AND TECHNOLOGY			
PST 31223	Artificial Intelligence	2	Compulsory
PST 31209	Multimedia and Hypermedia Systems Development	2	Compulsory
PST 31224	Software Project Management	2	Compulsory
PST 31225	Software Quality Assurances	2	Compulsory
PST 31226	Management Information Systems	2	Compulsory
PST 31227	Object Oriented Analysis and Design	2	Compulsory
PST 31228	Social and Professional Issues	2	Optional
PST 31229	Agile Software Development	2	Optional
PST 31130	Computer Laboratory 3-I	1	Compulsory
PST 31206	Optical Fiber & Telecommunication	2	Optional
PST 31211	Mathematical Programming	2	Optional
PST 31112	Numerical Methods	1	Optional
PST 31213	Economics	2	Optional

PST 31014	Industrial Visit	0	Non credited Compulsory
	Total	**24**	

Year III			
Semester II– *A student must earn a minimum of seventeen (17) credits including the number of credits specified under each special degree program*			
Course Code	Course Title	No of Credits	Compulsory or Elective
APPLIED PHYSICS			
PST 32201	Statistical Physics	2	Compulsory
PST 32202	Interaction of Radiation with Matter	2	Compulsory
PST 32103	Nuclear Physics & Applications	1	Compulsory
PST 32204	Advanced Electronics	2	Compulsory
PST 32205	Solid State Devices	2	Compulsory
PST 32206	Astrophysics	2	Compulsory
PST 32207	Atomic and Molecular Spectroscopy	2	Optional
PST 32108	Current Topics in Physics	1	Optional
PST 32209	Human Resource Management	2	Optional
PST 32210	Statistics in Quality Control	2	Optional
PST 32111	Physics Laboratory 3-II	1	Compulsory
PST 32212	Graph Theory	2	Optional
PST 32213	Cleaner Production & Green Productivity	2	Optional
	Total	**23**	
CHEMICAL TECHNOLOGY			
PST 32214	Chemistry of Drug Design and Drug Action	2	Compulsory
PST 32215	Polymer Technology	2	Compulsory
PST 32216	Surface and Colloid Chemistry	2	Compulsory
PST 32117	Food Technology	1	Compulsory
PST 32118	Advanced Organic Chemistry	1	Compulsory
PST 32119	Current Topics in Chemistry	1	Optional
PST 32220	Structures and Properties of Solids	2	Compulsory
PST 32121	Advanced Chemistry Laboratory	1	Compulsory
PST 32209	Human Resource Management	2	Optional
PST 32210	Statistics in Quality Control	2	Optional
PST 32222	Organometallic Chemistry	2	Optional
PST 32213	Cleaner Production & Green Productivity	2	Optional
	Total	**20**	
COMPUTER SCIENCE AND TECHNOLOGY			
PST 32223	Artificial Neural Networks	2	Compulsory
PST 32224	Digital Image Processing	2	Compulsory
PST 32225	Data Mining and Practical Machine Learning	2	Compulsory
PST 32226	Human Computer Interactions	2	Optional

PST 32227	Data Communication and Computer Networks	2	Compulsory
PST 32228	Computer Graphics & Applications	2	Compulsory
PST 32229	Mobile Computing	2	Optional
PST 32230	Semantic Web	2	Optional
PST 32231	Bioinformatics	2	Optional
PST 32132	Current Topics in Computer Technology	1	Optional
PST 32133	Computer Laboratory 3-II	1	Compulsory
PST 32205	Solid State Devices	2	Optional
PST 32209	Human Resource Management	2	Optional
PST 32210	Statistics in Quality Control	2	Optional
PST 32212	Graph Theory	2	Optional
PST 32213	Cleaner Production & Green Productivity	2	Optional
	Total	**30**	

Year IV			
Semester I –*A student must earn a minimum of fifteen (15) credits including the number of credits specified under each special degree program*			
Course Code	Course Title	No of Credits	Compulsory or Elective
APPLIED PHYSICS			
PST 41001	Research Methodology and Scientific Communication	0	Non credited Compulsory
PST 41202	Computational Physics	2	Compulsory
PST 41203	Robotics	2	Optional
PST 41204	Remote Sensing & GIS	2	Optional
PST 41205	Geophysics	2	Compulsory
PST 41206	Medical and Bio Physics	2	Optional
PST 41207	Advanced Nanotechnology	2	Optional
PST 41208	Data Acquisition and Signal Processing Methods	2	Compulsory
PST 41209	Advanced Laser Physics	2	Optional
PST 41210	Automation	2	Optional
PST 41211	Advanced Astrophysics	2	Compulsory
PST 41212	Electrochemical Power Conversion	2	Optional
PST 41113	Literature Search Seminar in Applied Physics	1	Compulsory
PST 41214	Independent Research / Project in Applied Physics	2	Compulsory
PST 41215	Industrial Management	2	Optional
PST 41116	Critical Thinking	1	Optional
	Total	**28**	
CHEMICAL TECHNOLOGY			
PST 41001	Research Methodology and Scientific Communication	0	Non credited Compulsory
PST 41217	Natural Products Chemistry	2	Compulsory

PST 41218	Biotechnology	2	Compulsory
PST 41219	Advanced Solid State Chemistry	2	Compulsory
PST 41120	Bioinorganic Chemistry	1	Compulsory
PST 41221	Instrumental Analysis	2	Compulsory
PST 41222	Applied Molecular Modeling	2	Optional
PST 41223	State of Matter	2	Optional
PST 41124	Literature Search Seminar in Chemical Technology	1	Compulsory
PST 41225	Independent Research / Project in Chemical Technology	2	Compulsory
PST 41226	Computer Applications in Instrumentation	2	Optional
PST 41207	Advanced Nanotechnology	2	Optional
PST 41212	Electrochemical power conversion	2	Optional
PST 41215	Industrial Management	2	Optional
PST 41116	Critical Thinking	1	Optional
	Total	**25**	
COMPUTER SCIENCE AND TECHNOLOGY			
PST 41201	Research Methodology and Scientific Communication	0	Non credited Compulsory
PST 41227	High Performance Computing	2	Compulsory
PST 41228	Computer System Security	2	Compulsory
PST 41229	Advanced Computer Networks	2	Compulsory
PST 41230	Distributed Systems	2	Optional
PST 41231	Computer Vision	2	Compulsory
PST 41232	Embedded Systems	2	Optional
PST 41233	Business Process Management Systems	2	Optional
PST 41234	Fuzzy Logic	2	Optional
PST 41135	Literature Search Seminar in Computer Science and Technology	1	Compulsory
PST 41236	Independent Research / Project in Computer Science and Technology	2	Compulsory
PST 41203	Robotics	2	Optional
PST 41208	Data Acquisition and Signal Processing Methods	2	Optional
PST 41210	Automation	2	Optional
PST 41215	Industrial Management	2	Optional
PST 41116	Critical Thinking	1	Optional
	Total	**28**	

Year IV			
Semester II –*A student must earn a minimum of 08 credits*			
Course Code	Course Title	No of Credits	Compulsory or Elective
APPLIED PHYSICS			
PST 42801	Project Work (Industrial Exposure) : B.Sc. Thesis in Applied Physics	8	Compulsory
	Total	**8**	

CHEMICAL TECHNOLOGY			
PST 42802	Project Work (Industrial Exposure): B.Sc. Thesis in Chemical Technology	8	Compulsory
	Total	**8**	
COMPUTER SCIENCE AND TECHNOLOGY			
PST 42803	Project Work (Industrial Exposure): B.Sc. Thesis in Computer Science and Technology	8	Compulsory
	Total	**8**	

The Minimum Numbers of Credits required for a B.Sc. (General) degree in Physical Sciences in each year.

	Semester I	**Semester II**	**Total**
Year 1	17	17	34
Year II	17	18	35
Year III	18	08	26
Total			**95**

The minimum numbers of credits required for a B.Sc. (Special) degree (Applied Sciences) in Physical Sciences in each year.

For a Special Degree			
	Semester I	**Semester II**	**Total**
Year 1	17	17	34
Year II	17	18	35
Year III	16	17	33
Year IV	15	08	23
Total			**125**

DETAILED SYLLABUS

Year I Semester I				
PST 11201	Mechanics and Properties of Matter			
Newtonian Dynamics: Concept of Force, Mass, Newton's Laws, Inertial Reference Frames; Momentum, Circular Motion, Mechanics of Particles and Rigid Bodies, Universal Gravitation, Kepler's Laws, Newton's Law of Gravitation, Planetary Motion, Satellite and Rocket Motion, Elasticity, Fluid Flow, Viscosity of Liquids and Gases, Surface Tension and Capillary Flow				

PST 11202	Introduction to Electricity and Magnetism			

Electricity:
Introduction to Electricity, First Law of Static Electricity, Coulomb Law, Electric Intensity, Concept of Electric Field & Line of Forces, Various Type of Electric Fields (one & two point charges), Electric Field of Continuous Charge Distributions, Gauss' Law, Application of Gauss' Law (sphere of charge, spherical shell of charge, infinite line charge and a uniform sheet of charge), Electric Potential due to (point charge and continuous charge distribution), Capacitors & Dielectrics, Energy Stored in Electric Field, Electric Dipole Moment, Method of Images, Current & Current Density, Drift Velocity, Resistance, Resistivity & Conductivity

Magnetism:
Magnetic Field, Lorentz Force, Hall Effect, Torque on a Current Loop, Motors, Magnetic Dipole, Biot-Savart Law & its Application, Ampere's Law, Solenoids & Toroids, Faraday's Law of Induction, Lenz's Law, Motional emf, Dynamos, Induced Electric Fields, Betatron, Gauss' Law for Magnetism and Atomic & Nuclear Magnetism

PST 11103	Physics Laboratory 1-I			

Mechanics, Optics, Waves & Sound, Electricity

PST 11204	General Chemistry			

Review of classical atomic theory, (Atoms and molecules, Orbital, Pauli exclusion principle, De Broglie relationship, Heisenberg's uncertainty principle, Schrödinger equation), Atomic spectra, Sub-atomic particles, Chemical bonds (Covalent bonds, Intra- and inter-molecular forces), Lewis theory, Valence bond theory, Molecular orbital theory, Shapes of molecules from VSEPR theory, Hybridisation. Size and energy factors in Chemistry, Born - Haber cycle, Oxidation-reduction reactions, Concepts of acid-base, Redox reactions, Nernst equation and applications of electrode potential data, .Balancing chemical equations and Half-reactions.

PST 11205	Fundamentals of Organic Chemistry			

Inter- and intra-molecular interactions of organic molecules, Principles of resonance, Hybridization, Conjugation, Polar effects, Steric effects, IUPAC Nomenclature of organic compounds, Aliphatic and aromatic compounds, Acidity and basicity of organic compounds, Stereochemistry (Stereoisomerism; Optical & geometrical isomerism, Absolute and relative configurations, Substitution and elimination reactions, Reactions of free radicals, carbocations and carbanions)

PST 11106	Elementary Chemistry Laboratory I			

Qualitative analysis: Analysis of inorganic anions, Cations and their mixtures
Quantitative inorganic analysis by volumetric titrations, Apparatus and measurements, Error analysis, Introduction to analytical methods

PST 11207	Structured Programming			

Introduction to Structured Programming: Introduction to compilers and interpreters, Data types, Variables, Expressions and Assignment Statements, Console Input/output, Libraries and Namespaces. Flow Control: Branching Mechanisms, Loops. Function Basics: Predefined Functions, User-Defined Functions, Scope Rules. Parameters: Parameters, Default Arguments, Arrays: Introduction to Arrays, Array manipulation, Multidimensional Arrays. Structures: Structures. Pointers: Pointers. Recursion: Recursive functions, Exception Handling: Testing and Debugging, File Handling

PST 11208	Computer Hardware and Software			

Central Processing Unit: Types of microprocessors, Multi processors vs. single processors, CPU architecture, Design and implementation of CPU. I/O: Introduction to I/O devices, Types of I/O devices. Computer Memory: Memory hierarchy, Primary storage; registers, cache, RAM and ROM; Secondary storage. Data transmission: Busses, Addressing modes, instruction sets, device controllers, I/O. Operating system functions and types: Introduction to system software, Overview of OS, OS modules, processes, Process management, Memory and file management, Examples and contrasts of hardware architectures and operating systems

PST 11109	Computer Laboratory 1-I			

Introduction: Program structure, Data types and variables, Arithmetic and logical operators, Flow Control: Branching Mechanisms, Loops , Functions: void and return type, recursive, Structures, Pointers and Arrays, File Handling

PST 11210	Calculus and Differential Equations			

Calculus: Sets, Relations, Functions, limits (right hand limit and left hand limit), continuity and differentiability. Partial derivatives and chain rule: Coordinate systems (2D and 3D),Partial derivatives and chain rule, Differential Equations: Basic concepts - Introduction, Ordinary and partial differential equations, Classification of ordinary differential equations, Applications, Simple Harmonic Motion, Simple Pendulum, General form and solution of a differential equation, Formation of a differential equation, Linear and non-linear differential equations, Initial value problem, Boundary value problem, Differential equations of the first order and first degree Introduction, Separation of variables, Homogeneous equations, Method of solving homogeneous equations, Linear differential equations, Bernoulli's equation, Exact differential equations, Equations reducible to the exact form

Year I Semester II

PST 12201	Physics of Heat and Waves			

Thermal Physics:
Concept of Temperature, Zeroth Law of Thermodynamics, Temperature Scales, Thermal Expansion, Internal Energy and Heat, Specific Heat, Latent Heat, Calorimetry, Work Done by a Gas, First Law of Thermodynamic, Application of the First Law of Thermodynamics, Energy Transfer Mechanisms, Kinetic Theory of Gases, Phase Diagrams and Critical Points, Drift & Diffusion Velocities, Specific Heat of Gases, Distribution of Molecular Speeds, Heat Engines and Second Law of Thermodynamic, Carnot Engine, Entropy

Waves & Vibrations:
Simple Harmonic Motion (SHM): Properties, Mathematical Representation, Energy of a SH Oscillator, examples of SHM, Damped Harmonic Motion, Forced Oscillations, Propagation of Waves in Strings, Linear Wave Equation, Principle of Superposition, Standing Waves in Stings and in Air Columns, Interference of Waves, Beats, Sound waves in Media, Doppler Effect, Shock Waves

PST 12102	Semi-Conductor Physics			

Free Electron Theory, Density of States, Fermi Energy, Electrical Conduction in Metals, Band Theory, Conductors Insulators & Semiconductors, Intrinsic & Extrinsic Semiconductors, Diffusion & Drift Current, Mobility & Conductivity of Charge Carriers, Abrupt & Smooth p-n Junction (Depletion Region, Built in Electric Field, Contact Potential, Density of Majority & Minority Charge Carriers, Depletion Capacitance), Biasing of p–n Junction, Rectifying Diodes, Breakdown in p–n Junction (Avalanche &Zenner), Homo Junction Schottky Junction & Hetero Junction, pnp&npn Bipolar Transistor, Photo Diodes, Light Emitting Diodes (LED), Zenner Diodes and Introduction to Solar Cells

PST 12103	AC Theory & Circuits			
Alternating Currents, Resistors &Colour Coding, Thevenin's Theorem & its Application to Complicated Circuits, Delta & Star Transformations of Resistor Networks, Resistors Capacitors & Inductors in a.c. Signal, A.C. Transients in CR & RL, Energy in Inductor, LC Oscillations, Damped Oscillations, Analysis of LCR a.c. Circuits using (Trigonometric, Phasor Diagram & Complex Notation), Power in ac. Circuits, Resonance in LCR Circuits, Q–Factor, Transformer, and Filter Circuits & Band Width				

PST 12104	Physics Laboratory 1-II			
Electricity & Magnetism, Optics, Electronics & AC Circuits				

PST 12205	Fundamentals of Physical Chemistry			
States of matter (The perfect gas and associated laws, Real gases and their behaviour), Thermodynamics and state variables (Basic concepts of work, Heat and energy, zeroth, first, second & third laws of thermodynamics, Thermo-chemistry, Chemical potential and mass action law Basic concept in reaction kinetics, Integrated rate laws of zeroth, first and second order reactions, Factors affecting the rate of reaction, Pseudo state and Pseudo Steady State Approximation (PSSA)				

PST 12206	Fundamentals of Analytical Chemistry			
Introduction to chemical analyses, Sampling methods, Types of errors, Error analysis, Statistical treatment of analytical data, Introduction to classical methods (Titrimetric analysis (Acid– base, Complexometric etc.), Gravimetry), Electromagnetic spectrum, Introduction to spectroscopic methods (UV-visible, AAS, Emission spectroscopy), Solvent extraction, Principles of separation techniques(solvent-solvent, solvent-solid, solid-solid, gas-solid/liquid/gas), Calibration methods (External & internal standard methods and standard addition)				

PST 12107	Elementary Chemistry Laboratory II			
Organic chemistry-Elemental analysis, Functional group analysis				

PST 12208	Object Oriented Programming			
Introduction to OOP, Classes, objects, methods and messages, Properties of OOP: Abstraction: data abstraction, abstract class, inheritance: (sub class, supper class), encapsulation: Class member visibility (private, public, protected, default), Information hiding, and polymorphism (late binding, early binding), Coupling and cohesion, exception handling, Memory management				

PST 12209	Fundamentals of Statistics			
Introduction to statistics; Data collection methods and sampling techniques, Descriptive statistics: Data presentation and Summary measures. Elementary Probability: Elements of probability, Different approaches of probability, Elementary properties of Probability, Calculating the probabilities of simple and complex events, Conditional probability and Bayes' theorem, Random variables and Probability Distributions: Properties of Probability distributions. Special Probability Distributions: Discrete; Bernoulli, Binomial, and Poison. Continuous; Uniform, Normal, and Exponential Introduction to statistical software: Data management and familiarize with the common statistical functionalities; Entering, Summarizing, Presenting and Describing the data				

PST 12110	Computer Laboratory 1-II			
Programming with IDE: Class and object Declarations and Access Control, Operators, Flow Control, Exceptions, OOP Concepts: Encapsulation, polymorphism, Inheritance and Abstraction, Memory Management, Using API libraries in Object Oriented Programming				

PST 12211	Database Management Systems			
Introduction: Standards and basic structure of SQL data Definition, Insertion and referential integrity constraints, Updates, Deletion, Views, Joins: Join operations, Join operation rules, Cartesian products, Inner joins, Complex joins with three or more tables, Outer joins, Self-joins, SQL Functions: AVG, SUM, MIN, MAX, GROUP BY, HAVING, Sub queries: Defining sub queries, Sub query restrictions, Sub queries with other SQL operators (IN, NOT IN, etc.), Multiple levels of nesting, Sub queries and comparison operators, Correlated sub queries, Implementation including user interface and reports, Database procedures, Functions and assertions				

Year II Semester I				
PST 21201	Electronics			
Diodes (Biasing, DC & AC Resistance, Equivalent Circuits, Load Line Analysis, Half & Full Wave Rectification, Clippers, Clampers, Voltage Multiplier Circuit & Diode Testing), Bipoler Transistors (Operation, Configuration, Characteristics, Testing, Biasing Methods, Load Line Analysis, Switching Net Work, r_e Model & the Hybrid Equivalent Model), BJT Frequency Response, Feedback, Oscillators, Operational Amplifiers (Inverting, Non-inverting), Basic OP-Amp Circuits, Applications of OP-Amp, Binary Decimal Octal & Hex Number Systems, Logic Gates, Logic Expressions & its Simplifications using Boolean Algebra and k–Maps, De Morgan's Theorem, Combinational Logic Circuits (Full adder), Sequential Logic Circuits, Introduction to Flip–Flops (S–R, J–K, D, and Master–Slave), Shift Registers, Asynchronous & Synchronous Counters				

PST 21202	Geometrical Optics& Physical Optics			
Geometrical Optics: Mirrors, Lenses (thin & thick), Prism and their Basic Definitions and all relevant Properties, Optical Instruments like Microscopes, Telescopes Compound & Simple **Physical Optics :** Huygens Theory and Quantum Theory of Light, Electrical and Magnetic Constants and Speed of Light, Solution to the Wave Equation, 3-D Wave Equation, Interference, Principle of Superposition, Young's Double Slit Experiment, Michelson's Interferometer, Newton's rings, Resolving Power of an Interferometer, Diffraction, Huygen-Fresnel Principle, Fresnel Diffraction, Fraunhoffer Diffraction, Dispersion, Polarisation, Scattering, Absorption				

PST 21103	Physics Laboratory 2-I			
Optics, Electricity & Thermodynamics, Electronics & AC Circuits				

PST 21204	Organic Chemistry			
Reaction mechanism: S_N1, S_N2 and S_Ni mechanisms, E1 and E2 mechanisms, Nucleophilic addition and aromatic substitution, Heterocyclic chemistry (N-heterocycles and O-heterocycles, Five- and six-membered ring systems and aromatic properties, The reactivity and bioactivity of heterocycles), Introduction to synthesis (Total synthesis of simple molecules, Common reagents used in synthesis), Pericyclic reactions				

PST 21205	Industrial Chemistry and Technology I (Organic)			

Introductions to the importance of chemical processes used in industry and to the aspects of R &D in the industry.
Industrial organic chemistry, Plantation crop industries, Coconut, Tea, Sugar cane, Chemistry of essential oils, Oils and fats, Edible margarine industry, Detergents , Petroleum products and bio fuels, Organic dyes, Pesticides, Tannery industry

PST 21106	Organic Chemistry Laboratory			

Organic chemistry (Recrystallization, Separation of Binary mixtures, (Acid / base/neutral), Preparation of Soap, Synthesis of organic polymers, Chromatography)

PST 21207	Data Structures & Algorithms			

Data Types (Simple and Compound data types, The realization in the Standard Language chosen for Study),Data Structure(Strings, Arrays and Tables, Stacks and Queues, Linked Lists, Binary Trees and Balanced Binary Trees), File Organization and Access (Sequential organization, Random Organization, Linked Organization, Inverted files and Databases, Sort and Search Algorithms (Searching – Sequential Search, Binary Search, Sort: Bubble Sort, Insertion, Selection, Quicksort, 2-Way Merge Sort), Consideration of the Efficiency of Algorithms in terms of Time and Space

PST 21208	Computer Architecture and Assembly Language			

Organization of a Simple Digital Computer, Study of Different Microprocessors, Address Segmentation, Memory Design, I/O Schemes, System Support Devices, I/O Devices, Programming in 80x86 Assembly Language

PST 21209	Advanced Statistics I			

Estimation: Point and Interval Estimation for measures of centre (mean) and measures of dispersion (variance). Hypothesis Testing: Concepts of Hypothesis testing, single sample tests, two sample tests (dependent and independent). Introduction to design of experiments: simple and comparative experiments, factors and treatments, randomization, replication, blocking, balanced and unbalanced designs, fixed effects and random effects. Introduction to Analysis of Variance (ANOVA): Assumptions and Basis of F – test. One way ANOVA and two way ANOVA. Special Experimental Designs: Complete Randomized Design (CRD), Randomized Complete Block designs (RCBD) and Latin Square. Mean comparisons methods. Two factor factorial with CRD and RCBD. Analysis of Count Data: Chi-squared test of goodness of fit. Analysis the real world data by using statistical software and interpret the results

PST 21110	Computer Laboratory 2-I			

Web based Application Development

Year II Semester II

PST 22201	Physics of Electromagnetic Radiation and the Introduction to the Laser			

Physics of Electromagnetic Radiation:
Cathode Ray Oscillograph, Aston's Mass Spectrograph, Betatron, Magnetization, Electron Spin, Introduction to Magnetic Material (Paramagnetism, Diamagnetism & Ferromagnetism), Magnetism of Planets, Diamagnetism &Langevin's Classical Theory, Paramagnetism&Langevin's Classical Theory, Quantum Theory&Paramagnetism, Weiss Theory of Ferromagnetism, Concept of Domains and Hysteresis,Maxwell Equations, and Electromagnetic Waves

Introduction to the Laser:
Historical Development, Principle of Coherence – Spatial, Temporal & Partial, Coherence, Methods of Measuring Temporal & Spatial Coherence
The Density of Modes, Mode in a Reflecting Volume, Longitudinal Modes in a Laser Resonator, Transverse Modes in a Plane-parallel Resonator
Interaction of Light with Matter – Processes of Spontaneous Emission, Absorption and Stimulated Emission, Radiative Energy Exchange, Einstein Coefficients.
Transmit of Light Beams through a Material Medium, Process of Excitation &Attennuation, Gain Saturation, Oscillation Threshold, and Population Inversion
Basic Laser Systems – 2-level, 3-level and 4-level Systems
Brief Discussion of the Diversity of Laser Applications

PST 22202	Quantum Physics, Atomic and Nuclear Physics			

Bohr Theory of the Hydrogen Atom, Atomic Spectra, Orbital Angular Momentum, Magnetic Dipole Moment, Spin, Pauli Exclusion Principle, Space-time, Mass Energy and Momentum in Relativity, Planck's Hypothesis, Photo Electric Effect, Compton Effect, De Brogile Waves, Heisenberg's Uncertainty principle, Atomic Nucleus Binding Energy, Models of the Nucleus, Liquid Drop, Shell Model, Decay of Unstable Nuclei (α,β,γ-decay), Fission and Fusion, Nuclear Reactions, Elementary Particles

PST 22103	Physics Laboratory 2-II			

Electronics (Transistor Amplifiers, Operational Amplifiers, Logic Gates, Digital Electronics), Advanced Optics

PST 22204	Chemistry of Elements			

Main group chemistry: Main group chemistry (General and systematic chemistry of the groups of elements), s- block elements (physical and chemical properties of the alkali metals and alkaline earth elements), p- block elements (Physical and chemical properties of group 13 - 18 elements), An introduction to d-block & f-block elements and their applications.

PST 22205	Physical Chemistry			

Phase Equilibria:
One component system, Miscible, partially miscible & immiscible liquid mixtures, Condensed phases, Eutectic systems and compounds formation, Partially miscible systems, Solid solutions, Simple three component systems, Distillation of liquid mixtures (Congruent and non-congruent)

Quantum Chemistry:
Revision of evidence for quantization, Dynamics of microscopic systems, Schrödinger equation, Quantum mechanical principles: Operators and observables, Superposition and expectation values, The uncertainty principle, Solution of the Schrödinger equation for particle in a one-dimensional box, 2-dimensional box, 3-dimensional box

PST 22106	Inorganic Chemistry Laboratory			
Gravimetric analysis, Determination of anions and cations by gravimety, Complexometric titration including EDTA, Synthesis of inorganic complexes and their analysis, Qualitative analysis of simple mixtures, Analysis of rare elements, Insoluble mixtures, Synthesis of special inorganic compounds				

PST 22207	Biochemistry I			
The structure, Functional roles biochemical properties of proteins, carbohydrates, lipids and nucleic acids. Methods of isolation, characterization quantitative determination of macromolecules, Vitamins coenzymes: structure and functions, Enzyme biochemistry: kinetics inhibition				

PST 22208	Software Engineering			
Introduction to Software Engineering, Introduction to problems, Software Processes, Requirements and Specification, Software Design , COTS and Reuse, CASE Tools, Metrics and Reliability Assessment, Software Testing and Quality Assurance (Testing, Analysis, QA, Reviews) , Implementation Models, Team Organization and People Management, Software and System Safety, Putting It All Together				

PST 22209	Advanced Statistics II			
Simple linear regressions and multiple linear regressions, parameter estimation (OLS) and its properties, tests for regression coefficients, tests for significance of the fitted model (ANOVA), model adequacy checking and remedial measure, Models with Qualitative Independent variables (Dummy variables), and model selection procedures. Nonparametric statistical methods: Scale of Measurements. Single sample tests: Sign and Wilcoxon Signed Rank Test. Two Sample tests: Wilcoxon Matched Paired Signed Rank test, Wilcoxon Rank Sum Test. The Kruskal – Wallis One-Way Analysis of Variance by Ranks, and Friedman Two-Way Analysis of Variance by Ranks. Rank Correlations (Spearman's and Kendall Tau).Introduction to time series analysis and Forecasting: Component of Time Series Data, Smoothing Methods, Forecasting methods. Analysis the real world data by using statistical software and interpret the results				

PST 22110	Computer Laboratory 2-II			
Application Development Using Modern Tools				

PST 22211	Operating Systems			
Overview, Operating system principles, Multi-Programming: Processes and threads, system calls, context switching. Managing processor time. Types of scheduling, Scheduling algorithm, concurrency, Memory management, Device management, File systems, Intercrosses Communication: pipes, sockets, signals, shared memory, security and protection, real time and embedded systems, fault tolerance, system performance and evaluation				

PST 22112	Leadership and Communication			
Leadership qualities and Tools team work and leadership building activities different communication tools ethic of communications group activities				

PST 22213	Biology for Physical Sciences			

Cell and its constituents, Cellular water relations, protein synthesis, introduction to enzymes principles of genetics, composition of living matter, Structure & characteristics of animal tissues

PST 22114	Soft Skill Development			

Student will give open presentation on two given topics.
Private study and reading, Attending conferences and seminars, preparing papers and presentations, Committee work with colleagues, Conversation and discussion with others, Courses and distance learning, Working with others outside the organization, debates

PST 22215	Mathematical Methods			

Complex Numbers: Introduction, Real and Imaginary Numbers, The Algebra of Complex numbers, Complex Number Operation, Polar form of the complex number. Matrices and determinants: Matrices and system of linear Equations, Operations with Matrices, Determinant of a Square Matrix, Inverse of a Square Matrix, Applications of Matrices and Determinants. Vectors: Vectors and Scalars, Vector Algebra, lineally independence and linearly independence, Vector Fields, Dot and Cross product, Reciprocal sets of Vectors, Vector differentiation, Gradient, Divergence, Vector integration. Fourier Series: Periodic functions, Function having arbitrary period, Even and odd functions, Half-range expression, Convergence of Fourier series, Operation on Fourier Series Fourier Transforms: Fourier's integral theorem, Fourier cosine and sine transforms, Fourier transforms of derivatives, Calculation of the Fourier transforms of some simple functions, Fourier transforms of some rational functions Laplace Transforms: Inverse functions, Linearity, Laplace transforms of derivatives and integrals, Shifting on the s-axis ,Shifting on the t-axis, Unit step functions, Differentiation and Integration of the transforms

One day training workshop on leadership, professional and skill development at an institution outside the University

GENERAL DEGREE COURSE UNITS

Year III Semester I

For B.Sc. General Degree in Physical Sciences (Majoring in Physics)

PST 31201	Solid State Physics			

Crystal Lattice & Translation Vectors, Symmetry Operations, Type of Lattices, Bravais Lattice, Lattice Directions and Planes, Miller Index, Inter–planar Spacing, Packing Density, Simple Crystal Structures (Close & Loose Packed), X–Ray Diffraction, Bragg's Law, Von Laue Treatment, X–Ray Diffraction Methods (Laue's, Rotary Crystal & Powder Methods), Atomic Scattering Factor, Geometrical Structure Factor & its Applications to Crystals, Lattice Vibrations (Mono-atomic Lattice & Diatomic Lattice), Phonons, and Various Theories of Lattice Specific Heat (Classical Theory, Einstein's Theory)

PST 31202	Atmospheric Physics			

Introduction:
Composition of the Atmosphere and its Vertical Structure
Basics of Atmospheric Thermodynamics:
The Gas Laws, Hydrostatic Equation and its Applications, The First Law of Thermodynamics, Work Heat, Adiabatic Processes, Second Law of Thermodynamics and its Applications in Atmospheric Science.
Thermodynamics of Moist Air:
Thermal Properties of Water Substance, Equation of State, Phase Change and Latent Heats, Vapour Pressure and Clausius–Clapeyron Equation, Adiabatic Process of Saturated Air, Thermodynamic Diagrams (e.g., Skew-T log-P diagram)
Atmospheric Stability:
Upper Air Soundings, Dry and Moist Adiabatic Lapse Rates and Static Stability
Fundamentals of Radiation:
Spectrum of Electromagnetic Radiation, Black–Body Radiation: Planck Function, Absorptivity and Emissivity. Wien's Displacement Law, Stefan-Boltzmann Law, Kirchhoff's Law, Physics of Scattering (Rayleigh and Mie) and Absorption and Emission, Atmospheric Phenomena (Rainbows, Blue and Red Skies etc.)
Applications of Radiation in the Earth-Atmosphere System:
Latitudinal and Seasonal Distribution of Solar Radiation, Radiative Heating and Cooling in Clouds, Atmospheric Absorption of Solar Radiation, Atmospheric Absorption and Emission of Infrared Radiation, Atmospheric Energy Balance and Greenhouse Effect
Properties of Cloud Particles:
Atmospheric Aerosols, Intermolecular Forces and Surface Tension, Equilibrium Vapour Pressure over Ice and Water Surfaces, Equilibrium Vapour Pressure over a Curved Surface, Condensation Nuclei and Equilibrium Vapour Pressure over a Solution, Formation and Growth of Cloud Droplets, Rain Formation, Ice Formation, Change Separation in Clouds and Lightning Discharges

PST 31203	Quantum Mechanics			

Brief History of Quantum Physics, De-broglie Waves, Heisenberg's Uncertainty Principle, Time Dependant Schrödinger equation (T.D.S.E.) Klein – Gordian equation, the Time Independent Schrödinger equation (T.I.S.E) Normalisation, Discrete Spectrum of Energy, Continuous Spectrum of Energy, Application of (T.I.S.E) to solve some Simple Problems in Quantum Mechanics is One-Dimension, and Three–Dimensions, Probability Current Density, Potential Step, Potential Barrier some Applications of the Tunnel Effect in Physics, Hilbert Space, "Ket" and "Bra" Vectors, Matrix Formulation of Quantum Mechanics, Mean Values

PST 31104	Material Physics			

Crystalline and Amorphous Solids, Space–Lattice and Primitive Cells, Bravais lattices, Crystal Structures (BCC, FCC & HCP), Introduction to Miller indices, Reciprocal Lattice to (BCC, FCC & SC), Point Defects (Vacancy, Interstitial, Frenkel, Substitutional, Colour or F–Centres, Polarons), Line Imperfection (Edge Dislocation & Screw Dislocation), Burgers Vector and Burgers Circuit, Surface Defects (Grain Boundaries, Tilt Boundaries, Twin Boundaries & Stacking Faults), Superconductivity, Sources of Superconductivity, Meissner Effect, Type I & Type II Superconductors, Super Electrons, Cooper Pair, Normal Tunnelling and Josephson Effect, Isotope Effect & High–T_C Superconductivity

PST 31105	Special Relativity			

Introduction, Michelson-Morley Experiment; Einstein's Postulates, Lorentz Transformations, Time Dilation & Proper Time, Simultaneity, Length Contraction & Proper Length, 4–Vectors, Space–Time Interval, Space – time Diagrams, Minkowski Diagrams, Relativistic Velocity Transformations, Thomas Precession, Relativistic Doppler Effect, Relativistic Mass and Energy, Momentum and Energy Transformations, Decay of Elementary Particles

PST 31206	Optical Fiber & Telecommunication			

Introduction to Fibre Optics, Types of Optical Sources and Detectors Modulation and Demodulation, Types of Fibres, Step-index, Graded-index, Monomode, Multimode Fibres, Connectors, Splicing and Couplers. Integrated Optics, Active and Passive Wave Guides Optical Fibre Transmission Losses due to Absorption, Bending, Scattering, Jointing, Material Dispersion. Local Area Networks, Long Distance Telecom Applications, (Topics to be offered will be decided by the department depending on the availability of staff)

PST 31107	Introduction to Nanotechnology			

Brief History of Industrial Revolution, Introduction to Nanotechnology, Understanding the Atom, Length scale, Feynman's Challenges, Importance of One Billionth of a Meter, Definitions of Nanoscale, Nanomaterials and Nanotechnology, Classification of Nanoscale Objects, Surface Effects, Size–dependent Properties, Nanotechnology in Everyday Life, Nature's Nanotechnology, Economics of Nanotechnology, Introduction to Miniaturization, Moor's Law, Scaling Laws in Mechanics, Electricity and Magnetism, Optics, Heat Transfer and in Biology, Quantum Tunnelling of Electrons, Principles, Operation, Image Generation, Applications and Limitations of Scanning Tunnelling Microscopy (STM), Atomic Force Microscopy (AFM), Scanning Electron Microscopy (SEM) and Transmission Electron Microscopy (TEM), Nanofabrication methods: Bottom-up and Top–down Approaches, Self-assembly, Introduction to Lithography

PST 31108	Physics Laboratory 3-I			

Independent open ended practical will be conducted on one or more on the given topics.

PST 31209	Multimedia and Hypermedia Systems Development			

Introduction to Multimedia & Hypermedia, Analog Vs Digital Systems, Hardware that Enables Multimedia, File Types, their Features and Usage, Audio Editing and MIDI Equipment, Video Editing, Multimedia on the Internet

PST 31010	Research Methodology and Scientific Communication			

Choosing a research problem, literature search, Objective formulation and Research proposal preparation, References, Data analysis and Interpretation, Writing and Presentation of research results, Research management, Personality and career development: Social and interpersonal skills

PST 31211	Mathematical Programming			

Constrained Optimization: Linear Programming (Introduction, Mathematical Modelling of Problems, Feasible Solution, Optimal (Optimum) Solution, Basic Feasible Solution, Basic Variables, Non-Degenerate Basic Feasible Solution, Degenerate Basic Feasible Solution, Convex Sets, Graphical Method, Simplex Methods, Development of Simplex Technique, Artificial Variables, Charne's Method of Penalties, Problem of Degeneracy, Duality of Linear Programming, Interpretation and Properties of Dual), Integer Programming (Introduction, Method of Solution, Gomory's Method of all Integer Programming Problem, Branch and Bound Method) Transportation Technique (Introduction, Mathematical Formulation, The initial Basic Feasible Solution, North-West Corner Rule, Row Minima and Column Minima Method, Matrix Minima Method, Vogel's Approximation Method, Optimal Basic Feasible Solution, Stepping Stone Method, Modi Method) Assignment Models (Introduction, Hungarian Method, Balanced and Unbalanced Assignment Problems), Unconstrained Optimization: Functions of One Variable (Derivatives, Maximum and Minimum, Binary Search, Convexity), Functions of Several Variables (Gradient, Maximum and Minimum, Global Optima)

PST 31112	Numerical Methods			

Errors in Computation (Representational error, Computational error – relative and absolute, Computer rounding approaches), Taylor Series representation of a function (Error term in the representation, Properties of alternating series, Appropriate and inappropriate applications), Finding Roots of Equations (Bisection method, Newton's method, Secant method, Analysis of convergence for each technique), Interpolation (Lagrange's interpolation, Newton's form for the interpolating polynomial, Hermite Interpolation, Divided differences algorithm, Inverse interpolation, Errors in interpolation, Theorems regarding error, Derivatives and divided differences), Solution of Linear System of Equations (Gaussian elimination, Gauss-Seidel method, Jacobi method)

PST 31213	Economics			

Introductory microeconomics, Economic systems, Theory of price, Government role in the economy, Theory of Production, Theory of costs, Theory of the firm, Factor markets and price determination

PST 31014	Industrial Visits			

Industrial visits (3) covering various chemical industries such as Sugar Cane, Glass, Rubber, Fertilizers. Research, Development and Service Laboratories, NERD Centre. Industrial, Scientific and Engineering organizations involve in Computer based technologies.

For B.Sc. General Degree in Physical Sciences
(Majoring in Chemical Technology)

PST 31215	Biochemistry II			

Regulation of the central metabolic pathways: Glucose metabolism, glycolysis, gluconeogenesis, pentose phosphate pathway, the citric acid cycle, metabolic regulation of glucose, glycogen metabolism oxidative phosphorylation, photosynthesis. Amino acid metabolism: Essential non-essential amino acids, Biosynthesis of nonessential amino acids, Amino acid catabolism, Urea cycle, Genetic diseases disorders associated with Amino acid metabolism, Lipid metabolism : Lipid transport, Biosynthesis of fatty acids, Metabolism of odd chain even chain fatty acids

PST 31216	Molecular Spectroscopy			
Molecular properties: Electrical properties and Magnetic properties; Intermolecular forces, , Electron paramagnetic resonance, Magnetic susceptibility, Magnetic moment, Theory and applications of rotational spectra, vibrational spectra, microwave spectra and electronic spectra; Sample preparation for IR, Raman , UV-visible, ^{1}H-NMR, ^{13}C-NMR , mass spectroscopies Application of these spectral methods for structure elucidation of organic molecules				

PST 31217	Electroanalytical Techniques			
Faraday's law of electrolyses, Strong and weak electrolytes and their conductivity, Transference numbers, Conductometry and potentiometry, Nernst equation, Concept of e.m.f., Electro chemical cells and applications, Electro analytical method ; Polarography, Amperometry, Electro gravimetry, Coulometry, Electrophoresis, Electro chemical sources of energy , Fuel cells , Electroplating, Electrochemistry of corrosion				

PST 31218	Industrial Chemistry and Technology II (Inorganic)			
Industrial inorganic chemistry, Mineral based industries of Sri Lanka, Glass, Silica, Clay, Ceramics, Mineral sands, Cements, Fertilizers (Apatite, Dolomite etc.) Chemistry of gems, Choler alkali industry, Metal extraction metallurgy, Steel and cast iron				

PST 31219	Environmental Chemistry			
Air pollution: Structure of the atmosphere, generation of air pollutants and sources, classes of air pollutants and photochemical smog. Air quality standards and air pollution monitoring. Indoor air pollution. Greenhouse effect and global warming. Ozone layer depletion. Acid rain and its environmental consequences. **Water pollution**: Pollutants in water and their origin. Water quality standards, analysis of water quality, water treatment. Eutrophication and algal blooms. Industrial pollutants and industrial pollution control. Pollutants in soil, soil analysis **Waste management**: Types of wastes, waste disposal practices (open dumping, sanitary landfills, incineration and biogas generation. Special types of wastes and their treatment: hospital, chemical, oil and radioactive wastes,				

PST 31120	Coordination Chemistry			
Co-ordination complexes, Structures, Stability constants, Nomenclature, Co-ordination numbers, Reaction mechanism, Crystal field theory, Magneto chemistry, Spectra of co-ordination complexes				

PST 31121	Laboratory Quality Control and Assurance			
Principles of QC (Matrix interference and spike analysis, Precision & accuracy, Blind samples, Sensitivity, Selectivity, Detection limits, Standard reference samples, Control charts, Instruments calibration, SOP, QC plan) Principles of QA (Method validation, Inter laboratory checks, Laboratory plans, QA plans, Data auditing and accreditation) Legal accreditation (ISO, SLS, WHO etc.)				

PST 31122	Physical Chemistry Laboratory			
Physical chemistry :Equilibria, Thermo chemistry				

PST 31107	Introduction to Nanotechnology			

Brief History of Industrial Revolution, Introduction to Nanotechnology, Understanding the Atom, Length scale, Feynman's Challenges, Importance of One Billionth of a Meter, Definitions of Nanoscale, Nanomaterials and Nanotechnology, Classification of Nanoscale Objects, Surface Effects, Size–dependent Properties, Nanotechnology in Everyday Life, Nature's Nanotechnology, Economics of Nanotechnology, Introduction to Miniaturization, Moor's Law, Scaling Laws in Mechanics, Electricity and Magnetism, Optics, Heat Transfer and in Biology, Quantum Tunnelling of Electrons, Principles, Operation, Image Generation, Applications and Limitations of Scanning Tunnelling Microscopy (STM), Atomic Force Microscopy (AFM), Scanning Electron Microscopy (SEM) and Transmission Electron Microscopy (TEM), Nanofabrication methods: Bottom-up and Top–down Approaches, Self–assembly, Introduction to Lithography

PST 31010	Research Methodology and Scientific Communication			

Choosing a research problem, literature search, Objective formulation and Research proposal preparation, References, Data analysis and Interpretation, Writing and Presentation of research results, Research management, Personality and career development: Social and interpersonal skills

PST 31211	Mathematical Programming			

Constrained Optimization: Linear Programming (Introduction, Mathematical Modelling of Problems, Feasible Solution, Optimal (Optimum) Solution, Basic Feasible Solution, Basic Variables, Non-Degenerate Basic Feasible Solution, Degenerate Basic Feasible Solution, Convex Sets, Graphical Method, Simplex Methods, Development of Simplex Technique, Artificial Variables, Charne's Method of Penalties, Problem of Degeneracy, Duality of Linear Programming, Interpretation and Properties of Dual), Integer Programming (Introduction, Method of Solution, Gomory's Method of all Integer Programming Problem, Branch and Bound Method) Transportation Technique (Introduction, Mathematical Formulation, The initial Basic Feasible Solution, North-West Corner Rule, Row Minima and Column Minima Method, Matrix Minima Method, Vogel's Approximation Method, Optimal Basic Feasible Solution, Stepping Stone Method, Modi Method) Assignment Models (Introduction, Hungarian Method, Balanced and Unbalanced Assignment Problems), Unconstrained Optimization: Functions of One Variable (Derivatives, Maximum and Minimum, Binary Search, Convexity), Functions of Several Variables (Gradient, Maximum and Minimum, Global Optima)

PST 31112	Numerical Methods			

Errors in Computation (Representational error, Computational error – relative and absolute, Computer rounding approaches), Taylor Series representation of a function (Error term in the representation, Properties of alternating series, Appropriate and inappropriate applications), Finding Roots of Equations (Bisection method, Newton's method, Secant method, Analysis of convergence for each technique), Interpolation (Lagrange's interpolation, Newton's form for the interpolating polynomial, Hermite Interpolation, Divided differences algorithm, Inverse interpolation, Errors in interpolation, Theorems regarding error, Derivatives and divided differences), Solution of Linear System of Equations (Gaussian elimination, Gauss-Seidel method, Jacobi method)

PST 31213	Economics			

Introductory microeconomics, Economic systems, Theory of price, Government role in the economy, Theory of Production, Theory of costs, Theory of the firm, Factor markets and price determination

PST 31014	Industrial Visits			
Industrial visits (3) covering various chemical industries such as Sugar Cane, Glass, Rubber, Fertilizers. Research, Development and Service Laboratories, NERD Centre. Industrial, Scientific and Engineering organizations involve in Computer based technologies.				

For B.Sc. General Degree in Physical Sciences
(Majoring in Computer Science & Technology)

PST 31223	Artificial Intelligence			
Artificial intelligence: Intelligent Agents, Search Techniques, Game Playing, Knowledge and Reasoning, First order logic, Logical reasoning systems, Uncertainty, Probabilistic Reasoning, Simple and complex Decisions, Learning. Expert systems: Characteristics and components of Expert systems, Machine learning, Knowledge base and bank, Rule Knowledge, Inference engine, transit fare rule, Rule interpreter, Inference tree				

PST 31209	Multimedia and Hypermedia Systems Development			
Introduction to Multimedia & Hypermedia, Analog Vs Digital Systems, Hardware that Enables Multimedia, File Types, their Features and Usage, Audio Editing and MIDI Equipment, Video Editing, Multimedia on the Internet				

PST 31224	Software Project Management			
Introduction to Software Project Management: Projects and Processes, The Process Framework, project integration Management, Scope Management, Time Management, project cost Management, Quality management, Human Resource Management, Communication Management, Risk Management, project management tools, advanced life cycle models, testing and maintenance and software project documentation and IT Management				

PST 31225	Software Quality Assurances			
Introduction to Quality Assurance, Quality Concepts, Software Quality Assurance Activities, Software Reviews and their importance Statistical SQA, Software Reliability, ISO 9000 approach to SQA, Software testing tools				

PST 31226	Management Information Systems			
Management within the organization: Management activities, roles and levels; Management Planning, Controlling and Strategic planning, Decision making and using MIS for decision making: Measurement of MIS performance and capabilities, MIS applications and relationships: Different types of Information Systems – Transaction Processing Systems, Decision Support Systems, Management Information Systems, Executive Support Systems; Databases and data warehouses – their relevance to MIS; Networks, Internet and MIS. Development of MIS: Managing MIS Project; Techniques and methodologies for supporting MIS development; Building and Managing Systems: Building Information Systems, Managing Projects, and Managing Global Systems				

PST 31227	Object Oriented Analysis and Design			
High level overview of OO Development Process, Use Case/Responsibility Driven Design: Contract based approach, Responsibility identification, Responsibility allocation, Roles, stereotypes and interfaces, Collaborations; CRC cards Object-Oriented Principles: Why OO, Structured Engineering and Information Engineering, Encapsulation, Inheritance, Polymorphism, Dynamic Binding, Abstraction, Objects and Classes, Object Relationships, UML Diagramming, Design Patterns, Testing objects				

PST 31228	Social and Professional Issues			

History of computing, social context of computing, methods and tools of analysis, professional and ethical responsibility, risks and liability of computer-based systems, intellectual property, privacy and civil liberties, computer crime, customs and law, economical issues in computing, philosophical frameworks

PST 31229	Agile Software Development			

Agile and Lean Software Development: Basics and Fundamentals: Values, principles, stakeholders, Lean Approach, Agile and Scrum Principles, Agile Product Management, Agile Requirements, Agile Architecture, Agile Risk Management, Agile Review, Agile Testing, Scaling Agile for large projects

PST 31130	Computer Laboratory 3-I			

AI programming, System Maintenance Practical

PST 31206	Optical Fiber & Telecommunication			

Introduction to Fibre Optics, Types of optical sources and detectors modulation and demodulation, types of fibres, step-index, graded-index, monomode, multimode fibres, connectors, splicing and couplers. Integrated optics, active and passive wave guides optical fibre transmission losses due to absorption, bending, scattering, jointing, material dispersion. Local area networks, Long distance telecom applications, (The topics to be offered will be decided by the department depending on the availability of staff)

PST 31010	Research Methodology and Scientific Communication			

Choosing a research problem, literature search, Objective formulation and Research proposal preparation, References, Data analysis and Interpretation, Writing and Presentation of research results, Research management, Personality and career development: Social and interpersonal skills

PST 31211	Mathematical Programming			

Constrained Optimization: Linear Programming (Introduction, Mathematical Modelling of Problems, Feasible Solution, Optimal (Optimum) Solution, Basic Feasible Solution, Basic Variables, Non-Degenerate Basic Feasible Solution, Degenerate Basic Feasible Solution, Convex Sets, Graphical Method, Simplex Methods, Development of Simplex Technique, Artificial Variables, Charne's Method of Penalties, Problem of Degeneracy, Duality of Linear Programming, Interpretation and Properties of Dual), Integer Programming (Introduction, Method of Solution, Gomory's Method of all Integer Programming Problem, Branch and Bound Method) Transportation Technique (Introduction, Mathematical Formulation, The initial Basic Feasible Solution, North-West Corner Rule, Row Minima and Column Minima Method, Matrix Minima Method, Vogel's Approximation Method, Optimal Basic Feasible Solution, Stepping Stone Method, Modi Method) Assignment Models (Introduction, Hungarian Method, Balanced and Unbalanced Assignment Problems), Unconstrained Optimization: Functions of One Variable (Derivatives, Maximum and Minimum, Binary Search, Convexity), Functions of Several Variables (Gradient, Maximum and Minimum, Global Optima)

PST 31112	Numerical Methods			

Errors in Computation (Representational error, Computational error – relative and absolute, Computer rounding approaches), Taylor Series representation of a function (Error term in the representation, Properties of alternating series, Appropriate and inappropriate applications), Finding Roots of Equations (Bisection method, Newton's method, Secant method, Analysis of convergence for each technique), Interpolation (Lagrange's interpolation, Newton's form for the interpolating polynomial, Hermite Interpolation, Divided differences algorithm, Inverse interpolation, Errors in interpolation, Theorems regarding error, Derivatives and divided differences), Solution of Linear System of Equations (Gaussian elimination, Gauss-Seidel method, Jacobi method)

PST 31213	Economics			

Introductory microeconomics, Economic systems, Theory of price, Government role in the economy, Theory of Production, Theory of costs, Theory of the firm, Factor markets and price determination

PST 31014	Industrial Visits			

Industrial visits (3) covering various chemical industries such as Sugar Cane, Glass, Rubber, Fertilizers. Research, Development and Service Laboratories, NERD Centre. Industrial, Scientific and Engineering organizations involve in Computer based technologies.

Year III Semester II

PST 32801	Project Work: B.Sc. Thesis in Physical Sciences			

Industrial/ laboratory studies on a research problem relevant to Physical Sciences, Students will be required to conduct either research or survey related to physics, chemistry or computer science either at a relevant industry, research institution, or at the faculty. The duration of the project period should be 15 weeks. During the period students may have to attend for any special lectures conducted by the supervisors and or resource personnel on request from the supervisor/ department. A project report should be submitted at the end of the semester and the thesis should be presented and defended by the respective student before an Examination Committee appointed by the department. A guideline for the preparation of report will be given separately

SPECIAL DEGREE COURSE UNITS

Year III Semester I

APPLIED PHYSICS

PST 31201	Solid State Physics			

Crystal Lattice & Translation Vectors, Symmetry Operations, Type of Lattices, Bravais Lattice, Lattice Directions and Planes, Miller Index, Inter−planar Spacing, Packing Density, Simple Crystal Structures (Close & Loose Packed), X−Ray Diffraction, Bragg's Law, Von Laue Treatment, X−Ray Diffraction Methods (Laue's, Rotary Crystal & Powder Methods), Atomic Scattering Factor, Geometrical Structure Factor & its Applications to Crystals, Lattice Vibrations (Mono-atomic Lattice & Diatomic Lattice), Phonons, and Various Theories of Lattice Specific Heat (Classical Theory, Einstein's Theory)

PST 31202	Atmospheric Physics			

Introduction:
Composition of the Atmosphere and its Vertical Structure
Basics of Atmospheric Thermodynamics:
The Gas Laws, Hydrostatic Equation and its Applications, The First Law of Thermodynamics, Work Heat, Adiabatic Processes, Second Law of Thermodynamics and its Applications in Atmospheric Science.
Thermodynamics of Moist Air:
Thermal Properties of Water Substance, Equation of State, Phase Change and Latent Heats, Vapour Pressure and Clausius–Clapeyron Equation, Adiabatic Process of Saturated Air, Thermodynamic Diagrams (e.g., Skew-T log-P diagram)
Atmospheric Stability:
Upper Air Soundings, Dry and Moist Adiabatic Lapse Rates and Static Stability
Fundamentals of Radiation:
Spectrum of Electromagnetic Radiation, Black–Body Radiation: Planck Function, Absorptivity and Emissivity. Wien's Displacement Law, Stefan-Boltzmann Law, Kirchhoff's Law, Physics of Scattering (Rayleigh and Mie) and Absorption and Emission, Atmospheric Phenomena (Rainbows, Blue and Red Skies etc.)
Applications of Radiation in the Earth-Atmosphere System:
Latitudinal and Seasonal Distribution of Solar Radiation, Radiative Heating and Cooling in Clouds, Atmospheric Absorption of Solar Radiation, Atmospheric Absorption and Emission of Infrared Radiation, Atmospheric Energy Balance and Greenhouse Effect
Properties of Cloud Particles:
Atmospheric Aerosols, Intermolecular Forces and Surface Tension, Equilibrium Vapour Pressure over Ice and Water Surfaces, Equilibrium Vapour Pressure over a Curved Surface, Condensation Nuclei and Equilibrium Vapour Pressure over a Solution, Formation and Growth of Cloud Droplets, Rain Formation, Ice Formation, Change Separation in Clouds and Lightning Discharges

PST 31203	Quantum Mechanics			

Brief History of Quantum Physics, De-Broglie Waves, Heisenberg's Uncertainty Principle, Time Dependent Schrödinger equation (T.D.S.E.) Klein – Gordian equation, the Time Independent Schrödinger equation (T.I.S.E) Normalization, Discrete Spectrum of Energy, Continuous Spectrum of Energy, Application of (T.I.S.E) to solve some Simple Problems in Quantum Mechanics is One-Dimension, and Three–Dimensions, Probability Current Density, Potential Step, Potential Barrier some Applications of the Tunnel Effect in Physics, Hilbert Space, "Ket" and "Bra" Vectors, Matrix Formulation of Quantum Mechanics, Mean Values

PST 31104	Material Physics			

Crystalline and Amorphous Solids, Space–Lattice and Primitive Cells, Bravais lattices, Crystal Structures (BCC, FCC & HCP), Introduction to Miller indices, Reciprocal Lattice to (BCC, FCC & SC), Point Defects (Vacancy, Interstitial, Frenkel, Substitutional, Colour or F–Centres, Polarons), Line Imperfection (Edge Dislocation & Screw Dislocation), Burgers Vector and Burgers Circuit, Surface Defects (Grain Boundaries, Tilt Boundaries, Twin Boundaries & Stacking Faults), Superconductivity, Sources of Superconductivity, Meissner Effect, Type I & Type II Superconductors, Super Electrons, Cooper Pair, Normal Tunnelling and Josephson Effect, Isotope Effect & High–T_C Superconductivity

PST 31105	Special Relativity			
Introduction, Michelson-Morley Experiment; Einstein's Postulates, Lorentz Transformations, Time Dilation & Proper Time, Simultaneity, Length Contraction & Proper Length, 4–Vectors, Space–Time Interval, Space – time Diagrams, Minkowski Diagrams, Relativistic Velocity Transformations, Thomas Precession, Relativistic Doppler Effect, Relativistic Mass and Energy, Momentum and Energy Transformations, Decay of Elementary Particles				

PST 31206	Optical Fiber & Telecommunication			
Introduction to Fiber Optics, Types of Optical Sources and Detectors Modulation and Demodulation, Types of Fibers, Step-index, Graded-index, Monomode, Multimode Fibers, Connectors, Splicing and Couplers. Integrated Optics, Active and Passive Wave Guides Optical Fiber Transmission Losses due to Absorption, Bending, Scattering, Jointing, Material Dispersion. Local Area Networks, Long Distance Telecom Applications, (Topics to be offered will be decided by the department depending on the availability of staff)				

PST 31107	Introduction to Nanotechnology			
Brief History of Industrial Revolution, Introduction to Nanotechnology, Understanding the Atom, Length scale, Feynman's Challenges, Importance of One Billionth of a Meter, Definitions of Nano scale, Nano materials and Nanotechnology, Classification of Nano scale Objects, Surface Effects, Size–dependent Properties, Nanotechnology in Everyday Life, Nature's Nanotechnology, Economics of Nanotechnology, Introduction to Miniaturization, Moor's Law, Scaling Laws in Mechanics, Electricity and Magnetism, Optics, Heat Transfer and in Biology, Quantum Tunneling of Electrons, Principles, Operation, Image Generation, Applications and Limitations of Scanning Tunneling Microscopy (STM), Atomic Force Microscopy (AFM), Scanning Electron Microscopy (SEM) and Transmission Electron Microscopy (TEM), Nanofabrication methods: Bottom-up and Top–down Approaches, Self-assembly, Introduction to Lithography				

PST 31108	Physics Laboratory 3-I			
Independent open ended practical will be conducted on one or more on the given topics.				

PST 31209	Multimedia and Hypermedia Systems Development			
Introduction to Multimedia & Hypermedia, Analog Vs Digital Systems, Hardware that Enables Multimedia, File Types, their Features and Usage, Audio Editing and MIDI Equipment, Video Editing, Multimedia on the Internet				

PST 31211	Mathematical Programming			
Constrained Optimization: Linear Programming (Introduction, Mathematical Modelling of Problems, Feasible Solution, Optimal (Optimum) Solution, Basic Feasible Solution, Basic Variables, Non-Degenerate Basic Feasible Solution, Degenerate Basic Feasible Solution, Convex Sets, Graphical Method, Simplex Methods, Development of Simplex Technique, Artificial Variables, Charne's Method of Penalties, Problem of Degeneracy, Duality of Linear Programming, Interpretation and Properties of Dual), Integer Programming (Introduction, Method of Solution, Gomory's Method of all Integer Programming Problem, Branch and Bound Method) Transportation Technique (Introduction, Mathematical Formulation, The initial Basic Feasible Solution, North-West Corner Rule, Row Minima and Column Minima Method, Matrix Minima Method, Vogel's Approximation Method, Optimal Basic Feasible Solution, Stepping Stone Method, Modi Method) Assignment Models (Introduction, Hungarian Method, Balanced and Unbalanced Assignment Problems), Unconstrained Optimization: Functions of One Variable (Derivatives, Maximum and Minimum, Binary Search, Convexity), Functions of Several Variables (Gradient, Maximum and Minimum, Global Optima)				

PST 31112	Numerical Methods			
Errors in Computation (Representational error, Computational error – relative and absolute, Computer rounding approaches), Taylor Series representation of a function (Error term in the representation, Properties of alternating series, Appropriate and inappropriate applications), Finding Roots of Equations (Bisection method, Newton's method, Secant method, Analysis of convergence for each technique), Interpolation (Lagrange's interpolation, Newton's form for the interpolating polynomial, Hermite Interpolation, Divided differences algorithm, Inverse interpolation, Errors in interpolation, Theorems regarding error, Derivatives and divided differences), Solution of Linear System of Equations (Gaussian elimination, Gauss-Seidelmethod, Jacobi method)				

PST 31213	Economics			
Introductory microeconomics, Economic systems, Theory of price, Government role in the economy, Theory of Production, Theory of costs, Theory of the firm, Factor markets and price determination				

PST 31014	Industrial Visits			
Industrial visits (3) covering various chemical industries such as Sugar Cane, Glass, Rubber, Fertilizers. Research, Development and Service Laboratories, NERD Centre. Industrial, Scientific and Engineering organizations involve in Computer based technologies.				

CHEMICAL TECHNOLOGY

PST 31215	Biochemistry II			
Regulation of the central metabolic pathways: Glucose metabolism, glycolysis, gluconeogenesis, pentose phosphate pathway, the citric acid cycle, metabolic regulation of glucose, glycogen metabolism oxidative phosphorylation, photosynthesi,. Amino acid metabolism: Essential non-essential amino acids, Biosynthesis of nonessential amino acids, Amino acid catabolism, Urea cycle, Genetic diseases disorders associated with Amino acid metabolism, Lipid metabolism : Lipid transport, Biosynthesis of fatty acids, Metabolism of odd chain even chain fatty acids				

PST 31216	Molecular Spectroscopy			
Molecular properties: Electrical properties and Magnetic properties; Intermolecular forces, Electron paramagnetic resonance, Magnetic susceptibility, Magnetic moment, Theory and applications of rotational spectra, vibrational spectra, microwave spectra and electronic spectra; Sample preparation for IR, Raman , UV-visible, ^{1}H-NMR, ^{13}C-NMR , mass spectroscopies Application of these spectral methods for structure elucidation of organic molecules				

PST 31217	Electroanalytical Techniques			
Faraday’s law of electrolyses, Strong and weak electrolytes and their conductivity, Transference numbers, Conductometry and potentiometry, Nernst equation, Concept of e.m.f., Electro chemical cells and applications, Electro analytical method ; Polarography, Amperometry, Electro gravimetry, Coulometry, Electrophoresis, Electro chemical sources of energy , Fuel cells , Electroplating, Electrochemistry of corrosion				

PST 31218	Industrial Chemistry and Technology II (Inorganic)			
Industrial inorganic chemistry, Mineral based industries of Sri Lanka, Glass, Silica, Clay, Ceramics, Mineral sands, Cements, Fertilizers (Apatite, Dolomite etc.) Chemistry of gems, Choler alkali industry, Metal extraction metallurgy, Steel and cast iron				

PST 31219	Environmental Chemistry			
Air pollution: Structure of the atmosphere, generation of air pollutants and sources, classes of air pollutants and photochemical smog. Air quality standards and air pollution monitoring. Indoor air pollution. Greenhouse effect and global warming. Ozone layer depletion. Acid rain and its environmental consequences. **Water pollution**: Pollutants in water and their origin. Water quality standards, analysis of water quality, water treatment. Eutrophication and algal blooms. Industrial pollutants and industrial pollution control. Pollutants in soil, soil analysis Waste management: Types of wastes, waste disposal practices (open dumping, sanitary landfills, incineration and biogas generation. Special types of wastes and their treatment: hospital, chemical, oil and radioactive wastes,				

PST 31120	Coordination Chemistry			
Co-ordination complexes, Structures, Stability constants, Nomenclature, Co-ordination numbers, Reaction mechanism, Crystal field theory, Magneto chemistry, Spectra of co-ordination complexes				

PST 31121	Laboratory Quality Control and Assurance			
Principles of QC (Matrix interference and spike analysis, Precision & accuracy, Blind samples, Sensitivity, Selectivity, Detection limits, Standard reference samples, Control charts, Instruments calibration, SOP, QC plan) Principles of QA (Method validation, Inter laboratory checks, Laboratory plans, QA plans, Data auditing and accreditation) Legal accreditation (ISO, SLS, WHO etc.)				

PST 31122	Physical Chemistry Laboratory			
Physical chemistry :Equilibria, Thermo chemistry				

PST 31107	Introduction to Nanotechnology			
Brief History of Industrial Revolution, Introduction to Nanotechnology, Understanding the Atom, Length scale, Feynman's Challenges, Importance of One Billionth of a Meter, Definitions of Nanoscale, Nanomaterials and Nanotechnology, Classification of Nanoscale Objects, Surface Effects, Size–dependent Properties, Nanotechnology in Everyday Life, Nature's Nanotechnology, Economics of Nanotechnology, Introduction to Miniaturization, Moor's Law, Scaling Laws in Mechanics, Electricity and Magnetism, Optics, Heat Transfer and in Biology, Quantum Tunnelling of Electrons, Principles, Operation, Image Generation, Applications and Limitations of Scanning Tunnelling Microscopy (STM), Atomic Force Microscopy (AFM), Scanning Electron Microscopy (SEM) and Transmission Electron Microscopy (TEM), Nanofabrication methods: Bottom-up and Top–down Approaches, Self-assembly, Introduction to Lithography				

PST 31211	Mathematical Programming			
Constrained Optimization: Linear Programming (Introduction, Mathematical Modelling of Problems, Feasible Solution, Optimal (Optimum) Solution, Basic Feasible Solution, Basic Variables, Non-Degenerate Basic Feasible Solution, Degenerate Basic Feasible Solution, Convex Sets, Graphical Method, Simplex Methods, Development of Simplex Technique, Artificial Variables, Charne's Method of Penalties, Problem of Degeneracy, Duality of Linear Programming, Interpretation and Properties of Dual), Integer Programming (Introduction, Method of Solution, Gomory's Method of all Integer Programming Problem, Branch and Bound Method) Transportation Technique (Introduction, Mathematical Formulation, The initial Basic Feasible Solution, North-West Corner Rule, Row Minima and Column Minima Method, Matrix Minima Method, Vogel's Approximation Method, Optimal Basic Feasible Solution, Stepping Stone Method, Modi Method) Assignment Models (Introduction, Hungarian Method, Balanced and Unbalanced Assignment Problems), Unconstrained Optimization: Functions of One Variable (Derivatives, Maximum and Minimum, Binary Search, Convexity), Functions of Several Variables (Gradient, Maximum and Minimum, Global Optima)			

PST 31112	Numerical Methods			
Errors in Computation (Representational error, Computational error – relative and absolute, Computer rounding approaches), Taylor Series representation of a function (Error term in the representation, Properties of alternating series, Appropriate and inappropriate applications), Finding Roots of Equations (Bisection method, Newton's method, Secant method, Analysis of convergence for each technique), Interpolation (Lagrange's interpolation, Newton's form for the interpolating polynomial, Hermite Interpolation, Divided differences algorithm, Inverse interpolation, Errors in interpolation, Theorems regarding error, Derivatives and divided differences), Solution of Linear System of Equations (Gaussian elimination, Gauss-Seidel method, Jacobi method)			

PST 31213	Economics			
Introductory microeconomics, Economic systems, Theory of price, Government role in the economy, Theory of Production, Theory of costs, Theory of the firm, Factor markets and price determination				

PST 31014	Industrial Visits			
Industrial visits (3) covering various chemical industries such as Sugar Cane, Glass, Rubber, Fertilizers. Research, Development and Service Laboratories, NERD Centre. Industrial, Scientific and Engineering organizations involve in Computer based technologies.				

COMPUTER SCIENCE AND TECHNOLOGY

PST 31223	Artificial Intelligence			
Artificial intelligence: Intelligent Agents, Search Techniques, Game Playing, Knowledge and Reasoning, First order logic, Logical reasoning systems, Uncertainty, Probabilistic Reasoning, Simple and complex Decisions, Learning. Expert systems: Characteristics and components of Expert systems, Machine learning, Knowledge base and bank, Rule Knowledge, Inference engine, transit fare rule, Rule interpreter, Inference tree				

PST 31209	Multimedia and Hypermedia Systems Development			
Introduction to Multimedia & Hypermedia, Analog Vs Digital Systems, Hardware that Enables Multimedia, File Types, their Features and Usage, Audio Editing and MIDI Equipment, Video Editing, Multimedia on the Internet				

PST 31224	Software Project Management			
Introduction to Software Project Management: Projects and Processes, The Process Framework, project integration Management, Scope Management, Time Management, project cost Management, Quality management, Human Resource Management, Communication Management, Risk Management, project management tools, advanced life cycle models, testing and maintenance and software project documentation and IT Management				

PST 31225	Software Quality Assurances			
Introduction to Quality Assurance, Quality Concepts, Software Quality Assurance Activities, Software Reviews and their importance Statistical SQA, Software Reliability, ISO 9000 approach to SQA, Software testing tools				

PST 31226	Management Information Systems			
Management within the organization: Management activities, roles and levels; Management Planning, Controlling and Strategic planning, Decision making and using MIS for decision making: Measurement of MIS performance and capabilities, MIS applications and relationships: Different types of Information Systems – Transaction Processing Systems, Decision Support Systems, Management Information Systems, Executive Support Systems; Databases and data warehouses – their relevance to MIS; Networks, Internet and MIS. Development of MIS: Managing MIS Project; Techniques and methodologies for supporting MIS development; Building and Managing Systems: Building Information Systems, Managing Projects, and Managing Global Systems				

PST 31227	Object Oriented Analysis and Design			
High level overview of OO Development Process, Use Case/Responsibility Driven Design: Contract based approach, Responsibility identification, Responsibility allocation, Roles, stereotypes and interfaces, Collaborations; CRC cards Object-Oriented Principles: Why OO, Structured Engineering and Information Engineering, Encapsulation, Inheritance, Polymorphism, Dynamic Binding, Abstraction, Objects and Classes, Object Relationships, UML Diagramming, Design Patterns, Testing objects				

PST 31228	Social and Professional Issues			
History of computing, social context of computing, methods and tools of analysis, professional and ethical responsibility, risks and liability of computer-based systems, intellectual property, privacy and civil liberties, computer crime, customs and law, economical issues in computing, philosophical frameworks				

PST 31229	Agile Software Development			
Agile and Lean Software Development: Basics and Fundamentals: Values, principles, stakeholders, Lean Approach, Agile and Scrum Principles, Agile Product Management, Agile Requirements, Agile Architecture, Agile Risk Management, Agile Review, Agile Testing, Scaling Agile for large projects				

PST 31130	Computer Laboratory 3-I			
AI programming, System Maintenance Practical				

PST 31206	Optical Fiber & Telecommunication			

Introduction to Fibre Optics, Types of optical sources and detectors modulation and demodulation, types of fibres, step-index, graded-index, monomode, multimode fibres, connectors, splicing and couplers. Integrated optics, active and passive wave guides optical fibre transmission losses due to absorption, bending, scattering, jointing, material dispersion. Local area networks, Long distance telecom applications, (The topics to be offered will be decided by the department depending on the availability of staff)

PST 31211	Mathematical Programming			

Constrained Optimization: Linear Programming (Introduction, Mathematical Modelling of Problems, Feasible Solution, Optimal (Optimum) Solution, Basic Feasible Solution, Basic Variables, Non-Degenerate Basic Feasible Solution, Degenerate Basic Feasible Solution, Convex Sets, Graphical Method, Simplex Methods, Development of Simplex Technique, Artificial Variables, Charne's Method of Penalties, Problem of Degeneracy, Duality of Linear Programming, Interpretation and Properties of Dual), Integer Programming (Introduction, Method of Solution, Gomory's Method of all Integer Programming Problem, Branch and Bound Method) Transportation Technique (Introduction, Mathematical Formulation, The initial Basic Feasible Solution, North-West Corner Rule, Row Minima and Column Minima Method, Matrix Minima Method, Vogel's Approximation Method, Optimal Basic Feasible Solution, Stepping Stone Method, Modi Method) Assignment Models (Introduction, Hungarian Method, Balanced and Unbalanced Assignment Problems), Unconstrained Optimization: Functions of One Variable (Derivatives, Maximum and Minimum, Binary Search, Convexity), Functions of Several Variables (Gradient, Maximum and Minimum, Global Optima)

PST 31112	Numerical Methods			

Errors in Computation (Representational error, Computational error – relative and absolute, Computer rounding approaches), Taylor Series representation of a function (Error term in the representation, Properties of alternating series, Appropriate and inappropriate applications), Finding Roots of Equations (Bisection method, Newton's method, Secant method, Analysis of convergence for each technique), Interpolation (Lagrange's interpolation, Newton's form for the interpolating polynomial, Hermite Interpolation, Divided differences algorithm, Inverse interpolation, Errors in interpolation, Theorems regarding error, Derivatives and divided differences), Solution of Linear System of Equations (Gaussian elimination, Gauss-Seidel method, Jacobi method)

PST 31213	Economics			

Introductory microeconomics, Economic systems, Theory of price, Government role in the economy, Theory of Production, Theory of costs, Theory of the firm, Factor markets and price determination

PST 31014	Industrial Visits			

Industrial visits (3) covering various chemical industries such as Sugar Cane, Glass, Rubber, Fertilizers. Research, Development and Service Laboratories, NERD Centre. Industrial, Scientific and Engineering organizations involve in Computer based technologies.

Year III Semester II				
APPLIED PHYSICS				
PST 32201	Statistical Physics			

Introduction, Concept of Probability, Statistical Distribution, Mean Free Path & its Microscopic Calculation, Temperature and Thermal Equilibrium, Zeroth Law, Measuring Temperature, Kinetic Theory and the Ideal Gas, Equation of State, Ideal Gas Model, Work Done on an Ideal Gas (Constant Volume, Constant Pressure, Constant Temperature & Thermal Isolation), Internal Energy of an Ideal Gas, Heat Capacity & Specific Heat (at Constant Volume & Pressure), First Law of Thermodynamics & its Applications, Reversible & Irreversible Process, Heat Engine & Second Law, Refrigerator & Second Law, Carnot Cycle, Carnot Theorem and the Second Law, Absolute Zero Temperature, Entropy, Macroscopic and Microscopic States, Classical and Quantum Statistics, Maxwell–boltzmann Statistics (Distribution of Speed, Distribution of Energies), Fermi–dirac Statistics & Bose–Einstein Statistics

PST 32202	Interaction of Radiation with Matter			

Interaction of Charged Particles with Matter; Scattering; Multiple Coulomb Scattering, Back Scattering, Scattering Cross-section, Differential Cross-section, Mean Free Path, Channeling, Range, Range Straggling, Energy Loss by the Charged Particles through Matter; Radiation Cascade, Energy Loss of Electrons, Braking Radiation ("Bremmstrahlung"), Cherenkov Radiation, Energy Straggling, Electronic Ionization and Excitation, Stopping Power, Ion Tracks, Sputtering Mechanisms, Luminescence, Surface and Bulk Defects, Radiation Damage Cross-section, Mass Spectrometry Applications of Sputtering, Interaction of Neutrons with Matter; Slow and Fast Neutrons, Elastic Scattering and Capture, Radiation Sources; Natural Sources, Man-made Sources

PST 32103	Nuclear Physics & Application			

General Survey of Radioactive Decay; Half Life; Series Decay; Artificial Radioactivity, Applications of Radioactivity; Biological effects of Radiation; Alpha Decay; Barrier Penetration; Fine Structure of Alpha Spectra; Theory of Alpha Decay; Rutherford Scattering, Beta Decay; Experiments on the Neutrino; Systematic of Beta Decay; Fermi Theory of Beta Decay; Binding Energies of Nuclei in their Ground States; Semi Empirical Mass Formula; Liquid Drop Model; Nuclear Potential Well, Introduction to Shell Model; Magic Numbers; Nuclear Chart; Power from Nuclear Fission; Induced Fission; Neutron Cross Sections for U235 and U238; Fission process; Chain Reaction; Nuclear Reactors; Radioactive Waste; Nuclear Fusion; Sun; Hydrogen Burning; Introduction to Particle Physics; Nomenclature and Catalogue of Particles; Conservation Laws; Introduction to Quarks and Basic Interactions in Nature; Brief Introduction to Nuclear Detectors

PST 32204	Advanced Electronics			

Latches & Flip–Flops (S–R, J–K, D & Master), Shift Registers (Serial in–serial out, Serial in–parallel out, Parallel in–serial out & Parallel in–parallel out), Asynchronous & Synchronous Counters (MOD 8, MOD 16 & MOD 10), Alternative Representation of Logic Gates, Digital Arithmetic (Binary Addition, Subtraction using 2s Complement System & Multiplication with their Circutrary Diagrams), Decoders (BCD to Decimal, BCD to SevenSegment), Encoders, BCD Code & ASCII Code, Multiplexer, Analysis of Sequential Logic Circuits, Transition Tables, Sequential Circuit Design, Excitation Tables, Field Effect Transistors (FET), JFET & MOSFETS, FET Amplifiers, Data Busing, and Introduction to Memory Devices

PST 32205	Solid State Devices			

Physical Electronics and Devices, Electronic Properties of Materials, Solid State Electronic Devices, Optoelectronics and Microelectronic Technology

PST 32206	Astrophysics			

Classification Systems for Stars, Physical Parameters of Stars, Principles and Theories of Star Formation, Stellar Interior Modeling (What powers the stars, What does hold a star up), Stellar Atmosphere Modeling (Plane Parallel Atmosphere, Grey Atmosphere, Local Thermodynamic Equilibrium (LTE)), Introduction of Hertzprung –Russell (HR) Diagram, Main Sequence Evolution of the Stars, Introduction of Variable, Binary Stars and their Properties, End Product of Star Evolution (White Dwarf/ Planetary Nebula, Neutrons Stars and Supernovae Type II, Concept of Black Holes)

PST 32207	Atomic and Molecular Spectroscopy			

Atomic Spectra : (15 hours)
Energy Levels in Free Ions, Quantum Numbers, Pauli Exclusion Principle, Russel-Saunders Coupling, JJ-coupling, Multi Electron Atom and the Vector Model of the Atom, Hund's Rules for finding the Ground Term of a given Configuration, Lande Interval Rule, Selection Rules for Electric-dipole Transitions, Zeeman Splitting, Stark Splitting. Energy Levels of an Ion in a Crystal Field, Crystal-field Splitting d- and f- levels in a Cubic Crystal Feld
Molecular Spectra: (15 hours)
Fundamentals–Rules and Principles, Separation of Molecular Energy – electronic, Vibrational and Rotational, Molecules in Rotation and Infrared Spectroscopy, Rotational Selection Rules, Experimental Methods and Centrifugal Distortion, Molecular Vibration and Infrared Spectroscopy, Vibrational Selection Rules, An-harmonic Oscillators, Frequency of Overtones, Vibrational-Rotational Fine Structure and Experimental Techniques, Raman Effect, Classical and Quantum Mechanical Description, Selection Rules, Depolarization Ratios, Experimental Methods. Vibration of Polyatomic Molecules, Introduction to Symmetry, Electronic Spectra, Frank-Condon Principle, Selection Rules

PST 32108	Current Topics in Physics			

Introduction, History, Thin Film Solar Cell Technology, Synthesis and Preparation of Semiconductor Films (Physical Vapour Deposition, Chemical Vapour Deposition, Molecular Beam Epitaxy, Sputtering, Chemical Deposition, Electrochemical Deposition, Spray Pyrolysis Deposition & Sol–gel method), Fundamentals of Photovoltaic Conversion, p–n Junction, Drift Current & Diffusion Current, Fill Factor, IPCE, Equivalent Circuit of a Solar Cell, Interfaces (Homo–Junction, Schottky–Junction & Hetero–Junction),
Composite Semiconductor Nano–cluster and Quantum Well, Dye–sensitized Solar Cells (History, Theoretical Aspect, Dye–sensitized Solid-state & Electrochemical Photovoltaic Solar Cells, Hot Carrier Generation), Roughness Factor, Porosity, Finding the Band Gap and Band Edge Position, Transient Photocurrent, Fluorescence Spectrum, Fourier Transform Infrared (FTIR) Spectroscopy & Dark I–V Measurements

PST 32209	Human Resource Management			

Human resource management and its environment, The importance of effective HRM, Human resource management goals, Attracting effective workforce; HRM planning, job analysis, forecasting, recruitment, selection, orientation, Training and Development of workforce; Training, development, performance appraisal, Maintain effective workforce; wage and salary, benefits, compensation, employee relations, termination, HRM strategies; Managing change, managing conflict, management control, Leadership, management styles, motivation and empowerment, Communication, teamwork building and Public relations strategies, Role of HRM in food industry

PST 32210	Statistics in Quality Control			
Introduction to Modern Quality Management and Improvement, Statistical Process Control, Control Charts: Control charts for Attributes (p-chart, c-chart, and u-chart), Control chart for variables (X-bar & R chart and X-bar & S chart), OC curve, and Process Capability Analysis. Acceptance Sampling Procedures: Single sampling plan for attributes, Double Sampling Plan for attributes, and Sequential Sampling by Variables. Quality Standards: ISO 9000 (QMS), ISO 14000 (EMS), 5S & KIZEN, TQM, Six Sigma and Lean				

PST 32111	Physics Laboratory 3 – II			
Independent practical will be conducted on one or more on the given topics				

PST 32212	Graph Theory			
Graphs and Digraphs (Graphs Isomorphism, Subgraphs, Degrees, Indegrees, and Outdegrees, Adjacency and incidence Matrices), Connectivity (Paths, Circuits and Cycles, Connected Graphs and Digraphs, trees and spanning trees, Eulerian and Hamiltonian Graphs), Optimization Involving Trees (Minimum weight spanning trees, Minimum weight branching, Matroids and the Greedy Algorithm, Shortest Path Problems, Flows and connectivity, Matching and Factors), Graph Embedding (Planer graph and duality, Hamiltonian plane graph), Colouring of Graphs (Vertex colouring, Edge Colouring, Colouring of Planer graphs)				

PST 32213	Cleaner Production & Green Productivity			
Metrics for resource consumption, Principles of Cleaner Production (CP), Management system elements according to ISO 14001, Management system documentation, Introduction to CP Auditing, CP Team and Motivation, Resource efficiency indicators, Benchmarking, Eco design, Chemical management, Introduction to ergonomics, Introduction to Green Productivity, Tools and techniques in Green Productivity Field excursion to industrial sites to gain hands-on experience on tools of environmental management and their applicability				

CHEMICAL TECHNOLOGY

PST 32214	Chemistry of Drug Design and Drug Action			
Comparison of western medicine and other traditional medicine, General Pharmacochemistry: Drug action and dose-response relationship, Principles of drug design, Chemistry of drugs: CNS drugs, Anti-inflammatory drugs (NSAID, SAID) Analgesics, Antibiotics etc.				

PST 32215	Polymer Technology			
Introduction: Basic concepts, Properties and characterization of polymers , Types of polymers, Types of polymerization, Properties of polymers and specific uses, Synthetic polymers (Polystyrene and Styrene co-polymers, Dyes and related polymers, Acrylic polymers, Poly ethers, Poly amides, Poly esters), Natural polymers (Rubber, Cellulose etc.), Processing of polymers, Polymer based industries				

PST 32216	Surface and Colloid Chemistry			
Introduction to surface phenomenon, Adsorption & absorption, Surface tension, Kelvin equations, and its application, Physisorption & Chemisorptions, Sticking probability, Condensation coefficient absorption Theories determination of surface area and molecular cross section (Langmuir methods, Gibbs adsorption isotherms) Colloidal systems, Electrophoresis & isoeletric points, Electrical double layer theory, Surfactants and their application				

PST 32117	Food Technology			
Analysis of quality of oil/fat based products. Mechanism of food preservatives (synthetic & natural), Food additives and their actions (flavoring agents), Analysis of micro & macro nutrients in foods, Analysis of food toxins, Enzymatic & non-enzymatic browning and prevention measures				

PST 32118	Advanced Organic Chemistry			
Reaction dynamics (structure & bonding, donor-acceptor interactions, and conformational analysis), isotope effects and molecular orbital theory applied to pericyclic and photochemical reactions, cyclic and acyclic stereocontrol				

PST 32119	Current Topics in Chemistry			
Thermal analysis, Preparative methods: Co-precipitation, Sol-gel, Microwave, Hydrothermal, Crystal defects and diffusion, Band theory of solids, Bands in metals, The Fermi-Dirac distribution, Semi-conductors, Advanced ceramics, Inorganic polymers, Conducting polymers and their applications, Solid state batteries, Nanostructures, Semiconductor catalysts, Photochemical solar cells, Photovoltaic				

PST 31220	Structures and Properties of Solids			
Crystal Lattice, Translational Vectors, Types of Lattice, Miller Index, Lattice Directions and Planes, X-ray Diffraction, Single Crystal and Powder Diffraction, Bragg's Law, Packing Density Reciprocal Lattice, Crystal Systems, Structures of Solids				

PST 32121	Advanced Chemistry Laboratory			
X-ray diffraction, UV-visible spectra of transitions metal complexes, Inorganic preparations, Colorimetry, Applications of physical methods to study inorganic reactions, Quantitative analytical methods Experiments in advanced analytical chemistry: Error analysis as applied to instrumental techniques, Analytical atomic spectrometric methods, Analytical molecular spectroscopic methods, Gas liquid chromatographic in analysis. Advanced electrochemical methods: Cyclic voltammetry and amperometry (Depends on availability of instruments)				

PST 32209	Human Resource Management			
Human resource management and its environment, The importance of effective HRM, Human resource management goals, Attracting effective workforce; HRM planning, job analysis, forecasting, recruitment, selection, orientation, Training and Development of workforce; Training, development, performance appraisal, Maintain effective workforce; wage and salary, benefits, compensation, employee relations, termination, HRM strategies; Managing change, managing conflict, management control, Leadership, management styles, motivation and empowerment, Communication, teamwork building and Public relations strategies, Role of HRM in food industry				

PST 32210	Statistics in Quality Control			
Introduction to Modern Quality Management and Improvement, Statistical Process Control, Control Charts: Control charts for Attributes (p-chart, c-chart, and u-chart), Control chart for variables (X-bar & R chart and X-bar & S chart), OC curve, and Process Capability Analysis. Acceptance Sampling Procedures: Single sampling plan for attributes, Double Sampling Plan for attributes, and Sequential Sampling by Variables. Quality Standards: ISO 9000 (QMS), ISO 14000 (EMS), 5S & KIZEN, TQM, Six Sigma and Lean				

PST 32222	Organometallic Chemistry			
Organo transition metal chemistry; Eighteen electron rule, Classification of Ligands, Metal Ligand Binding (Carbon Monoxide, Dinitrogen , Olefins Acetylenes, Nitric Oxide, Isocyanides Carbines, Carbines) Reactivity, Patterns, (Oxidative Additive Insertion Reaction, Migrations, Reductive Eliminations Association, Dissociation , Substitution reactions)				

PST 32213	Cleaner Production & Green Productivity			
Metrics for resource consumption, Principles of Cleaner Production (CP), Management system elements according to ISO 14001, Management system documentation, Introduction to CP Auditing, CP Team and Motivation, Resource efficiency indicators, Benchmarking, Eco design, Chemical management, Introduction to ergonomics, Introduction to Green Productivity, Tools and techniques in Green Productivity Field excursion to industrial sites to gain hands-on experience on tools of environmental management and their applicability				

COMPUTER SCIENCE AND TECHNOLOGY

PST 32223	Artificial Neural Networks			
Elementary neurophysiological principles, Artificial neuron models, Single layer networks (perceptions), Multi-layer feed forward networks (+back propagation), Cascade correlation (correlation training), Recurrent networks (Hopfield), Bi-directional associative memory, Counter propagation networks, Adaptive resonance theory, Spatiotemporal sequences, Individual projects				

PST 32224	Digital Image Processing			
Introduction to image processing, Elements of a digital image processing system; image acquisition, storage, processing, transmission and display, Image processing fundamentals; human vision system, sampling and quantization (spatial and brightness resolution), pixels and their relationships, Digital image processing techniques; image enhancement and restoration, pixel point processing, pixel group processing, frequency domain processing(Fourier transform), image analysis, coding systems; error detection and correction, data compression schemes				

PST 32225	Data mining Practical Machine Learning			
Introduction: Data Mining, Machine learning, Patterns, Example data sets, applications, Input, Output, Basic Learning Algorithms: Inference Rudimentary rules (1R), Statistical Modeling, Divide and Conquer, Covering algorithms, Association rule mining, Instance-Based Learning, Clustering, Evaluating Learning Algorithms: Cross-Validation, Comparing data Mining schemes, predicting probabilities, counting cost, ROC Curves, Evaluating Numeric Prediction, Data mining tools, Individual Project				

PST 32226	Human Computer Interaction			
Foundation of HCI, Usability principles, building a simple GUI, Human abilities, human-centered software development, cultural aspects, human-centered software evaluation, GUI design, GUI programming, HCI aspects of multimedia systems, HCI aspects of collaboration and communication, validation of usability and user experience, Handling errors & help				

PST 32227	Data Communication and Computer Networks			
Introduction to Data Communication, The Physical Layer, Framing, Error Detection and Correction, Channel Allocation, Routing and Congestion Control Algorithms, Internet Working, Transport Protocols, Network Security and Administration, Applications (SMTP, HTTP, NNTP)				

PST 32228	Computer Graphics & Applications			

Basics of Computer Graphics: Introduction, Graphics Pipeline and Coordinate Systems, Transformations in 2D, Three Dimensional Graphics, 3D Viewing, Scan Converting Lines, Circles and Ellipses, Lines And Polygons, Solid Modelling, Visible Surface Detection, Illumination and Shading, Curve Representation, Anti-Aliasing ,Colour, Soft Objects, Rendering: Lighting Models, Fast-Phong Algorithm, A-buffer, V-buffer, Ray-tracing Algorithms, Geometric Transformations Animation: Key-frame Systems, Animation Languages, Kinetic vs. Dynamic Systems, Modelling Human and Animal Motion

PST 32229	Mobile Computing			

Overview: Mobile Technologies, Anatomy of a Mobile Device, Survey of Mobile Devices, Applications of Mobile Computing, Application Design: Context, Information Architecture, Design Elements, Mobile Web Vs Native Applications, Development Environments: Introduction to Objective-C, The Model-View-Controller Model, The Delegate Pattern, The iPhone, Android, & Blackberry SDKs, The Application Environment: Limited Resource Computing, Memory Management, Low Power Computing, Fault Tolerance and Persistence, Security Issues, The Future of Mobile Computing: Upcoming Technologies, Convergence of Media and Communication Devices

PST 32230	Semantic Web			

Introduction to Knowledge Representation and the Semantic Web, Description logics and classifiers, Methods for developing and evaluating ontologies: Theoretical aspects: definition, scope, types of ontologies, ontology repositories., Common problems in ontology development , Architectures and languages used in creating semantic web services [RDF(S) and OWL]

PST 32231	Bioinformatics			

Introduction to bioinformatics, Bioinformatics algorithms Basic concepts in Molecular Biology, Nucleic acids and Proteins, Bioinformatics Databases, Sequence alignment, Similarity searching, DNA sequence analysis and protein Sequence analysis, protein structure prediction, Genome bioinformatics, Applications of bioinformatics
Computational approaches to biological science concepts of bioinformatics the computational skills for problems solving in biology, Establish, and maintain research information in biology, Solutions to bioinformatics, software packages, usages, and development

PST 32132	Current Topics in Computer Technology			

Current trends and demands in the field of Computer Science and technology. Topics like policies and laws in software industry, Software quality assurance, Design Patterns.

PST 32133	Computer Laboratory 3-II			

Implement Graphics and Digital image processing techniques using MATLAB, Data mining tool.

PST 32205	Solid State Devices			

Physical Electronics and Devices, Electronic Properties of Materials, Solid State Electronic Devices, Optoelectronics Microelectronic Technology

PST 32209	Human Resource Management			
Human resource management and its environment, The importance of effective HRM, Human resource management goals, Attracting effective workforce; HRM planning, job analysis, forecasting, recruitment, selection, orientation, Training and Development of workforce; Training, development, performance appraisal, Maintain effective workforce; wage and salary, benefits, compensation, employee relations, termination, HRM strategies; Managing change, managing conflict, management control, Leadership, management styles, motivation and empowerment, Communication, teamwork building and Public relations strategies, Role of HRM in food industry				

PST 32210	Statistics in Quality Control			
Introduction to Modern Quality Management and Improvement, Statistical Process Control, Control Charts: Control charts for Attributes (p-chart, c-chart, and u-chart), Control chart for variables (X-bar & R chart and X-bar & S chart), OC curve, and Process Capability Analysis. Acceptance Sampling Procedures: Single sampling plan for attributes, Double Sampling Plan for attributes, and Sequential Sampling by Variables. Quality Standards: ISO 9000 (QMS), ISO 14000 (EMS), 5S & KIZEN, TQM, Six Sigma and Lean				

PST 32212	Graph Theory			
Graphs and Digraphs (Graphs Isomorphism, Subgraphs, Degrees, Indegrees, and Outdegrees, Adjacency and incidence Matrices), Connectivity (Paths, Circuits and Cycles, Connected Graphs and Digraphs, trees and spanning trees, Eulerian and Hamiltonian Graphs), Optimization Involving Trees (Minimum weight spanning trees, Minimum weight branching, Matroids and the Greedy Algorithm, Shortest Path Problems, Flows and connectivity, Matching and Factors), Graph Embedding (Planer graph and duality, Hamiltonian plane graph), Colouring of Graphs (Vertex colouring, Edge Colouring, Colouring of Planer graphs)				

PST 32213	Cleaner Production & Green Productivity			
Metrics for resource consumption, Principles of Cleaner Production (CP), Management system elements according to ISO 14001, Management system documentation, Introduction to CP Auditing, CP Team and Motivation, Resource efficiency indicators, Benchmarking, Eco design, Chemical management, Introduction to ergonomics, Introduction to Green Productivity, Tools and techniques in Green Productivity Field excursion to industrial sites to gain hands-on experience on tools of environmental management and their applicability				

Year IV Semester I

APPLIED PHYSICS

PST 41001	Research Methodology and Scientific Communication			
Choosing a research problem, literature search, Objective formulation and Research proposal preparation, References, Data analysis and Interpretation, Writing and Presentation of research results, Research management, Personality and career development: Social and interpersonal skills				

PST 41202	Computational Physics			
Introduction to Mathematica, Execute commands in Syntax method, Palette's and Plain English format ***Mathematics & Algorithms:*** Develop mathematical functions, Vector analysis, Probability and statics, Differentiate, Integration, Solve linear equations, first order, second order and third order differential equations, Interpolation and extrapolation, linear and non-linear situations and modeling of practical scenarios ***Visualization & Graphics:*** Visualization of 2D, 3D functions, Develop histogram, Bar charts, pie charts for financial data, Styling the functions, Import and export of image, word, excel document to interface and vice versa, Manipulation of Physical scenarios, mathematical modeling, Object animation, Develop sound and wave's for practical situations				

PST 41203	Robotics			

Analog and Digital Circuits for Control Applications, Electronic Devices used in Robotics, Microprocessor/ Microcontroller & Interfacing, DC and Stepper Motors, Design of Mechatronics Systems, Sensors and Signal Processing, Power Electronics, Two wheel Driven Autonomous Robot Applications

PST 41204	Remote Sensing & GIS			

Remote Sensing Basic Principles of Remote Sensing ;(Introduction to Remote Sensing Key Words: Platforms, Satellite Orbits, Sensor, Electromagnetic Spectrum, Introduction to a Digital Image and Active and Passive Satellites Systems), Earth Observation Satellites and Sensors; (Introduction to Different Satellite Systems, Sensor Characteristics and Image Resolution), Distortions and Corrections; (Radiometric / Geometric Distortions and Corrections, Image Enhancement Techniques, Basic Digital Image Processing; (Image Interpretation, Classification and Image Fusion), Microwave Remote Sensing; (Basic Theory and Applications), Applications of Remote Sensing

Geographic information systems (GIS) Introduction to GIS, Cartographic Data Structures such as Vector Raster and Attribute Data, Digitizing, Editing and Geo-referencing, Development and Use of a GIS, Basic Concepts of Spatial Modeling and Analysis, Data Visualization and Presentation for GIS

PST 41205	Geophysics			

Introduction to Geophysics; Principles and Processes; Methods of Investigation, Materials of the Earth, Seismic Methods, Gravity and Magnetic Methods, Electrical and Electromagnetic Methods, Borehole Geophysics, Introduction to Global Geophysics, Principles of Geophysics Exploration

PST 41206	Medical and Bio Physics			

Physics of the Body (Body Structure) Analyzing Forces in the Body, Forces on (Hip Joint & Backbone), Body Movements (Standing, Walking), Eye (Optical System), Defects in the Eye's Optical System, Ear (Threshold of hearing, loudness, Hearing Defects), Body Electric (Nerve Cells, Heart, Measuring Electrical Signals of the Heart, ECG.)

Introduction to Medical Physics, Production of Radioactive Materials in Medicine and their Properties and Applications, Various Attenuation Coefficients, Interaction Processes and their Practical Consequences, X – ray Tube and Generators, X – ray Production and Properties , Imaging with X ray an Film Processing, X ray Imaging Modalities (General Radiography, Mammography Fluoroscopy and Computed Tomography), Image Quality Influence Factors, Introduction to Nuclear Imaging (Gamma Camera), Basics of Radiotherapy (Teletherapy Machines, Simple Treatment Planning, Dosimetry Principles and Detectors), Basics of Radiobiology and Radiation Protection

Light in Medicine (Visible Light, IR, UV and Laser), Interaction of Light with BiologicalSystems,Trans-illumination and Endoscopy, Principles of Laser Production, Types of Commercially Available Laser and their Features, Biological Effects Caused by Lasers, Laser Instrumentation, Clinical Application of Lasers and Laser Hazards, Properties of Ultrasound (US), Generation and Reception of US, Imaging with US and Scanning Methods, Types of US Scanners and their Features, Artifacts of US Imaging, Typical Applications of US in Diagnostic Radiology and Biological Effects, Nuclear Magnetic Resonance Imaging(MRI), Principles of Nuclear Magnetic Resonance, MRI Instrumentation, MRI Safety, Medical Applications of MRI

PST 41207	Advanced Nanotechnology			

Introduction to Nanoscale Physics, Quantum Nature of Nanoworld, Revisit the Fundamental Concepts of Quantum Mechanics, Atomic Orbital, Electromagnetic Waves and their Production, the Quantization of Energy, Atomic Spectra and Discreteness, the Photoelectric Effect, Wave-particle Duality of Matter, the Double Slit Experiment, the Uncertainty Principle, Particle in a Well and Esaki Quantum Tunnelling Diodes. Nanomaterials and/ or Nanopowders, Bonding Atoms to make Solids and Molecules (Ionic, Metallic and Covalent Bonding in Materials), Forces at Nanoscale, van der Walls Force versus Gravity, Crystal Structures (14 Bravis lattices), Structure Small enough to be different and useful, (Particles, Colloidal Particles, Wires, Films, Layer and Coating, Porous Materials etc), Widely used Method for Nanoparticle Preparation, Nucleation, Growth and Termination of Growth of Nanoparticles, Types of Interactions between Nanomaterials, Stabilization of Nanomaterials in Sols, Quantum Dots of Many Colours and Metal Nanoparticles, the Carbon Age, Carbon Nanotubes and Fullerenes- synthesis, Properties, Characterization, and Applications, Graphene as a Mother of all Carbon Allotropes synthesis, Properties, Characterization and Applications, Introduction to Nanostructure Electronic and Chemical Characterization using Surface Science Techniques: Basic Physical Concepts and Operation (these topics are first time in the university system in SL) of X-ray Photoelectron Spectroscopy, Ultraviolet Photoelectron Spectroscopy, Auger Electron Spectroscopy and Brief Introduction to Synchrotron Radiation and Techniques based on it, Physics based Experimental Approaches to Nanofabrication and Nanotechnology, Bottom-up and Top-down Approaches of Nanofabrication, Molecular Self-assembly, Lithography, Applications of Nanotechnology in: Energy, Agriculture, Water Treatment, Disease Diagnosis, Drug Delivery, Food Processing and Storage, Air pollution Monitoring, Construction Industry, Health Monitoring, Vector and Pest Control

PST 41208	Data Acquisition and Signal Processing Methods			

Elements of a Computer Controlled Data Acquisition System, Various Types of Sensors and Detectors, Signal Processing; Noise, Pile-up Effects, Signal to Noise Ratio, Improving Signal to Noise Ratio; CR-RC Pulse Shaping, Linear Wave Shaping, Passive Filters, Active Filters, Delay Lines, Non-linear Wave Shaping, Signal Processing Electronics; Discriminators, Comparators, Schmitt Trigger, Timing Circuits, Leading Edge Trigger, Zero Crossing Trigger, Constant Fraction Trigger, Signal Conversion Methods; Converters and Analyzers, Encoders, Decoders and Multiplexers, Coincidence Units, Coincidence Techniques used in Nuclear Physics Experiments, Basic Computer System Organization; Memory Devices; Semiconductor ROMs and RAMs, ROM Applications, Static and Dynamic RAMs and their Operations, Microprocessor Architecture; Machine Language Representation, Assembly Language Programming, Microprocessor Applications in the Laboratory, Computer Controlled Electronics; CAMAC Standard, FASTBUS, GPIB Interfaces, examples of Data Acquisition Systems

PST 41209	Advanced Laser Physics			

Normal Laser Oscillation, Theory of Q-switching, Types of Q-switch, Effects Leading to Multi-mode Oscillation, Homogeneous & Inhomogeneous Broadening, Spectral & Spatial Hole Burning, Doppler Broadening, Lamb Dip, Mode Pulling. Mode Selection, Isolation of a Single Laser Transition, Selection of Longitudinal Modes, Selection of Transverse Modes, Effects of Mode Selection on the Laser Output, Mode Locking, Longitudinal Mode Locking, Other Types of Mode Locking, Active &PassiveMode Locking Techniques, Isolation of a Single Mode Locked Pulse, Amplification and Detection of Mode Locked Pulses. Rate Equation Model for 3-level and 4-level Lasers, Introduction to Laser Media-Solid, Liquid and Gaseous Media, Resonator Design, Reflector Types and Laser Rod Design, Three- and Four-level Laser Systems, Parameters Affecting Laser Threshold, Advantages of Four-level Systems, Optical Pumping and Power Threshold, Energy Threshold for a Pulsed Laser,

Energy Threshold for a Pulsed Laser, Power Threshold for CW Lasers, Energy output for Pulsed Lasers and Power Output for CW Lasers, Optimum Output Coupling Factor. Gas Lasers – Methods of Excitation, Electron Collision Kinetics, Impurity Gas Kinetics, Different Types of Gas Lasers, Semi-conductor Lasers & Dye Lasers, Non Linear Optics

PST 41210	Automation			

Intelligent Controllers, Programmable Logic Control, Automation Elements, Hardware Components for Automation and Process Control, Logical Design for Automation, Electro Pneumatic Automation. Industrial Networks (RS232, RS485/422, SPI, I2C, CAN, MODBUS, PROFIBUS), Basic Programming in PLC and the PID at the Industry SCADA Systems and Software

PST 41211	Advanced Astrophysics			

Definition of the Intensity, Radiative Energy Transport through a Gas Volume with Absorption and Emission, Source Function, Absorption versus Emission Lines, Radiative Transfer Equation, Surface Intensities, Fluxes, Surface Flux and the Effective Temperature, Flux and the Anisotropy of the Radiation Field, Radiation Density, Empirical Determination of the Depth Dependence of the Source Function for the Sun, Wavelength Dependence of the Absorption Coefficient in the Sun Radiative Equilibrium, Theoretical Temperature Stratification in a Grey Atmosphere in Radiative Equilibrium, Different Absorption Processes for Hydrogen, Boltzmann Formula, Saha Equation, H^- absorption coefficient in the Sun, Helium Absorption in the Sun, Metallic Absorption in the Sun, Scattering by Atoms and Ions, Thomson Scattering by Free Electrons, Absorption Coefficients for A and B Stars, Continuum Energy Distribution, Dependence of the Balmer Discontinuity on Temperature and Electron Density, Influence of the Balmer Jump on the UBV Colors, Influence of the Non-greyness on the Temperature Stratification, Hydrostatic Equilibrium Equation, Integration of the Hydrostatic Equilibrium Equation, Dependence of the Gas Pressure on the Gravitational Acceleration, Electron Pressure, Effects of Turbulent Pressure, Effects of Radiation Pressure, Formation of Optically Thin Lines, Line Absorption Coefficient, Doppler Profile, Voigt Profile, Line Broadening due to Turbulent Motions, Other Distortions of the Line Profiles, Equivalent Widths for Optically Thin Lines, Optically Thick Lines, Curve of Growth, Hydrogen Lines, Balmer Jump and the Hydrogen Lines, Stromgren Colors, Curve of Growth Analysis, Observed Element Abundances

PST 41212	Electrochemical Power Conversion			

Thermodynamics of Electrochemical Reactions, Kinetics of Electrochemical Reactions, Electrochemical Techniques (Electrochemical Impedance Spectroscopy (EIS) and its Applications, Cyclic voltammetry and Linear Polarization, Galvanostatic Intermittent Titration); Principles of Batteries, Advanced Rechargeable Battery, Li-ion Battery, Nanostructured Materials for Li-ion Battery, Principle of Super Capacitors, Advanced Super Capacitor Technology, Difference between Batteries and Super Capacitors, Principle of Fuel Cells, Types of Fuel Cells, New Material for Proton Exchange Membrane Fuel Cells, Alkaline Fuel Cells and Solid Oxide Fuel Cells, Applications of Fuel Cells, Fuel Cells, Battery and Super Capacitor Hybrid Power Systems

PST 41113	Literature Search Seminar in Applied Physics			

A topic would be provided where the student is required to conduct a literature survey and present the obtained data at a seminar series

PST 41214	Independent Research / Project in Applied Physics			

Independent research will be conducted on one or more of the given topics under internal supervision

PST 41215	Industrial Management			
Business Organization & the economical effective planning, Production Management, Production process planning & control, Industrial Engineering: plant management Inventory & warehouse management, marketing managements				

PST 41116	Critical Thinking			
Critical Thinking Scientific Approaches, Decision Making, Creative Process, Leaning Process, Breaking Problems down, Problem Analysis, Role Play, Logic.				

CHEMICAL TECHNOLOGY

PST 41001	Research Methodology and Scientific Communication			
Choosing a research problem, literature search, Objective formulation and Research proposal preparation, References, Data analysis and Interpretation, Writing and Presentation of research results, Research management, Personality and career development: Social and interpersonal skills				

PST 41217	Natural Products Chemistry			
Importance and utilization of natural products, Biosynthesis of natural products, Terpenes, Steroids, Alkaloids, Flavonoids etc., Industrial use, ,Chemical reactions, Bioactivity of natural products, Structure elucidation of natural products				

PST 41218	Biotechnology			
DNA and RNA, Replication of DNA, Protein synthesis, Gene technology: PCR technology, ELISA, Enzyme immobilization				

PST 41219	Advanced Solid State Chemistry			
Soild State, Solid Solutions, Solid State Reactions, Solid State Synthesis, Characterization of Solid State Products, Thermal Analysis, Preparative Methods: Co-precipitation, Sol-gel, Microwave, Hydrothermal, Band Theory of Solids, Bands in Metals, The Fermi-Dirac Distribution, Semi-Conductors.				

PST 41120	Bioinorganic Chemistry			
Introduction, Composition and structure of metals in biological systems, Roles of metals in biological systems, Metals in human health, Specification and speciation of metal complexes, Hard and soft acid and base theory, Classification of metals in biological systems, Transition metals in biological redox reactions. Oxygen transport and nitrogen fixation. Inorganic model systems. Inorganic model systems to mimic active sites in enzymes. Vitamin B_{12}.Transport and storage of iron. Biological role of metals: zinc and copper				

PST 41221	Instrumental Analysis			
Atomic spectroscopic methods: Atomic Absorption Spectroscopy (AAS), Inductively coupled plasma spectroscopy (ICP). Direct current plasma spectroscopy (DCP); X-ray fluorescence spectroscopy (XRF) Microscopic methods: Scanning electron microscopy (SEM); Scanning tunneling microscopy (STM); Transmission electron microscopy (TEM) Surface analytical methods: Ultraviolet photoelectron spectroscopy, X-ray photoelectron spectroscopy, Rutherford back scattering (RBS) Chromatographic methods: Gas chromatography (GC); High performance liquid chromatography (HPLC), Ion chromatography (IC), Supercritical fluid chromatography (SFC); Affinity chromatography; Size exclusion chromatography; Capillary electrophoresis, Hyphenated techniques: GC-MS, LC-MS, EPMA, FTIR-GC , Recent advances and applications of the above techniques				

PST 41222	Applied Molecular Modeling			
Chemical structure and property calculations and drawing, molecular mechanics methods (Force fields, Inter intra molecular forces), Stable conformers calculations & energy minimization algorithms , Molecular dynamics (Classical treatment of system of particles, Montecalo methods, Prediction of thermodynamic Properties, QSAR prediction method), Ab-inito methods (HF theory, Molecular orbitlals and HOMO LUMO), Vibrational and rotational spectroscopic calculations, Efficient use of public domain software				

PST 41223	State of Matter			
Gas Laws, Intermolecular forces and potential energy functions, Theories and models of liquids, Properties of liquids, Ionic liquids, Liquid crystals: Types, Properties and applications, Bonding in solids: Ionic forces, Gadwalls forces, Covalent bonding, H-bonding and metallic bonding, Cohesive energy of ionic crystal, Calculation of crystal energies, Heat capacity of crystals, Theories of solids, Einstein model, Debye model, Free electron theory of metals, Properties of solids: Conductance, thermal, mechanical, optical magnetic properties, Crystal engineering				

PST 41124	Literature Search Seminar in Chemical Technology			
A topic would be provided where the student is required to conduct a literature survey and present the obtained data at a seminar series				

PST 41225	Independent Research / Project in Chemical Technology			
Independent research will be conducted on one or more of the given topics under internal supervision				

PST 41226	Computer Applications in Instrumentation			
Logic gates, Computer memory organization, Digital conversation, Data acquisition and instrument interfacing, graphical programming exercises, Plotting of radical functions, Atomic and molecular orbital, Hybridization				

PST 41207	Advanced Nanotechnology			
Introduction to Nanoscale Physics, Quantum Nature of Nanoworld, Revisit the Fundamental Concepts of Quantum Mechanics, Atomic Orbital, Electromagnetic Waves and their Production, the Quantization of Energy, Atomic Spectra and Discreteness, the Photoelectric Effect, Wave-particle Duality of Matter, the Double Slit Experiment, the Uncertainty Principle, Particle in a Well and Esaki Quantum Tunnelling Diodes. Nanomaterials and/ or Nanopowders, Bonding Atoms to make Solids and Molecules (Ionic, Metallic and Covalent Bonding in Materials), Forces at Nanoscale, van der Walls Force versus Gravity, Crystal Structures (14 Bravis lattices), Structure Small enough to be different and useful, (Particles, Colloidal Particles, Wires, Films, Layer and Coating, Porous Materials etc), Widely used Method for Nanoparticle Preparation, Nucleation, Growth and Termination of Growth of Nanoparticles, Types of Interactions between Nanomaterials, Stabilization of Nanomaterials in Sols, Quantum Dots of Many Colours and Metal Nanoparticles, the Carbon Age, Carbon Nanotubes and Fullerenes- synthesis, Properties, Characterization, and Applications, Graphene as a Mother of all Carbon Allotropes synthesis, Properties, Characterization and Applications, Introduction to Nanostructure Electronic and Chemical Characterization using Surface Science Techniques: Basic Physical Concepts and Operation (these topics are first time in the university system in SL) of X-ray Photoelectron Spectroscopy, Ultraviolet Photoelectron Spectroscopy, Auger Electron Spectroscopy and Brief Introduction to Synchrotron Radiation and Techniques based on it, Physics based Experimental Approaches to Nanofabrication and Nanotechnology, Bottom-up and Top-down Approaches of Nanofabrication, Molecular Self-assembly, Lithography, Applications of Nanotechnology in: Energy, Agriculture, Water Treatment, Disease Diagnosis, Drug Delivery, Food Processing and Storage, Air pollution Monitoring, Construction Industry, Health Monitoring, Vector and Pest Control				

PST 41212	Electrochemical Power Conversion			
Thermodynamics of Electrochemical Reactions, Kinetics of Electrochemical Reactions, Electrochemical Techniques (Electrochemical Impedance Spectroscopy (EIS) and its Applications, Cyclic voltammetry and Linear Polarization, Galvanostatic Intermittent Titration); Principles of Batteries, Advanced Rechargeable Battery, Li-ion Battery, Nanostructured Materials for Li-ion Battery, Principle of Super Capacitors, Advanced Super Capacitor Technology, Difference between Batteries and Super Capacitors, Principle of Fuel Cells, Types of Fuel Cells, New Material for Proton Exchange Membrane Fuel Cells, Alkaline Fuel Cells and Solid Oxide Fuel Cells, Applications of Fuel Cells, Fuel Cells, Battery and Super Capacitor Hybrid Power Systems			

PST 41215	Industrial Management			
Business Organization & the economical effective planning, Production Management, Production process planning & control, Industrial Engineering: plant management Inventory & warehouse management, marketing managements				

PST 41116	Critical Thinking			
Critical Thinking Scientific Approaches, Decision Making, Creative Process, Leaning Process, Breaking Problems down, Problem Analysis, Role Play, Logic.				

COMPUTER SCIENCE AND TECHNOLOGY				
PST 41201	Research Methodology and Scientific Communication			
Choosing a research problem, literature search, Objective formulation and Research proposal preparation, References, Data analysis and Interpretation, Writing and Presentation of research results, Research management, Personality and career development: Social and interpersonal skills				

PST 41227	High Performance Computing			
Fundamental concepts in High Performance Computing, Shared memory programming (Open MP), Message passing programming (MPI),Parallel decomposition, Hardware, compilers and performance programming, Performance measurement and estimation High performance networking				

PST 41228	Computer System Security			
Introduction to security, Feature of security systems, Threatsandattackson security,Introductiontocryptography,DigitalSignatures,ProgramLevelSecurity,Clientserversecurity,Introductionto Firewalls,SecureProtocols,Kerberos,VPN,L2TP,PPTP IP Sec,SSL,HTTPS,Securenetworkdesignpolicies,segmentations,isolation,IDS/IPSandfirewalls				

PST 41229	Advanced Computer Networks			
Layered communication architecture: layers, services, protocols, layerentities, service access points, protocol functions, IPv6, Advanced Routing algorithms, Advanced Network Congestion Control algorithms, Quality of service, Real Time Transport Protocol, Internetworking,Performance Issues, Overview on VPN networks, Overview on Wireless Networks and Mobile Networks: LAN, PAN, Sensor Networks, Ad-hocNetworks, Mobile IP, Mobile TCP, IP Security, Network Programming				

PST 41230	Distributed Systems			
Overview of Distributed System Architecture: motivation, system structures, Legacy Applications, architectures, ODP Reference model and distribution transparencies, design issues. Distributed System Models, Networks and Internetworks, Interaction primitives: message passing, Interface definition language, Socket Programming, RPC, Remote Method Invocation (RMI) Interaction and Implementation: message passing, concurrency and threads, heterogeneity of systems and languages. Time Synchronization, Distributed systems management: SNMP management model & MIBs, management and security policy. Ubiquitous computing: grand challenges, engineering issues, policy-based management and self-managed cells Publish-Subscribe systems: subscription classification, composite events, case studies on this, event routing Peer-to-peer Networking: structure and case studies, JXTA. Senior Networks: history and deployment, case studies, future directions				

PST 41231	Computer Vision			
Review of Computer Graphics and Image processing, Image Formation and Filtering: Basic filters, Frequency domain, Multi resolutions, Feature Detection and Matching: Interest point, corners, invariant features, feature vectors and dimensionality Multiple views and Motions: Stereo vision, motion structures, optical flow, motion vectors Multi-object tracking: Feature clustering, regions, motion groups, Object Recognition: Bag of features, multimodal systems				

PST 41232	Embedded Systems			
Modeling Dynamic Behaviors, Composition of State Machines, Concurrent Models of Computation, Memory Architectures, Input and Output, Multitasking, Scheduling, Analysis and Verification, Equivalence and Refinement, Reachability Analysis and Model Checking, Quantitative Analysis				

PST 41233	Business Process Management Systems			
Simulation in management decision making, Queuing theory, Concepts of discrete-event simulation, Construction of models: modeling issues, verification and validation of models, development of simulation models using selected software, analysis of results				

PST 41234	Fuzzy Logic			
Classical set and Fuzzy sets, membership degree of set and membership functions, Equality of Fuzzy set, containment of Fuzzy set, Complement of Fuzzy set, Intersection of Fuzzy set and union of Fuzzy set, Fuzzy set characteristics; Normality, Height, Support, Core, α – cut, unimodality, cardinality, Normalization, Linguistics variable and hedges, Fuzzy Inference System				

PST 41135	Literature Search Seminar in Computer Science and Technology			
A topic would be provided where the student is required to conduct a literature survey and present the obtained data at a seminar series				

PST 41236	Independent Research / Project in Computer Science and Technology			
Independent research will be conducted on one or more of the given topics under internal supervision				

PST 41203	Robotics			
Analog and Digital Circuits for control applications, Electronic Devices used in Robotics, Microprocessor/ Microcontroller & Interfacing, DC and stepper Motors, Design of Mechatronics Systems, Sensors and Signal Processing, Power Electronics, Two wheel driven autonomous robot applications				

PST 41208	Data Acquisition and Signal Processing Methods			
Elements of a computer controlled Data Acquisition system, Various types of sensors and detectors, Signal processing; noise, pile-up effects, signal to noise ratio, Improving signal to noise ratio; CR-RC pulse shaping, linear wave shaping, passive filters, active filters, delay lines, non-linear wave shaping, Signal processing electronics; Discriminators, Comparators, Schmitt Trigger, Timing circuits, leading edge trigger, zero crossing trigger, constant fraction trigger. Signal conversion methods; Converters and analyzers, encoders, decoders and Multiplexers, Coincidence units, coincidence techniques used in nuclear physics experiments. Basic computer system organization; Memory devices; semiconductor ROMs and RAMs, ROM applications, Static and Dynamic RAMs and their operations, Microprocessor architecture; machine language representation, assembly language programming, microprocessor applications in the laboratory, Computer controlled electronics; CAMAC standard, FASTBUS, GPIB interfaces, examples of data acquisition systems				

PST 41210	Automation			
Intelligent Controllers, Programmable Logic Control, Automation elements, Hardware components for Automation and Process Control, Logical design for automation, Electro pneumatic automation. Industrial networks (RS232, RS485/422, SPI, I2C, CAN, MODBUS, PROFIBUS), Basic programming in PLC and the PID at the industry SCADA systems and software				

PST 41215	Industrial Management			
Business Organization & the economical effective planning, Production Management, Production process planning & control, Industrial Engineering: plant management Inventory & warehouse management, marketing managements.				

PST 41116	Critical Thinking			
Critical Thinking Scientific Approaches, Decision Making, Creative Process, Leaning Process, Breaking Problems down, Problem Analysis, Role Play, Logic.				

Year IV Semester II				
PST 42801	Project Work: B.Sc. Thesis in Applied Physics			
Industrial/ laboratory studies on a research problem relevant to Physical Sciences, Students will be required to conduct either research or survey related to physics, chemistry or computer science/ Information Technology either at a relevant industry, research institution, or at the faculty. The duration of the project period should be 15 weeks. During the period students may have to attend for any special lectures conducted by the supervisors and or resource personnel on request from the supervisor/ department. Students must submit their project proposals and present them to a panel appointed by the department at the 3rd week of the research/project assignment. The record book, which is provided by the department, should be maintained by the students. Students are required to submit three evaluation/progress reports during their training period. A project report should be submitted at the end of the semester and the thesis should be presented and defended by the respective student before an Evaluation panel appointed by the department. A guideline for the preparation of report will be given separately.				

PST 42802	Project Work: B.Sc. Thesis in Chemical Technology			

Industrial/ laboratory studies on a research problem relevant to Physical Sciences, Students will be required to conduct either research or survey related to physics, chemistry or computer science/ Information Technology either at a relevant industry, research institution, or at the faculty. The duration of the project period should be 15 weeks. During the period students may have to attend for any special lectures conducted by the supervisors and or resource personnel on request from the supervisor/ department. Students must submit their project proposals and present them to a panel appointed by the department at the 3rd week of the research/project assignment. The record book, which is provided by the department, should be maintained by the students. Students are required to submit three evaluation/progress reports during their training period. A project report should be submitted at the end of the semester and the thesis should be presented and defended by the respective student before an Evaluation panel appointed by the department. A guideline for the preparation of report will be given separately.

PST 42803	Project Work: B.Sc. Thesis in Computer Science and Technology			

Industrial/ laboratory studies on a research problem relevant to Physical Sciences, Students will be required to conduct either research or survey related to physics, chemistry or computer science/ Information Technology either at a relevant industry, research institution, or at the faculty. The duration of the project period should be 15 weeks. During the period students may have to attend for any special lectures conducted by the supervisors and or resource personnel on request from the supervisor/ department. Students must submit their project proposals and present them to a panel appointed by the department at the 3rd week of the research/project assignment. The record book, which is provided by the department, should be maintained by the students. Students are required to submit three evaluation/progress reports during their training period. A project report should be submitted at the end of the semester and the thesis should be presented and defended by the respective student before an Evaluation panel appointed by the department. A guideline for the preparation of report will be given separately.

Note :

- Obtaining a pass for the Professional English Program (refer to section 7.7) is a prerequisite for the award of the B. Sc. Special Degree in Applied Physics/ Chemical Technology/ Computer Science & Technology.

5.5. DEPARTMENT OF SPORT SCIENCES & PHYSICAL EDUCATION

Degree Program : BACHELOR OF SCIENCE (SPECIAL) IN PHYSICAL EDUCATION

Summary of the Course

Year I Semester I			
Code	Subject	Credits	Compulsory or Elective
PED 11101	Foundation of Physical Education	1	C
PED 11102	General Fitness	1	C
PED 11103	Movement Concept, Skill Analysis, Performance and Practices in Athletics (Track Events)	1	C
PED 11104	Movement Concept, Skill Analysis, Performance and Practices in Gymnastics	1	C
PED 11105	Movement Concept, Skill Analysis, Performance and Practices in Swimming & Life Saving	1	C
PED 11106	Movement Concept, Skill Analysis, Performance and Practices in Basketball	1	C
PED 11107	Fundamental Motor Skills and Practices of Games	1	C
PED 11308	Systemic Anatomy & Basic Physiology	3	C
PED 11209	Fundamentals of Physics	2	C
PED 11210	Introduction to Information Technology	2	C
CPE 1101	Professional English I	0	C
Total Credits = 14 (Compulsory = 14 and Elective = 0)			

Year I Semester II			
Code	Subject	Credits	Compulsory Elective
PED 12001	General Fitness	0	C
PED 12102	Movement Concept, Skill Analysis, Performance and Practices in Athletics (Field Events -Jumps)	1	C
PED 12103	Movement Concept, Skill Analysis, Performance and Practices in Badminton	1	C
PED 12104	Movement Concept, Skill Analysis, Performance and Practices in Netball	1	C
PED 12105	Movement Concept, Skill Analysis, Performance and Practices in Volleyball	1	C
PED 12206	Basics of Education Psychology	2	C
PED 12207	Mathematics	2	C
PED 12308	Introduction to General Chemistry	3	C
PED 12209	History of Physical Education	2	C
PED 12110	Aerobics and Rhythmic Activities	1	C
PED 12211	Applications of Information Technology	2	C
CPE 1201	Professional English II	0	C
Total Credits = 16 (Compulsory = 16 and Elective = 0)			

Year II Semester I			
Code	Subject	Credits	Compulsory Elective
PED 21001	General Fitness	0	C
PED 21102	Movement Concept, Skill Analysis, Performance and Practices in Athletics (Field Events -Throws)	1	C
PED 21103	Movement Concept, Skill Analysis, Performance and Practices in Elle	1	C
PED 21104	Movement Concept, Skill Analysis, Performance and Practices in Karate	1	C
PED 21105	Movement Concept, Skill Analysis, Performance and Practices in Tennis	1	C
PED 21206	Practicum – Level I	2	C
PED 21207	Basic Statistics and Introduction to Statistical Software	2	C
PED 21208	Sport Biomechanics	2	C
PED 21209	Exercise Physiology	2	C
PED 21210	Education Psychology	2	C
PED 21211	Safety and Injury Prevention	2	C
CPE 2101	Professional English III	0	C
One credit to be selected from the following elective subjects			
PED 21112	German Language – Part 1	1	E
PED 21113	Spanish Language – Part 1	1	E
PED 21114	Chinese Language – Part 1	1	E
Total Credits = 17 (Compulsory = 16 and Elective = 1)			

Year II Semester II			
Code	Subject	Credits	Compulsory Elective
PED 22001	General Fitness	0	C
PED 22102	Movement Concept, Skill Analysis, Performance and Practices in Cricket	1	C
PED 22103	Movement Concept, Skill Analysis, Performance and Practices in Rugby	1	C
PED 22104	Movement Concept, Skill Analysis, Performance and Practices in Judo	1	C
PED 22105	Movement Concept, Skill Analysis, Performance and Practices in Table Tennis	1	C
PED 22106	Comparative Physical Education	1	C
PED 22207	Practicum – Level II	2	C
PED 22208	Physical Education in Pre-school & Primary Schools	2	C
PED 22209	Sport Nutrition	2	C
PED 22110	Dance	1	C
PED 22311	Theory and Methodology of Sports Training	3	C
PED 22212	Statistics for Data Analysis	2	C
CPE 2201	Professional English IV	0	C
One credit to be selected from the following elective subjects			

PED 22113	German Language – Part 2	1	E
PED 22114	Spanish Language – Part 2	1	E
PED 22115	Chinese Language – Part 2	1	E
Total Credits = 18 (Compulsory = 17 and Elective = 1)			

Year III Semester I			
Code	Subject	Credits	Compulsory Elective
PED 31001	General Fitness	0	C
PED 31102	Movement Concept, Skill Analysis, Performance and Practices in Hockey	1	C
PED 31103	Movement Concept, Skill Analysis, Performance and Practices in Baseball	1	C
PED 31104	Movement Concept, Skill Analysis, Performance and Practices in Soccer	1	C
PED 31105	Movement Concept, Skill Analysis, Performance and Practices in Weight Lifting	1	C
PED 31206	Physical Education in Secondary & Tertiary Institutions	2	C
PED 31207	Practicum – Level III	2	C
PED 31208	Advanced Theory and Methodology of Sports Training	2	C
PED 31209	Sport Psychology	2	C
PED 31210	Curriculum Perspective and Issues in Physical Education	2	
PED 31211	Test, Measurement & Evaluation of Physical Activity	2	C
Total Credits = 16 (Compulsory = 16 and Elective = 0)			

Year III Semester II			
Code	Subject	Credits	Compulsory Elective
PED 32001	General Fitness	0	C
PED 32202	Specialization of a Selected Sport – Part 1	2	C
PED 32203	Practicum – Level IV	2	C
PED 32204	Sociology of Physical Education	2	C
PED 32205	Sport and Education Law	2	C
PED 32106	Sport Facility Design	1	C
PED 32207	Management Process in Physical Education	2	C
PED 32208	Research Methodology	2	C
Two credits to be selected from the following elective subjects			
PED 32109	Sport Education Model & Game Sense Approach	1	E
PED 32210	Human Resource Management	2	E
PED 32211	Strength and Conditioning	2	E
PED 32112	Success in Sports	1	E
PED 32113	Guidance and Counseling	1	E
Total Credits = 15 (Compulsory = 13 and Elective = 2)			

Year IV Semester I			
Code	Subject	Credits	Compulsory Elective
PED 41201	Specialization of a Selected Sport – Part 2	2	C
PED 41202	Health & Health Behavior	2	C
PED 41203	Outdoor Recreations and Leadership	2	C
PED 41204	Adaptive Physical Education	2	C
PED 41105	Science of Yoga and Relaxation	1	C
PED 41206	Community Service Project	2	C
PED 41207	Sport Therapy	2	C
PED 41108	Professional Development	1	C
Two credits to be selected from the following elective subjects			
PED 41109	Reflective Practice in Physical Education	1	E
PED 41210	Long Term Athlete Development (LTAD)	2	E
PED 41111	Olympism	1	E
PED 41112	International Politics & Sports	1	E
PED 41113	Traditional Sports in Sri Lanka	1	E
PED 41114	Drugs and Sports	1	E
PED 41115	Sport Administration Structure	1	E
Total Credits = 16 (Compulsory = 14 and Elective = 2)			

Year IV Semester II			
Code	Subject	Credits	Compulsory Elective
PED 42801	B.Sc. Research Project in Physical Education	8	C
Total Credits = 8 (Compulsory = 8 and Elective = 0)			

The minimum number of credits required:

YEAR	Semester I	Semester II	Total
Year I	14	16	30
Year II	17	18	35
Year III	16	15	31
Year IV	16	08	24
Total			**120**

DETAIL SYLLABUS

N.B.		
T	-	Theory
P	-	Practical
F	-	The department organizes field visit relevant to the particular subject area.
W	-	The department organizes workshops relevant to particular sports/course unit.
TH	-	Thesis
GP	-	Group Project

Year I Semester I				
PED 11101	Foundation of Physical Education	T	-	-
The General History of Sport and Physical Education - Sport and Society, the Ancient Olympics, the Modern Olympics; Why take part in sports and physical activities at all?; Definition of Sports, Science and Management; Definition of Physical Education; The reflective performer in Physical Education and the field of study; Physiological foundation of physical education; Philosophical foundation of physical education; Psychological foundation of physical education; Sociological foundation physical education and equity in sports and physical education; Major discourses in Physical Education in the world context; Sources available to improve knowledge related to Physical Education.				

PED 11102	General Fitness	T	P	F/W
Introduction to fitness; Benefits of exercise; Exercise is medicine: acute and chronic adaptation to exercise; Importance of physical activity in health and fitness; Components of fitness: health related and skill related; Methods to develop general fitness; Test batteries and norms for testing general fitness; Testing physical fitness.				

PED 11103	Movement Concept, Skill Analysis, Performance and Practices in Athletics (Track Events)	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

PED 11104	Movement Concept, Skill Analysis, Performance and Practices in Gymnastics	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

PED 11105	Movement Concept, Skill Analysis, Performance and Practices in Swimming & Life Saving	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

PED 11106	Movement Concept, Skill Analysis, Performance and Practices in Basketball	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

PED 11107	Fundamental Motor Skills and Practices of Games	T	P	-
Introduction to FMS, Sequence of instruction, Critical FMS, Issues in teaching FMS, Fundamental motor skills assessment: Purpose of the FMS assessment; Age and sequence of acquisition of FMS components; Administration and scoring procedures; Scoring and interpretation of results; Safety considerations and standards. Historical review, Classification, Games and their influence in bio psycho social development during the pre-school and school stages, Important of games in the formation of values, Games as an education means: Appropriate selection of games; Teacher's roll as a leader of the game, Teaching learning methodology of games.				

PED 11308	Systemic Anatomy & Basic Physiology	T	P	-
General introduction to human anatomy, Cellular forms and functions, The integumentary system, The skeletal system, Muscular system, Circulatory system, The lymphatic system, Nervous system, Endocrine system, Digestive system, Respiratory system, Reproductive system, Embryology, Excretory system, Body fluids.				

PED 11209	Fundamentals of Physics	T	P	-
Basic Physics: International system of units, Vectors and Scalars, Motion in one & two dimensions (Equations of motion, Motion under Gravity, Displacement–time and Velocity–time graph), Relativistic velocity, Force and Newton's laws, Adding and Splitting up forces, Type of forces (Gravitational, Frictional, Electro–static, Electromagnetic and Nuclear), Circular Motion, Satellites in orbit, System of particles (Mass, Centre of Gravity and Moment of Inertia), Rotational kinematics, Momentum and Impulse, Conservation of momentum (Collisions, Explosions and Rockets & Jets), Work and Energy, Conservation of energy (Kinetic and Potential energy), Elasticity, Power and Efficiency, Machines (Levers, Ramp, Pulleys and Screw jacks), Equilibrium of rigid bodies, Pressure and Density of fluids, Pascal's Principle and Archimedes' Principle, Fluid flow, Bernoulli's Equation and its Applications and Viscosity. Thermal Physics: Temperature, Heat energy, Expansion and Contraction of materials, Heat capacities (solid, gas), Work done on gas, The First law of Thermodynamics and its Applications, Gas laws, Propagation of heat (Conduction, Convection and Radiation), Climate and Weather (Formation of Clouds, Winds Patterns, Monsoons, Lighting and its hazardous, Solar radiation and Greenhouse effect, Time zones, Temperature zones and Patterns).				

PED 11210	Introduction to Information Technology	T	P	-
Introduction to Computer Systems: Elements of Computer System (Block diagram of main components and their functions), Hardware & Software, CPU, Computer memory types, Input/ Output devices, Storage devices, Types of computers and generations, Introduction to Operating Systems: Functions of an operating system, Types of operating systems, Introduction to Information systems, File handling and management, Introduction to Information Systems: Difference between data and information, Introduction to database systems, Introduction to Network: Networking devices, Network types, Internet & World Wide Web: E-mail and Internet Details, Web browsers.				

CPE 1101	Professional English I	T	-	-
Language Structure: Basic English sentence structures, uses, formation and types of nouns and pronouns with their singular and plural forms, use of "be" and "have", prepositions, determiners (articles), forms and uses of tenses (the simple present, simple past, simple future, and their passive forms). Speaking: Use social English confidently; introduce self and others; communicate information; produce meaningful statements on personal/ familiar topics; speak and discuss on general topics; engage in group discussions, conversations, and dialogues; formal and informal greeting, leave taking and responses; consonant and vowel sounds. Listening: Listen to general conversations, dialogues, speeches, etc. and identify the topic/ subject matter; comprehend simple instructions, statements and questions; listen to and respond to songs appropriately. Writing: Write short descriptions on personal/ familiar topics using simple sentences, write short compositions, improve spelling, and use basic capitalization and punctuation appropriately. Reading: Identify and understand the general meaning of and simple short texts, read common/ general texts for comprehension, read and understand the implied meaning, read with humour. Integrated Skills: Listening, taking down notes, discussion and reading; reading, thinking and discussion.				

Year I Semester II				
	General Fitness	T	P	F/W
Weight management: Popular diets, Adipose tissue, distribution of body fat, Energy balance, Effective dietary interventions, Creating energy deficit; Modern systems for weight management: The dietary guidelines for whole food carbohydrate diet, Ketogenic diets and Paleolithic diet; Programming personal training with clients: Introduction to personal training, fitness and the health care continuum, advantages of personal training, linking with other professions, goal setting; Appraisal and lifestyle analysis: Rationale for conducting a health and fitness appraisal, Health evaluation, Life style analysis; Consultation and goal setting; Designing aerobic training programs. Practical session covers one-hour moderate intensity physical activities such as brisk Walking, Jogging, Running, Cycling and sports such as Swimming or Football daily.				

PED 12102	Movement Concept, Skill Analysis, Performance and Practices in Athletics (Field Events-Jumps)	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

PED 12103	Movement Concept, Skill Analysis, Performance and Practices in Badminton	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

PED 12104	Movement Concept, Skill Analysis, Performance and Practices in Netball	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

PED 12105	Movement Concept, Skill Analysis, Performance and Practices in Volleyball	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

PED 12206	Basics of Education Psychology	T	-	-
Introduction: why study of psychology is important? Explanation of how people employ research based knowledge in psychology for destruction or construction of our society, to live in this world without facing problems, explanation the importance of knowledge in psychology; Definition of Psychology; Categories of psychologists'; Branches/Subfields of psychology Branches/Subfields of psychology; Brief history of psychology: the Greek and the age of rationalism, the renaissance & the rice of mechanism, pre-scientific psychology, foundation of scientific psychology, development of psychology in the United State of America; Contemporary approaches to psychology; Research methods in psychology; The physical, cognitive, moral, emotional and social development of children and adolescent.				

PED 12207	Mathematics	T	-	-
Sets and number line, Fundamental of Mathematics, Indices, Algebraic Expression, Intervals, Inequalities, Linear & Quadratic Equations, Simultaneous Equations, Straight line and graphs, Logarithms, Geometry and Introduction to Trigonometry, Limits, Differentiation, Integration.				

PED 12308	Introduction to General Chemistry	T	P	-
Introduction of chemistry in life: water, air and soil. Chemicals associated with life: use examples; water, food, cloths, medicine etc. Understanding of chemistry is life links: Current issues associated with chemicals (local/global), Chemistry and Sports: explanation with some examples. Introduction to elements and compounds, Sub atomic particles, Periodic table, Electronic configuration and stability of elements, Classification of elements in periodic table, Chemical bonding and molecular structure, Mole concept and stoichiometry. Introduction to carbon chemistry, Chemistry of hydrocarbon, Basic concepts of organic structures, Acid base properties of organic molecules, physical properties of organic molecules, and nitrogen compounds, Basic Reaction mechanisms. Introduction to basic unit molecules and structures (glucose, amino acids, unit molecules of polymers etc.). Introduction to basic structures and functions of bio-macromolecules (Carbohydrates, Lipids, Proteins).				

PED 12209	History of Physical Education	T	-	-
Introduction; Historical development of physical education in England; The British Public School traditions; The British public school games traditions; Thomas Arnold's (Principal at Rugby School in England from 1828 to 1842) sports and physical education philosophy; Sports in Sri Lanka before the European Colonization; Sports in Sri Lanka during the European ruling period; Sports in Sri Lanka after Independence (1948); Social constructionists approach to study physical education history (Major attentions to Ivor Goodson).				

PED 12110	Aerobics and Rhythmic Activities	T	P	-
Introduction to Aerobics: History and evolution, Importance of Aerobics, Basic Rhythmic exercises and conditioning activities performed to music, Types of Aerobics, Special muscle toning exercises, Aerobics session planning and brief knowledge of equipment using: Methods and materials of teaching rhythmic aerobic activities.				

PED 12211	Applications of Information Technology	T	P	-
Introduction to Web design: Introduction to web designing software, Introduction to html, Creating blogs, Graphics and image editing, Word processing (how to add reference, table of content, reports etc.), Spreadsheet, database management software, presentation tools. Introduction to sports analysis and performance analysis software.				

CPE 1201	Professional English II	T	-	-
Language Structure: Forms and uses of tenses (the present continuous, past continuous, future continuous and their passive forms); conjunctions; complex sentences – with special reference to the relative clauses, relative pronounce and their uses; subject-verb agreement in simple and complex sentences; determiners – some, any, many, a lot. Speaking: Use marks of courtesy in agreeing, disagreeing, getting permission, giving permission, thanking, apologizing, appreciating; ways of saying 'yes' or 'No'; use questions appropriately to ask for information; provide appropriate responses to fairly complex questions with a seasonable degree of accuracy; express facts and opinion on familiar topics; make and respond to suggestions; role plays; talking about one's family. Listening: Listen to variety of texts (dialogues, conversations, etc.); comprehend fairly complex questions; understand internal cohesion; understand simple explanations and descriptions in short texts; identify and understand key ideas in a longer text; listen and take down notes; listen for comprehension. Writing: Write down dictated notes, write short compositions on general topics with a fair degree of accuracy, write conversations and dialogues, take and convey messages, write informal letters, do Paragraph writing. Vocabulary: Use contextual, structural, and morphological clues to deduce meanings of unfamiliar words of phrases. Reading: Read variety of texts and respond appropriately, use Skimming and scanning techniques identify and understand main ideas in more complex texts, infer implicit information in simple texts, read and take down notes. Integrated Skills: Text reconstruction (Listening, Writing, Speaking, and Reading).				

Year II Semester I				
PED 21001	General Fitness	-	P	W
Practical session covers one-hour moderate intensity physical activities such as brisk walking, Jogging, running, Cycling and sports such as Swimming or Soccer daily.				

PED 21102	Movement Concept, Skill Analysis, Performance and Practices in Athletics (Field Events-Throws)	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

PED 21103	Movement Concept, Skill Analysis, Performance and Practices in Elle	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

PED 21104	Movement Concept, Skill Analysis, Performance and Practices in Karate	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

PED 21105	Movement Concept, Skill Analysis, Performance and Practices in Tennis	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

PED 21206	Practicum Level I	T	P	F
Teacher and the teacher's role; Teachers' concern theory and check list; Methods of knowing to become a competent physical education (PE) teacher; Major characteristics that should be possessed by a competent PE teacher; Code of Ethics for teachers in physical education; Objective model and Procedures model in curriculum designing in physical education; Bloom's Taxonomy; Objective statements and lesson planning; School/Industrial plant; Practical teaching sessions at school settings (Two days block within the mid semester and three days block before the end semester).				

PED 21207	Basic Statistics and Introduction to Statistical Software	T	P	-
The nature of probability and statistics, Variables and Types of data, Data collection methods and Sampling techniques, Frequency distributions and graphs, Shapes of distribution. Data description: Measures of central tendency; Measures of dispersion; Skewness and kurtosis; Measures of position and Exploratory data analysis. Introduction to probability: Probability approaches; Probability axioms; Elementary properties of probability; Conditional probability and Bayes theorem. Random variables and probability distributions: Binomial, Poisson and Normal distribution. Introduction to statistical software; Data management; Data presentation; Data description, and solve probability problems.				

PED 21208	Sport Biomechanics	T	P	-
Introduction of Biomechanics; concepts of mechanics as they apply to human movement; Determination of the center of mass of the human body; Fundamentals of angular kinetics; The body's movements; The joints of the body, Muscles, the power house of movement; Biomechanical experiment procedures; Data processing; Linear velocities and accelerations caused by rotations; Fundamental movements; Movement patterns; Introduce human motion analyzing software for sporting activities.				

PED 21209	Exercise Physiology	T	P	-
Physical fitness through healthy life, Energy for physical activities, Respiratory control during exercise, Cardiovascular control during exercise, Cardiovascular adaptation to endurance training, Muscular control during exercise, Hormonal regulation during exercise, Thermoregulation during exercise, Neural control of human movement, Body composition and assessment techniques.				

PED 21210	Education Psychology	T	-	-
Introduction: the importance of studying educational psychology; Teacher and the teacher's role; Teachers' concern theory; Learning theories: cognitive approaches including constructivists approach (Piaget & Vygotsky), behaviorist approaches, social approach, humanistic and biological approach; learning types: cognitive, psychomotor and affective learning; Intelligence; Memory; Motivation and emotion; Perception; Personality.				

PED 21211	Safety and Injury Prevention	T	-	-

Introduction to safety in sports and injury prevention: How to do a proper Warm-up; Importance of stretching; Taping and bracing; Protective equipment and Appropriate surfaces; Appropriate training; Adequate recovery , Introduction to sports first aids : Basic sports first aids skills; Anatomy and sport injury terminology, Emergency action steps and providing life supports: Physical assessment and first aid techniques; Moving injured or sick athlete Sport first aids for specific injuries; Respiratory emergencies and illnesses; Closed head and spine injuries; First aids for wounds and bleeding; First aids for Weather related problems; First aids for musculoskeletal injuries (upper and lower body).

CPE 2101	Professional English III	T	-	-

Language Structure: Uses, formation and classification of adjectives and adverbs; phrasal verbs; functions of basic modals; determiners – a few, few, a little, little, no, none; forms and uses of tenses (present perfect, past perfect, future perfect and their passive forms). Vocabulary: High frequency vocabulary items required for academic purpose; use dictionaries and glossaries; use clues provided by etymology, suffixes, pre-fixes, pre-modifiers and post modifiers. Speaking: Express likes and dislikes, describe routine; interact in discussions on academic topics; take turn in various speech situations, communicate with confidence to an acceptable degree of fluency. Listening: Listen and take down notes, understand the gist of spoken/ academic texts and respond appropriately, identify the main idea and the supporting details, listen and comprehend instructions and/ or information related to the field of study presented orally. Writing: Spelling/ Spelling rules, describe a process using sequence markers with a reasonable degree of accuracy, write short reports, be familiar with official correspondence, compile a resume (Bio-data), write appropriate covering letters, write official/ formal letters, draft memos, write essays, paraphrase texts; use coherence and cohesive devises. Reading: Differentiate the main idea from the supporting details, identify and unstained functions of discourse markers/ coherence and cohesive devises, read intensively for comprehension, read between lines/ understand the implied meaning; use encyclopedias, read with humour Vocabulary: Everyday expressions – conversation building expressions with “this” and “that”. Integrated Skills: Static Description – description of organisms, substance, objects, people and places in relation to definition, classification, physical appearance, chemical composition, structure etc.; express cause and effect relationship; comparison and contrast; definition and exemplification.

PED 21113	German Language – Part 1	T	-	W

Rehearsing phonetics and revising fundamental elements of German grammar, conjunction of verbs and variation in verbs, Syntax of a German sentence and formations of questions. Practicing more German Verbs in a sentence with Accusative and Dative cases. Introduction to sports and Leisure activities. Practice general conversation Reading simple chosen text related to sports.

PED 21114	Spanish Language – Part 1	T	-	W

Introduction to Spanish for Sports, The phonetic alphabet, vocabulary, How to pronounce Spanish Words, Useful verbs and expressions: counting, spelling, Basic Spanish grammar: Articles; Pronouns; Nouns; Verb, Basic vocabulary introduced, Simple sentence structures: Greeting people; Basic personal information, Basic skills of comprehension, Sports Equipment related phrases.

PED 21115	Chinese Language – Part 1	T	-	W

Introduction to Chinese for Sports, The phonetic alphabet, vocabulary, pronunciation, Greetings, Basic vocabulary introduced: Games; equipment; countries, Basic Chinese grammar: Nouns; verbs; adjectives; particles; demonstratives, Simple sentence structures, Basic skills of comprehension, Sports Equipment related phrases.

Year II Semester II				
PED 22001	General Fitness	-	P	W
Practical session covers one-hour moderate intensity physical activities such as brisk walking, Jogging, running, Cycling and sports such as Swimming or Soccer daily.				

PED 22102	Movement Concept, Skill Analysis, Performance and Practices in Cricket	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

PED 22103	Movement Concept, Skill Analysis, Performance and Practices in Rugby	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

PED 22104	Movement Concept, Skill Analysis, Performance and Practices in Judo	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

PED 22105	Movement Concept, Skill Analysis, Performance and Practices in Table Tennis	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

PED 22106	Comparative Physical Education	T	-	F
Introduction and present physical education programs in Sri Lanka: Physical education in the general education and higher education systems; Physical education at present in the United Kingdom, Portugal, Netherlands and in the Germany; Physical education at present in the USA and in Canada; Physical education at present in China, India and Japan; Physical education at present in Australia and in New Zealand; Physical education at present in Brazil, and in Cuba; Physical education at present in South Africa and in Kenya; Comparison of physical education systems in deferent countries mentioned above with Sri Lankan system. Field trips: the first one to study general physical education curriculum in the National Institute of Education (NIE) at Maharagama where the existing curriculum designing is being carried out, the second field trip to Ministry of Higher Education/ University Grant Commission to study physical education in higher educational institution in Sri Lanka.				

PED 22207	Practicum – Level II	T	P	F
Learning theories; Teaching methods/ strategies; Preparation and usage of teaching/ learning resources; Teaching models in PE: technical model and 5E approach to lesson planning, game sense, sport education etc.; Other contemporary approach to curriculum designing in PE: key learning areas; Fundamental motor skills, outcome base education; Vocational education, Bicultural awareness etc.; Practical teaching sessions at school settings (Two days block within the mid semester and three days block before the end semester).				

PED 22208	Physical Education in Pre-school & Primary Schools	T	-	F

Pre-school education in world context; Primary education in the world context; Pre-school PE in world context; Primary school PE in world context; Pre-school education and physical education in Sri Lanka (Theory with practical); Primary school education and physical education in Sri Lanka (Theory with practical). Pre- School visits and a minor project work of a report with presentation. Primary School visit and a minor project work of a report with presentation.

PED 22209	Sport Nutrition	T	-	-

Basics of nutrition, Energy expenditure during physical activity, Carbohydrate and exercise performance: Fueling up before exercise; carbohydrate intake during exercise; Post exercise refueling, Fat and exercise performance: Fat oxidation and fat intake during exercise; High fat diets, Protein requirement for exercise, Weight maintenance and body weight issues: Strategies for eating to loss body fat, Vitamins, minerals and antioxidants requirement for exercise, Fluid and electrolyte loss and replacement in exercise, Sport supplements and their side-effects.

PED 22110	Dance	T	P	-

Introduction to dance: Elements of dancing; Importance of dance to physical fitness: Health benefits; Perform dances using simple movement patterns: Body Awareness; Introduction to Falk dance: History, Perform dances using Falk dance styles; Characteristics of Falk dance; Develop co-ordination and rhythm with free dancing styles: Four gestures (Abhina), Expressions (Bhava), Spatial Awareness: Formations, Levels, Dance Arrangement; Create a dance using a range of movement patterns: Group, Individual.

PED 22311	Theory and Methodology of Sports Training	T	P	W

Basic aspect of athlete preparation: A coaching Philosophy; Basic concepts of sports training; Principles of sports training; The load and biological adaptation, Sport as a long period process: Component of fitness (Physical qualities); Energy systems training; Content and objectives in the planning of the training process; Periodic and cyclic Scheme of Matveev and their characteristics; Planning of training – the yearly plan; Planning a meso cycle of training; Planning a micro cycle of training; Planning a practice session; Forms of control and evaluation.

PED 22212	Statistics for Data Analysis	T	P	-

Sampling Theory, Interval and Point estimation, Testing Hypothesis: Principles of hypothesis, Single sample z and t test, Paired t-test and Pooled t-test, Test for proportions. Introduction to design and analysis of experiments: Strategy of Experimentation, Basic Principles, Experiments with a Single Factor, Analysis of variance (ANOVA), Randomized Blocks Design, Mean comparisons methods, Two-Factor Factorial Design. Nonparametric statistics: Single sample tests, Two sample tests, Multiple sample tests, Rank Correlation. Regression analysis: Scatter plot and correlation, Simple linear regression, OLS estimates, Testing the significance of the fitted model (ANOVA), multiple linear regression, model adequacy checking. Practical: Testing hypothesis and constructing confidence intervals, Analysis of count and rank data, Model fitting: Simple and multiple linear regression, Model diagnostic checking, Analysis of simple and factorial experiments data.

CPE 2201	Professional English IV	T	-	-
Language Structure: Forms and uses of tenses (present perfect continuous, past perfect continuous and future perfect continuous and their passive forms); conditions; complex modality – modals with perfective/ progressive aspects, semi-auxiliaries and catenative; nominalization; focalization. Speaking: Present and discuss matters pertaining to their field of study (present information clearly, ask for information/ clarification, express a point of view: agree/ disagree politely, answer questions appropriately); engage in debates/ discussions on academic/ social/ ethical issues; use appropriate interactive strategies; public speaking. Listening: Understand opinions and inferences, take down notes appr0priately on academic texts, identify various registers, identify and comprehend points made by multiple speakers; listen and take down notes; listen for comprehension. Writing: Summary/ Précis writing; write articles, assignments, tutorials to a considerable degree of accuracy; write academic/ formal essays. Reading: Understand implicit information in texts by making inference; distinguish between facts, suppositions, opinions, attitudes and arguments. Integrated Skills: Description of a process; describing position, movement, and direction; narration: field/ laboratory report; description of graphs, charts and tables. Vocabulary: Common expressions for modifying statements.			

PED 22113	German Language – Part 2	T	-	-
Comparison, Two way prepositions, Adjective declination, Genitive case, Simple past, Syntax of subordinate clauses and infinitive constructions, relative clauses, Present tense of the General subjunctive (Konjunktiv II), introduction to common language usage in field and practice dialogues and reading general text related to sport in order to improve vocabulary and expressions.				

PED 22114	Spanish Language – Part 2	T	-	-
Situational dialogues related to sports, Specific vocabulary related to various sports, Situational Dialogues, Phrases, Offer, Deny, Accept requests, Complaints, Giving directions, Emergencies, Injuries, Complaints, Commonly used phrases discussed.				

PED 22115	Chinese Language – Part 2	T	-	-
Situational dialogues related to sports, Specific vocabulary related to various sports, Situational Dialogues, Phrases, Offer, Deny, Accept requests, Complaints, Giving directions, Emergencies, Injuries, Complaints, Commonly used phrases discussed.				

Year III Semester I				
PED 31001	General Fitness	-	P	-
Practical session covers one-hour moderate intensity physical activities such as brisk walking, Jogging, running, Cycling and sports such as Swimming or Soccer daily.				

PED 31102	Movement Concept, Skill Analysis, Performance and Practices in Hockey	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

PED 31103	Movement Concept, Skill Analysis, Performance and Practices in Baseball	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

PED 31104	Movement Concept, Skill Analysis, Performance and Practices in Soccer	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

PED 31105	Movement Concept, Skill Analysis, Performance and Practices in Weight Lifting	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

PED 31206	Physical Education in Secondary & Tertiary Institutions	T	-	F
Secondary school education in world context; Tertiary education in world context; Secondary school PE in the world context; PE in Tertiary Intuitions in the world context; Secondary school education and physical education in Sri Lanka; Education and physical education in tertiary institutions in Sri Lanka. Secondary school visits and a minor project work and a presentation with a report. Tertiary institutes visit and a minor project work and a presentation with a report.				

PED 31207	Practicum – Level III	T	P	F
Developing relationship skills- personal qualities and characteristics; Actions for establishing personal relationships; Actions to help students feel good about themselves; Developing instructional skills - Clarity of communication; Beginning a lesson; Concluding a lesson; Questioning and responding; Practical teaching sessions at school settings (Two days block within the mid semester and three days block before the end semester).				

PED 31208	Advanced Theory and Methodology of Sports Training	T	P	W
Methods of sports training, Strength, Endurance, Speed, Agility, Flexibility and Coordination; High altitude training, Planning and preparation of macro cycles, Planning and preparation of meso cycles, Planning and preparation of micro cycles, Planning and preparation of training work outs, Training in extreme conditions, Psychology of athlete preparation and performance, Forms of control and evaluation of the physical component of the preparation, Forms of control and evaluation of the technical component of the tactical preparation.				

PED 31209	Sport Psychology	T	-	-
Introduction to sports psychology; Basic psychological concepts; Motivation in sports and exercise; Arousal, attention and personality of athlete; Situational factors related to anxiety and mood; Improve your self-confidence; Psychological obstacles in the clay of performance.				

PED 31210	Curriculum Perspective and Issues in Physical Education	T	-	-
The origin of curriculum: Greeks' notion of curriculum (the running track); Definitions of curriculum; The history of the present; Social constructionists approach to design physical education curriculum; Major discourses in physical education; Contemporary curriculum practices in physical education in the world context; The major issues facing the physical education in the world context; Capitalist, socialist and mixed mode physical education curriculum in Sri Lanka; Major issues for the development of physical education curriculum in Sri Lanka; Physical education curriculum designers in Sri Lanka.				

PED 31211	Test, Measurement & Evaluation of Physical Activity	T	P	-

Introduction to physical education measurement and evaluation: Orientation toward measurement and evaluation in physical education; A brief historical over view in the areas of physical education test and measurement. Statistic and its application in test, construction, evaluation and grading; Basic statistics techniques; Test evaluation construction a d administration; Grading in physical education. Physical fitness measurements: The measurement of flexibility; The measurement of strength; The measurement of muscular endurance; The measurement of cardiovascular condition; Anthropometric measurements, body build, body composition; Physical fitness test batteries. Motor performance measurements; The measurement of power; The measurement of agility; The measurement of balance; The measurement of speed and reaction; The measurement of sports skills; The measurement of rhythm and dance; Motor performance test batteries. Other area of measurements: The measurement of social qualification and attitudes; The measurement of knowledge; The measurement of posture.

Year III Semester II				
PED 32001	General Fitness	-	P	-

Practical session covers one-hour moderate intensity physical activities such as brisk walking, Jogging, running, Cycling and sports such as Swimming or Soccer daily.

PED 32202	Specialization of a Selected Sport – Part 1	T	P	W

Tactics of the game (Attacking & Defensive), Formation systems (Attacking & Defensive). Match Systems, Planning of training, Training Sessions, Role of the Coach, Statistics especially for the sport, Different type of game situation drills. Students need to select a one sport that will be listed by the department in the assigned semester for the both specialization part 1 and part 2. Students need to do an action research minor project related to the selected sport (group project) and they need to submit the project report with a presentation. The department organizes workshops relevant to particular sports.

PED 32203	Practicum – Level IV	T	P	F

Classroom management- preventing management problems, techniques for responding to inappropriate behavior; Punishment; Check list for effective management during teaching practice; Advanced relationship skills - classroom social interactions, the teacher expectancy effect; Classroom achievement motivation- attribution achievement motivation theory, Dweck and Elliott's theory, Covington's self-worth theory; Evaluating student learning- key concepts in evaluation, types of evaluation, evaluative techniques, measuring student performances with teacher made tests, measurement, assessment, evaluation and decision making; Students' motivation development; Practical teaching sessions at school settings (Two days block within the mid semester and three days block before the end semester).

PED 32204	Sociology of Physical Education	T	-	-

Sport, theory and the problem of values; Sport, history and social change; Sport, politics and culture; Sport and globalization; Internationalism, reconciliation and sport in the making of nations; Sport, media and television; Sport, law and governance; Other' sporting communities; Sport, violence and crime; Sport, body and society; Sport and the environment; Sport and religion; Sport, lifestyles and alternative cultures; Sport, identities and recognition.

PED 32205	Sport and Education Law	T	-	-

The history of the legal systems in Sri Lanka, Legal systems in Sri Lanka, A brief introduction to the constitution of Sri Lanka and the powers of the constitution, Introduction to the personal laws: Kandyan law; Muslim law; Thesawalamei law, Functions of legislative, Executive and judiciary systems of Sri Lanka. The laws relating to the sport in the world: History of sport law in the world, the laws relating to the sport in Sri Lanka: Sport law in Sri Lanka (no.25 of 1973); Sport (amendment) acts, the rule of law and principles for good governance and ethical practice: Corporate governance, Moral reasoning and ethical theory, Stakeholder relationships, Managerial ethics and the rule of law, Improving the ethical climate in organizations and code of ethics, Social responsibility and organizations.

PED 32106	Sport Facility Design	T	-	-

Sport and Physical Education facility design: Nature of Physical Education and Sport facility; Active design and good design; Facility design concept; Introduction to sport facility management: Management task, Demand modeling; Feasibility study; Develop a management plan and design brief.

PED 32207	Management Process in Physical Education	T	-	-

History of management thoughts, Managerial functions, Characteristic of the manager, Managerial levels, managerial roles, Skills of the managers, The Nature of organization, Planning in the organization, Organizing the organization, Leading in organization, Controlling in organization, Strategic Management (Strategic Planning, SWOT Analysis), Motivation, Decision Making, Human resource management, Communication in the Workplace.

PED 32208	Research Methodology	T	-	-

What is research; What is science; Methods of inquiry; Scientific method; Characteristics of research; Types of research; Research Methodology; Qualitative, quantitative and mixed-method research; Ethics of research; The process of research (identifying the problem, literature review, formulating a hypothesis, developing the research plan, collecting data, analyzing data using appropriate techniques, interpreting results and forming conclusions); Writing a research proposals; Dissemination of knowledge; Scientific writing; Citations, referencing and plagiarism; Writing of abstracts, extended abstracts and theses; Scientific publishing; Academic presentations; Introduction to action research in sports sciences.

PED 32109	Sport Education Model & Game Sense Approach	T	-	-

Technical approach vs games sense approach (Bunker and Thorpe, 1984); Similarities and Differences between Sports; Classification of sports according to games sense approach; Steps in game sense approach to teach sports; Phase Sport Educational model; Teacher Engagement with teaching games for understanding; game sense in physical education, the teachers 'Coach Role in games sense; Practical knowledge and games, Educative game and sports teaching; Moral acceptable conditions and professional ethics. Sports and values; Introduction historical perspective; Beliefs about values and sports.

PED 32210	Human Resource Management	T	-	-

Introduction to human resources management: Definition of human resources management; Evaluation of human resources management; Advantages of human resources management and significance; Functions of human resources management, Human recourses planning, Job analysis, Job designing, Recruitment and selection, Induction, Performance evaluation, Training and development.

PED 32211	Strength and Conditioning	T	P	-

Discovering where to locate strength and conditioning research; Anaerobic exercise prescription: needs analysis, exercise selection, training frequency, exercise order, training load and repetitions, volume and rest periods; Strength and power development; Plyometric training: plyometric mechanics and physiology, plyometric program design and age considerations, plyometric and other forms of exercise, safety considerations, plyometric drills; Speed development; Endurance development; Core stabilization: spinal stabilizing program creation; SAQ training; Resistance training and spotting techniques; Aerobic conditioning; Anaerobic conditioning; Periodization for biomotor abilities; Agility training; Designing strength and conditioning programmes for different sports. Practical sessions covering the demonstration and evaluation of: dead lift, squat, Olympic lifts and derivatives; plyometric exercises; SAQ and speed development exercises; agility exercises; and core stabilization.

PED 32112	Success in Sports	T	-	-

Somatotype and sport performance, Comparing sporting standard, Sport and the mind, Stress and sports, Personality and sport, Motivation and sport, Race and sport.

PED 32113	Guidance and Counseling	T	-	W

Introduction of Education and Vocational Guidance, Meaning of guidance, need for guidance and its scope in Sri Lanka, aims of guidance; Foundations of guidance (Philosophical, Psychological and Socio-cultural); History of Guidance Movement in Sri Lanka; Types of guidance (Education, Vocational and Personal); Non-Testing Techniques in Guidance; Testing Techniques in Guidance; Guidance Services; Roles of the following in the Guidance Services; Occupational information, meaning and importance, information about education and job opportunities; Counseling.

Year IV Semester I				
PED 41201	Specialization of a Selected Sport – Part 2	T	P	W

Refereeing & Officiating, Match and Techniques analyzing, coaching practice, Code of Ethics of the Coaches, Coaching of the match and coach's behavior, Advance training of deferent evaluations of the techniques and tactics. Students need to continue the specializing the same sport that they selected in the Specialization of a Selected Sport – Part 1. Students need to do an action research minor project related to the selected sport (Individual mini-project) and students need to submit the project report with a presentation. The department organizes workshops relevant to particular sports.

PED 41202	Health & Health Behavior	T	-	-

The concept of disease, iceberg phenomenon of disease, concept of disease control and Prevention, non-communicable diseases, Communicable diseases, Universal infection control precautions, Sexually transmitted diseases (STDs), Contraceptive methods; Indicators of health National immunization schedule in Sri Lanka: illness-wellness continuum; Maslow's hierarchy of needs; Health care of the community - Concept of health care, Health system, Levels of health care, Model of a health care system; Health and Wellness definitions, skill related physical fitness terms; Introduction to health and health behavior; concept of health, health and disease; dimensions of health; determinants of health; Health behavior- models of health behavior, global health issues in 21st century; Public health services in Sri Lanka.

PED 41203	Outdoor Recreations and Leadership	T	P	FW
History, resources, programs, facilities, operations and management philosophy of OBT; Governmental agency, private sector, and non-profit sector cooperation in nature park management & Outdoor recreation; Current issues, research and professional practice related to OBT in its programs; Committee updates and preliminary presentations by student Track Teams. Final Trip Logistics and Preparations; Outdoor Recreation Consortium Non-Perial Mountains, Natural Resource Park; Course wrap-up, conclusions and evaluation.				

PED 41204	Adaptive Physical Education	T	-	-
Physical Education for children and with special intellectual education needs and behavioral disorders: Review of main aspects of the subject; Curricula adaptation; Mental reiteration; emotional and behavioral disorders, PE for children and youngsters with sensory dysfunction and communication disorders: Sensory dysfunction blind and visually impaired people; Hearing and sight impairment, PE for the children and youngsters with motor disorders: Physical – motor disorders; Strategies for educational intervention.				

PED 41105	Science of Yoga and Relaxation	T	P	W
Basic technique and practice of yoga, Breath control, Meditation techniques, Physical postures (yoga asana), Mantras (sacred chants) and Philosophical and religious scriptures, Yoga sutras.				

PED 41206	Community Service Project	GP
This course will provide students with an opportunity to undertake a community service project in order to develop an appreciation for how their discipline knowledge intersects with community need. Students will work in multi-disciplinary teams to manage real projects and solve real problems experienced by community organizations/ area. They will work with the community to understand their needs, scope the project and develop viable and sustainable solutions. Students will complete a learning journal throughout the course which reflects on the progress of the project, their use of the knowledge and skills taught throughout their degree, and the relevance of the community service project experience to their future careers. Student need to submit a project report relavant to their project.		

PED 41207	Sport Therapy	T	P	-
General notions of manual massage: Definition of massage, Brief historical review of massage, Technical conditions and hygienic of the massage, General classification of massage, Physiological influence of massage, Main manual manipulations of massage, Methodology of application the massage, Classification of sport massages according its objectives and task, Soft tissue massage, Active recovery, Somatic relaxation techniques				

PED 41108	Professional Development	T	-	W
Career exploration and Graduate school preparation: Career Development Models, Steps in the career planning/ graduate school process, Job search and graduate school search skills and strategies, Marketing Yourself, Overview of resume, Cover letter, Professionalism & First Year on the Job, Ethics and Etiquette. Money management: Financial Planning & Money Matters. Leadership and Community development, Professional/ Academics Portfolio. Students are expected to prepare Portfolio and at the end of the course need to submit for grading.				

PED 41109	Reflective Practice in Physical Education	T	-	FW

The reflective student/ teacher; Learning to reflect; Becoming a reflective teacher/ coach- Habitual teaching and intentional reflection; An action research approach to reflective teaching; Monitoring and reflecting, getting good data, different types of data; Keeping a journal for reflection; Reflective practice, playing the game of reflection; Reflecting on sport and PE teacher/ coach education programs: Coaching philosophy, Effective coaching, Principles of coaching, Planning and organization, Pedagogy for coaching, Communication skill acquisition, Psychology for coaches, Principles of management, Inclusive coaching, Reflective coaching timetable and teaching. School visits and the department organize a Workshop.

PED 41210	Long Term Athlete Development (LTAD)	T	P	-

Introduction to long term athlete development(LTAD); Importance of LTAD; Growth, development and maturation: peak height velocity and peak speed velocity; Physical Literacy; LTAD model: a scientific approach for sports development; Key stages of LTAD: Fundamental stage, Learning to learn stage, Training to train stage, Training to compete stage, Training to win and Retaining; Developing key performance components; Key messages for coaching practice; characteristics of physical, Mental/ Cognitive and Emotional development; optimal windows of trainability. Practical session covers 'Kids athletics' training programs suggested by IAAF.

PED 41111	Olympism	T	-	-

Foundations of the Olympic Movement and the modern Olympic Games; The International Olympic Committee- Role and structure of the IOC, Olympic financing, Olympic solidarity, The Olympic museum; The national Olympic committees; The Olympic Games; Values and issues.

PED 41112	International Politics & Sports	T	-	-

The history of sports in USA, UK, Canada; The commercialization of sports; Ethics and sports; The internationalization of sports; The Olympic movement; Sports and social institutions; Sport and social divisions; Sport, community and social capital; Sport and social change; Sport, human rights and poverty.

PED 41113	Traditional Sports in Sri Lanka	T	-	F

Introduction to Sinhala combative, Field and aquatic sports and games; Combative Sports; Field sports (with animals); Field games (religious); Aquatic sports; Asian Children's game; Traditional games and sports in Sri Lanka, Traditional games and sports in Asian countries festivals; Festivities and games associated with the Sinhala and Hindu New Year.

PED 41114	Drugs and Sports	T	-	-

Introduction to drugs and sports: Define the drug; Development process of new drugs; Drugs and their targets; Agonist drugs and Antagonist drugs; Drug reactions, Drug toxicity, Side effects of drugs, Complex drug reactions, Drug use and abuse in sports, Legal aspects of drugs use in sports, Historical perspective of drug abuse in sports, Introduction to doping and doping classes and methods: CNS stimulants; Sympathomimetic amines and their antagonists; Drug treatment of inflammation in sports injuries; The anabolic steroids and peptide hormones; Anti-anxiety drugs and sports; Diuretics; Physical and Chemical manipulation; Gene doping.

PED 41115	Sport Administration Structure	T	-	F

The international federations- Role of international federations, Associations of international sport federations, The national sport federations; The international Olympic committee and the national Olympic committees; The operating environment of sport organisations- Sport system in Sri Lanka, Understanding the sport environment in Sri Lanka; Governance of sport organizations- Key principles of good governance, Good governance of the Olympic and sport movement: Universal principles; Key roles in sport organisations- Introduction, Key roles, Key committees; Tools- Sample constitution of an organization, Questionnaire for strategy development.

Year IV Semester II		
PED 42801	B.Sc. Research Project in Physical Education	TH

Students have to be required to conduct either research or survey related to Physical Education either at a relevant industry, research institution, or at the faculty. Students can conduct a product development for the research project, in which case they have to evaluate the product using a research methodology.

The thesis should compulsorily consist of the following parts:

1. Introduction
2. Literature review and the theoretical framework
3. Methodology
4. Results and Discussion
5. Conclusion and recommendations
6. References
7. Annexes

The duration of the project period should be 15 weeks. Project proposal needs to be submitted to the department for the approval through the internal supervisor within the first two weeks and the project report (Thesis) should be submitted at the end of the semester. Guidelines for the preparation of report will be given separately.

Students are advised to plan their project, review relevant literature, develop methodologies and establish links with relevant organizations during the first semester.

** Elective course units will be offered provided a minimum of five (05) of the registered students apply for the given course unit.

++ Obtaining a pass for the Professional English Program (CPE 1101, CPE 1201, CPE 2101 and CPE2201) and General Fitness (PED 12001, PED 21001, PED 22001, PED 31001 and PED 32001) is a requirement for the award of the B.Sc. Special Degree in Physical Education.

Degree Program : BACHELOR OF SCIENCE (SPECIAL) IN SPORT SCIENCES & MANAGEMENT

Summary of the Course

Year I Semester I			
Code	Subject	Credits	Compulsory Elective
SSM 11101	Foundations of Sport Sciences and Management	1	C
SSM 11102	General Fitness	1	C
SSM 11103	Movement Concept, Skill Analysis, Performance and Practices in Athletics (Track Events)	1	C
SSM 11104	Movement Concept, Skill Analysis, Performance and Practices in Gymnastics	1	C
SSM 11105	Movement Concept, Skill Analysis, Performance and Practices in Swimming & Life Saving	1	C
SSM 11106	Movement Concept, Skill Analysis, Performance and Practices in Basketball	1	C
SSM 11107	Fundamental Motor Skills and Practices of Games	1	C
SSM 11208	Systemic Anatomy and Physiology – Part 1	2	C
SSM 11209	Basic Mathematics	2	C
SSM 11210	Introduction to Chemistry	2	C
SSM 11211	Introduction to Information Technology	2	C
CPE 1101	Professional English I	0	C
Total Credits = 15 (Compulsory = 15 and Elective = 0)			

Year I Semester II			
Code	Subject	Credits	Compulsory Elective
SSM 12001	General Fitness	0	C
SSM 12102	Aerobics and Rhythmic Activities	1	C
SSM 12103	Movement Concept, Skill Analysis, Performance and Practices in Athletics (Field Events-Jumps)	1	C
SSM 12104	Movement Concept, Skill Analysis, Performance and Practices in Badminton	1	C
SSM 12105	Movement Concept, Skill Analysis, Performance and Practices in Netball	1	C
SSM 12106	Movement Concept, Skill Analysis, Performance and Practices in Volleyball	1	C
SSM 12107	Basic Chemistry	1	C
SSM 12208	Systemic Anatomy & Physiology – Part II	2	C
SSM 12209	Mathematics	2	C
SSM 12310	Basic Physics	3	C
SSM 12211	Applications of Information Technology	2	C
CPE 1201	Professional English II	0	C
Total Credits = 15 (Compulsory = 15 and Elective = 0)			

Year II Semester I			
Code	Subject	Credits	Compulsory Elective
SSM 21001	General Fitness	0	C
SSM 21102	Movement Concept, Skill Analysis, Performance and Practices in Athletics (Field Events-Throws)	1	C
SSM 21103	Movement Concept, Skill Analysis, Performance and Practices in Elle	1	C
SSM 21104	Movement Concept, Skill Analysis, Performance and Practices in Karate	1	C
SSM 21105	Movement Concept, Skill Analysis, Performance and Practices in Tennis	1	C
SSM 21106	Sports Massage Therapy	1	C
SSM 21207	Introduction to Psychology	2	C
SSM 21208	Introduction to Biomechanics	2	C
SSM 21209	Basic Statistics & Introduction to Statistical Software	2	C
SSM 21210	Exercise Biochemistry	2	C
SSM 21211	Exercise Physiology	2	C
CPE 2101	Professional English III	0	C
One credit to be selected from the following elective subjects			
SSM 21112	German Language – Part 1	1	E
SSM 21113	Spanish Language – Part 1	1	E
SSM 21114	Chinese Language – Part 1	1	E
Total Credits = 16 (Compulsory = 15 and Elective = 1)			

Year II Semester II			
Code	Subject	Credits	Compulsory Elective
SSM 22001	General Fitness	0	C
SSM 22102	Movement Concept, Skill Analysis, Performance and Practices in Cricket	1	C
SSM 22103	Movement Concept, Skill Analysis, Performance and Practices in Rugby	1	C
SSM 22104	Movement Concept, Skill Analysis, Performance and Practices in Judo	1	C
SSM 22105	Movement Concept, Skill Analysis, Performance and Practices in Table Tennis	1	C
SSM 22206	Sport Psychology	2	C
SSM 22307	Theory and Methodology of Sports Training	3	C
SSM 22208	Sport Nutrition	2	C
SSM 22209	Statistics for Data Analysis	2	C
SSM 22210	Sports Physiology	2	C
CPE 2201	Professional English IV	0	C
One credit to be selected from the following elective subjects			
SSM 22111	German Language – Part 2	1	E
SSM 22112	Spanish Language – Part 2	1	E

SSM 22113	Chinese Language – Part 2	1	E
Total Credits = 16 (Compulsory = 15 and Elective = 1)			

Year III Semester I			
Code	Subject	Credits	Compulsory Elective
SSM 31001	General Fitness	0	C
SSM 31102	Movement Concept, Skill Analysis, Performance and Practices in Hockey	1	C
SSM 31103	Movement Concept, Skill Analysis, Performance and Practices in Baseball	1	C
SSM 31104	Movement Concept, Skill Analysis, Performance and Practices in Soccer	1	C
SSM 31105	Movement Concept, Skill Analysis, Performance and Practices in Weight Lifting	1	C
SSM 31206	Practicum	2	C
SSM 31207	Advanced Theory and Methodology of Sports Training	2	C
SSM 31208	Sport Medicine & Injury Prevention	2	C
SSM 31209	Outdoor Recreation & Leadership	2	C
SSM 31210	Sport Biomechanics	2	C
Two credits to be selected from the following elective subjects			
SSM 31211	Musculoskeletal Anatomy & Kinesiology	2	E
SSM 31112	Women and Sports	1	E
SSM 31113	Mathematical Applications in Sports	1	E
SSM 31214	Health, Wellness & Lifelong Physical Activities	2	E
SSM 31115	Sport Tourism	1	E
Total Credits = 16 (Compulsory = 14 and Elective = 2)			

Year III Semester II			
Code	Subject	Credits	Compulsory Elective
SSM 32001	General Fitness	0	C
SSM 32202	Specialization of a Selected Sport – Part 1	2	C
SSM 32203	Advanced Practicum	2	C
SSM 32204	Research Methodology	2	C
SSM 32205	Sociology of Sports	2	C
SSM 32106	Guidance and Counseling	1	C
SSM 32207	Sport Law	2	C
SSM 32208	Sport Management	2	C
SSM 32209	Human Resource Management	2	C
Two credits to be selected from the following elective subjects			
SSM 32110	Test and Measurements	1	E
SSM 32111	Success in Sports	1	E
SSM 32112	Sport Education Model & Game Sense Approach	1	E

SSM 32213	Strength and Conditioning	2	E
SSM 32214	Sport Journalism	2	E
Total Credits = 17 (Compulsory = 15 and Elective = 2)			

Year IV Semester I			
Code	Subject	Credits	Compulsory Elective
SSM 41201	Specialization of a Selected Sport – Part 2	2	C
SSM 41102	Sport Facility Design	1	C
SSM 41203	Accounting and Financial Management	2	C
SSM 41204	Risk Management and Sport Safety	2	C
SSM 41205	Sport Marketing	2	C
SSM 41106	Sport Administration Structure	1	C
SSM 41107	Comparative Sports	1	C
SSM 41208	Community Service Project	2	C
SSM 41109	Professional Development	1	C
Three credits to be selected from the following elective subjects			
SSM 41110	Sports for differently abled Persons	1	E
SSM 41111	Event management	1	E
SSM 41112	Traditional Sports in Sri Lanka	1	E
SSM 41113	Sport Development	1	E
SSM 41214	Teaching Practice	2	E
SSM 41215	Long Term Athlete / Player Development (LTAD)	2	E
Total Credits = 17 (Compulsory = 14 and Elective = 3)			

Year IV Semester II			
Code	Subject	Credits	Compulsory Elective
SSM 42801	B.Sc. Research Project in Sport Sciences & Management	8	C
Total Credits = 8 (Compulsory = 8 and Elective = 0)			

The minimum number of credits required:

YEAR	Semester I	Semester II	Total
Year I	15	15	30
Year II	16	16	32
Year III	16	17	33
Year IV	17	08	25
Total			**120**

DETAIL SYLLABUS

N.B.

T - Theory

P - Practical

F - The department organizes field visit relevant to the particular subject area.

W - The department organizes workshops relevant to particular sports/course unit.

TH - Thesis

GP - Group Project

Year I Semester I				
SSM 11101	Foundations of Sport Sciences and Management	T	-	-
The General History of Sport - Sport and Society, the Ancient Olympics, the Modern Olympics; Why take part in sports at all?; Definition of Sports, Science and Management; Definition of Physical Education; Sub disciplines of Sport Sciences & Management; Philosophical foundation of Sport Sciences & Management; Sociological foundation of Sport Sciences & Management; Psychological foundation of Sport Sciences & Management; Sources available to improve knowledge related to Sport Sciences and Management.				

SSM 11102	General Fitness	T	P	F/W
Introduction to fitness; Benefits of exercise; Exercise is medicine: acute and chronic adaptation to exercise; Importance of physical activity in health and fitness; Components of fitness: health related and skill related; Methods to develop general fitness; Test batteries and norms for testing general fitness; Testing physical fitness.				

SSM 11103	Movement Concept, Skill Analysis, Performance and Practices in Athletics (Track Events)	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

SSM 11104	Movement Concept, Skill Analysis, Performance and Practices in Gymnastics	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

SSM 11105	Movement Concept, Skill Analysis, Performance and Practices in Swimming & Life Saving	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

SSM 11106	Movement Concept, Skill Analysis, Performance and Practices in Basketball	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

SSM 11107	Fundamental Motor Skills and Practices of Games	T	P	-
Introduction to FMS, Sequence of instruction, Critical FMS, Issues in teaching FMS, Fundamental motor skills assessment: Purpose of the FMS assessment; Age and sequence of acquisition of FMS components; Administration and scoring procedures; Scoring and interpretation of results; Safety considerations and standards. Historical review, Classification, Games and their influence in bio psycho social development during the pre-school and school stages, Important of games in the formation of values, Games as an education means: Appropriate selection of games; Teacher's roll as a leader of the game, Teaching learning methodology of games.				

SSM 11208	Systemic Anatomy and Physiology – Part 1	T	P	-
General introduction to human anatomy, Cellular forms and functions, The integumentary system, The skeletal system, Muscular system, Circulatory system, The lymphatic system.				

SSM 11209	Basic Mathematics	T	-	-
Fundamental of Mathematics; Algebraic Expression; Intervals, Inequalities, Absolute Values, Linear & Quadratic Equations, Simultaneous Equations; Indices; Basic Logarithms, Graphs; Set Theory; Trigonometric Functions; Vectors; Friction; Principles in Equilibrium of system and applications.				

SSM 11210	Introduction to Chemistry	T	P	-
Introduction to inorganic chemistry-elements and compounds, Atomic parameters, Quantum theory and electronic configuration, Classification of elements and the periodic table, Molecular structure and chemical bonding, Mole concept and stoichiometry, Introduction to Acids and Bases(pH), Introduction to organic chemistry, basic concepts of organic structures; acid base properties of organic molecules, physical properties of organic molecules; Chemistry of hydrocarbon and nitrogen compounds; Reaction mechanism, Introduction to drugs and their actions.				

SSM 11211	Introduction to Information Technology	T	P	-
Introduction to Computer Systems: Elements of Computer System (Block diagram of main components and their functions), Hardware & Software, CPU, Computer memory types, Input/ Output devices, Storage devices, Types of computers and generations, Introduction to Operating Systems: Functions of an operating system, Types of operating systems, Introduction to Information systems, File handling and management, Introduction to Information Systems: Difference between data and information, Introduction to database systems, Introduction to Network: Networking devices, Network types, Internet & World Wide Web: E-mail and Internet Details, Web browsers.				

CPE 1101	Professional English I	T	-	-
Language Structure: Basic English sentence structures, uses, formation and types of nouns and pronouns with their singular and plural forms, use of “be” and “have”, prepositions, determiners (articles), forms and uses of tenses (the simple present, simple past, simple future, and their passive forms). Speaking: Use social English confidently; introduce self and others; communicate information; produce meaningful statements on personal/ familiar topics; speak and discuss on general topics; engage in group discussions, conversations, and dialogues; formal and informal greeting, leave taking and responses; consonant and vowel sounds. Listening: Listen to general conversations, dialogues, speeches, etc. and identify the topic/ subject matter; comprehend simple instructions, statements and questions; listen to and respond to songs appropriately. Writing: Write short descriptions on personal/ familiar topics using simple sentences, write short compositions, improve spelling, and use basic capitalization and punctuation appropriately. Reading: Identify and understand the general meaning of and simple short texts, read common/ general texts for comprehension, read and understand the implied meaning, read with humour. Integrated Skills: Listening, taking down notes, discussion and reading; reading, thinking and discussion.				

Year I Semester II				
SSM 12001	General Fitness	T	P	F/W
Weight management: Popular diets, Adipose tissue, distribution of body fat, Energy balance, Effective dietary interventions, Creating energy deficit; Modern systems for weight management: The dietary guidelines for whole food carbohydrate diet, Ketogenic diets and Paeolithic diet; Programming personal training with clients: Introduction to personal training, fitness and the health care continuum, advantages of personal training, linking with other professions, goal setting; Appraisal and lifestyle analysis: Rationale for conducting a health and fitness appraisal, Health evaluation, Life style analysis; Consultation and goal setting; Designing aerobic training programmes. Practical session covers one hour moderate intensity physical activities such as brisk Walking, Jogging, Running, Cycling and sports such as Swimming or Football daily.				

SSM 12102	Aerobics and Rhythmic Activities	T	P	W
Introduction to Aerobics: History and evolution, Importance of Aerobics, Basic Rhythmic exercises and conditioning activities performed to music, Types of Aerobics, Special muscle toning exercises, Aerobics session planning and brief knowledge of equipment using: Methods and materials of teaching rhythmic aerobic activities.				

SSM 12103	Movement Concept, Skill Analysis, Performance and Practices in Athletics (Field Events - Jumps)	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

SSM 12104	Movement Concept, Skill Analysis, Performance and Practices in Badminton	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

SSM 12105	Movement Concept, Skill Analysis, Performance and Practices in Netball	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

SSM 12106	Movement Concept, Skill Analysis, Performance and Practices in Volleyball	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

SSM 12107	Basic Chemistry	T	P	-
Energy concept in sports, Measurement of energy, Use of units, SI system of measurements. Introduction to basic structures and functions of bio macromolecules (Carbohydrates, Lipids, Proteins). Theory and practice in chemistry - Laboratory exposure and explanation to chemical phenomenon.				

SSM 12208	Systemic Anatomy & Physiology – Part II	T	P	-
Nervous system, Endocrine system, Digestive system, Respiratory system, Reproductive system, Embryology, Excretory system, Body fluids.				

SSM 12209	Mathematics	T	-	-
Cartesian Coordinate; polar coordinates; Operators; Matrices - Introduction to Matrices, Properties, Adjoin Matrices, Inverse Matrices, and Rank of the Matrices; Solving System of Equation; Limits and Differentiations; Basic Concept of Limits; Introduction to higher order derivatives; Maximum and Minimum Principle Problems and applications; Partial Derivatives; Integration - Rules of Integrations; Differential equation; Basics of Fourier Analysis.				

SSM 12310	Basic Physics	T	P	-
Basic Physics: International system of units, Vectors and Scalars, Motion in one & two dimensions (Equations of motion, Motion under Gravity, Displacement–time and Velocity–time graph), Relativistic velocity, Force and Newton's laws, Adding and Splitting up forces, Type of forces (Gravitational, Frictional, Electro–static, Electromagnetic and Nuclear), Circular Motion, Satellites in orbit, System of particles (Mass, Centre of Gravity and Moment of Inertia), Rotational kinematics, Momentum and Impulse, Conservation of momentum (Collisions, Explosions and Rockets & Jets), Work and Energy, Conservation of energy (Kinetic and Potential energy), Elasticity, Power and Efficiency, Machines (Levers, Ramp, Pulleys and Screw jacks), Equilibrium of rigid bodies, Pressure and Density of fluids, Pascal's Principle and Archimedes' Principle, Fluid flow, Bernoulli's Equation and its Applications and Viscosity. Waves & Vibrations: Waves and Vibration, Material wave (Transverse and Longitudinal), Type of waves (Propagation wave, Stable wave and Beat wave), Ripple tank (Introduction and its demonstration to Reflection, Refraction, Diffraction & Interference), Electromagnetic wave (x–rays and γ rays, Ultra–violet wave, Visible, Infra-red, Micro wave, Radio wave…), Sound wave (Nature of sound, Reflection & Echoes, Reverberation), Wave nature of sound (Refraction, Diffraction, and Interference), Hearing sound (Amplitude, Loudness & Intensity, Frequency & Pitch), The nature and measurement of light, Beams and Rays, Shadows (Eclipse of the Sun and Moon), Reflection and Refraction at plane surfaces, Spherical mirrors and Lenses, Human eye (Short and Long sight), Optical instruments (Camera, Microscope and Telescope). Thermal Physics: Temperature, Heat energy, Expansion and Contraction of materials, Heat capacities (solid, gas), Work done on gas, The First law of Thermodynamics and its Applications, Gas laws, Propagation of heat (Conduction, Convection and Radiation), Climate and Weather (Formation of Clouds, Winds Patterns, Monsoons, Lighting and its hazardous, Solar radiation and Greenhouse effect, Time zones, Temperature zones and Patterns).				

SSM 12211	Applications of Information Technology	T	P	-
Introduction to Web design: Introduction to web designing software, Introduction to html, Creating blogs, Graphics and image editing, Word processing (how to add reference, table of content, reports etc.), Spreadsheet, database management software, presentation tools. Introduction to sports analysis and performance analysis software.				

CPE 1201	Professional English II	T	-	-
Language Structure: Forms and uses of tenses (the present continuous, past continuous, future continuous and their passive forms); conjunctions; complex sentences – with special reference to the relative clauses, relative pronounce and their uses; subject-verb agreement in simple and complex sentences; determiners: some, any, many, a lot. Speaking: Use marks of courtesy in agreeing, disagreeing, getting permission, giving permission, thanking, apologizing, appreciating; ways of saying 'yes' or 'No'; use questions appropriately to ask for information; provide appropriate responses to fairly complex questions with a seasonable degree of accuracy; express facts and opinion on familiar topics; make and respond to suggestions; role plays; talking about one's family. Listening: Listen to variety of texts (dialogues, conversations, etc.); comprehend fairly complex questions; understand internal cohesion; understand simple explanations and descriptions in short texts; identify and understand key ideas in a longer text; listen and take down notes; listen for comprehension. Writing: Write down dictated notes, write short compositions on general topics with a fair degree of accuracy, write conversations and dialogues, take and convey messages, write informal letters, do Paragraph writing. Vocabulary: Use contextual, structural, and morphological clues to deduce meanings of unfamiliar words of phrases. Reading: Read variety of texts and respond appropriately, use Skimming and scanning techniques identify and understand main ideas in more complex texts, infer implicit information in simple texts, read and take down notes. Integrated Skills: Text reconstruction (Listening, Writing, Speaking, and Reading).				

Year II Semester I				
SSM 21001	General Fitness	-	P	W
Practical session covers one hour moderate intensity physical activities such as brisk walking, Jogging, running, Cycling and sports such as Swimming or Soccer daily.				

SSM 21102	Movement Concept, Skill Analysis, Performance and Practices in Athletics (Field Events-Throws)	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

SSM 21103	Movement Concept, Skill Analysis, Performance and Practices in Elle	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

SSM 21104	Movement Concept, Skill Analysis, Performance and Practices in Karate	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

SSM 21105	Movement Concept, Skill Analysis, Performance and Practices in Tennis	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

SSM 21106	Sports Massage Therapy	T	P	W
General notions of manual massage: Definition of massage, Brief historical review of massage, Technical conditions and hygienic of the massage, General classification of massage, Physiological influence of massage, Main manual manipulations of massage, Methodology of application the massage, Classification of sport massages according its objectives and task, Soft tissue massage, Active recovery, Somatic relaxation techniques.				

SSM 21207	Introduction to Psychology	T	-	-
Introduction to psychology and sports psychology; Basic psychological concepts; Motivation in sports and exercise; Arousal, attention and personality of athlete; Situational factors related to anxiety and mood; Improve yourself confidence; Imagery; Psychological obstacles in the clay of performance; Competition and Cooperation; Leadership Psychological Skills Training; Arousal Regulation.				

SSM 21208	Introduction to Biomechanics	T	P	-
Introduction of Biomechanics; concepts of mechanics as they apply to human movement; Determination of the center of mass of the human body; Fundamentals of angular kinetics; The body's movements; The joints of the body, Muscles, the power house of movement; Biomechanical experiment procedures; Data processing; Linear velocities and accelerations caused by rotations; Fundamental movements; Movement patterns; Introduce human motion analyzing software for sporting activities.				

SSM 21209	Basic Statistics & Introduction to Statistical Software	T	P	-
The nature of probability and statistics, Variables and Types of data, Data collection methods and Sampling techniques, Frequency distributions and graphs, Shapes of distribution. Data description: Measures of central tendency; Measures of dispersion; Skewness and kurtosis; Measures of position and Exploratory data analysis. Introduction to probability: Probability approaches; Probability axioms; Elementary properties of probability; Conditional probability and Bayes theorem. Random variables and probability distributions: Binomial, Poisson and Normal distribution. Introduction to statistical software; Data management; Data presentation; Data description, and solve probability problems.				

SSM 21210	Exercise Biochemistry	T	-	-
Biochemistry basics , Introduction to carbohydrates , proteins, lipids, vitamins and minerals: classification and nomenclature, structure, physical and chemical and biochemical properties, functions and reactions, Carbohydrate metabolism during exercise: Glycogen metabolism ; Glycolysis ; The citric acid cycle ; Oxidative phosphorylation ; Lactate production of muscles during exercise , Lipid metabolism in exercise muscle: Triacylglycerol metabolism ; Exercise and lypolysis ; Fatty acid degradation and energy yield of fatty acid oxidation ; Effect of exercise on plasma lipoproteins ; Triacylglycerol and cholesterols , Protein metabolism of muscles during exercise: Amino acid metabolism of muscles during exercise and contribution of protein to the energy expenditure ,Integration of exercise metabolism: interconnections of metabolic pathways ; energy systems and sources in exercise.				

SSM 21211	Exercise Physiology	T	-	-
Physical fitness through healthy life, Energy for physical activities, Respiratory control during exercise, Cardiovascular control during exercise, Cardiovascular adaptation to endurance training, Muscular control during exercise, Hormonal regulation during exercise, Thermoregulation during exercise, Neural control of human movement.				

CPE 2101	Professional English III	T	-	-
Language Structure: Uses, formation and classification of adjectives and adverbs; phrasal verbs; functions of basic modals; determiners – a few, few, a little, little, no, none; forms and uses of tenses (present perfect, past perfect, future perfect and their passive forms). Vocabulary: High frequency vocabulary items required for academic purpose; use dictionaries and glossaries; use clues provided by etymology, suffixes, pre-fixes, pre-modifiers and post modifiers. Speaking: Express likes and dislikes, describe routine; interact in discussions on academic topics; take turn in various speech situations, communicate with confidence to an acceptable degree of fluency. Listening: Listen and take down notes, understand the gist of spoken/ academic texts and respond appropriately, identify the main idea and the supporting details, listen and comprehend instructions and/ or information related to the field of study presented orally. Writing: Spelling/ Spelling rules, describe a process using sequence markers with a reasonable degree of accuracy, write short reports, be familiar with official correspondence, compile a resume (Bio-data), write appropriate covering letters, write official/ formal letters, draft memos, write essays, paraphrase texts; use coherence and cohesive devises. Reading: Differentiate the main idea from the supporting details, identify and unstained functions of discourse markers/ coherence and cohesive devises, read intensively for comprehension, read between lines/ understand the implied meaning; use encyclopedias, read with humour Vocabulary: Everyday expressions – conversation building expressions with “this” and “that”. Integrated Skills: Static Description – description of organisms, substance, objects, people and places in relation to definition, classification, physical appearance, chemical composition, structure etc.; express cause and effect relationship; comparison and contrast; definition and exemplification.				

SSM 21112	German Language – Part 1	T	-	W
Comparison, Two way prepositions, Adjective declination, Genitive case, Simple past, Syntax of subordinate clauses and infinitive constructions, relative clauses, Present tense of the General Subjunctive (Konjunktiv II), introduction to common language usage in the field and practice dialogues and reading general texts related to sport in order to improve vocabulary and expressions.				

SSM 21113	Spanish Language – Part 1	T	-	W
Introduction to Spanish for Sports, The phonetic alphabet, vocabulary, How to pronounce Spanish Words, Useful verbs and expressions: counting, spelling, Basic Spanish grammar: Articles; Pronouns; Nouns; Verb, Basic vocabulary introduced, Simple sentence structures: Greeting people; Basic personal information, Basic skills of comprehension, Sports Equipment related phrases.				

SSM 21114	Chinese Language – Part 1	T	-	W
Introduction to Chinese for Sports, The phonetic alphabet, vocabulary, pronunciation, Greetings, Basic vocabulary introduced: Games; equipment; countries, Basic Chinese grammar: Nouns; verbs; adjectives; particles; demonstratives, Simple sentence structures, Basic skills of comprehension, Sports Equipment related phrases.				

Year II Semester II				
SSM 22001	General Fitness	-	P	W
Practical session covers one hour moderate intensity physical activities such as brisk walking, Jogging, running, Cycling and sports such as Swimming or Soccer daily.				

SSM 22102	Movement Concept, Skill Analysis, Performance and Practices in Cricket	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

SSM 22103	Movement Concept, Skill Analysis, Performance and Practices in Rugby	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

SSM 22104	Movement Concept, Skill Analysis, Performance and Practices in Judo	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

SSM 22105	Movement Concept, Skill Analysis, Performance and Practices in Table Tennis	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

SSM 22206	Sport Psychology	T	P	-
Introduction to sports psychology; Basic psychological concepts; Motivation in sports and exercise; Arousal, attention and personality of athlete; Situational factors related to anxiety and mood; Improve your self-confidence; Psychological obstacles in the clay of performance.				

SSM 22307	Theory and Methodology of Sports Training	T	P	W
Coaching philosophy; Developing the skill of coaching; Basis of sports training; Essence of sports training; Variables of training; General principles of sports training; Training means and methods of Training; Load, fatigue and recovery; Construction and management of training process: micro-cycle, meso-cycle, macro cycle; Planning: Definition, importance, Types, Principles of planning, Steps in formulation of a plan, Planning of various types of plans.				

SSM 22208	Sport Nutrition	T	-	-

Basics of nutrition, Energy expenditure during physical activity, Carbohydrate and exercise performance: Fueling up before exercise; carbohydrate intake during exercise; Post exercise refueling, Fat and exercise performance: Fat oxidation and fat intake during exercise; High fat diets, Protein requirement for exercise, Weight maintenance and body weight issues: Strategies for eating to loss body fat, Vitamins, minerals and antioxidants requirement for exercise, Fluid and electrolyte loss and replacement in exercise, Sport supplements and their side-effects.

SSM 22209	Statistics for Data Analysis	T	P	-

Sampling Theory, Interval and Point estimation, Testing Hypothesis: Principles of hypothesis, Single sample z and t test, Paired t-test and Pooled t-test, Test for proportions. Introduction to design and analysis of experiments: Strategy of Experimentation, Basic Principles, Experiments with a Single Factor, Analysis of variance (ANOVA), Randomized Blocks Design, Mean comparisons methods, Two-Factor Factorial Design. Nonparametric statistics: Single sample tests, Two sample tests, Multiple sample tests, Rank Correlation. Regression analysis: Scatter plot and correlation, Simple linear regression, OLS estimates, Testing the significance of the fitted model (ANOVA), multiple linear regression, model adequacy checking. Practical: Testing hypothesis and constructing confidence intervals, Analysis of count and rank data, Model fitting: Simple and multiple linear regression, Model diagnostic checking, Analysis of simple and factorial experiments data.

SSM 22210	Sports Physiology	T	P	-

Meaning, Nature and Scope of Sports Physiology , Body composition and energy balance , Physiological Effects of Sprint and Endurance Training , Muscular system and exercise , Special aids to exercise training and performance , Exercise performance and environmental stress, Physiological determinants in physical performance , Special topics in applied exercise physiology.

CPE 2201	Professional English IV	T	-	-

Language Structure: Forms and uses of tenses (present perfect continuous, past perfect continuous and future perfect continuous and their passive forms); conditions; complex modality – modals with perfective/ progressive aspects, semi-auxiliaries and catenative; nominalization; focalization. Speaking: Present and discuss matters pertaining to their field of study (present information clearly, ask for information/ clarification, express a point of view: agree/ disagree politely, answer questions appropriately); engage in debates/ discussions on academic/ social/ ethical issues; use appropriate interactive strategies; public speaking. Listening: Understand opinions and inferences, take down notes appr0priately on academic texts, identify various registers, identify and comprehend points made by multiple speakers; listen and take down notes; listen for comprehension. Writing: Summary/ Précis writing; write articles, assignments, tutorials to a considerable degree of accuracy; write academic/ formal essays. Reading: Understand implicit information in texts by making inference; distinguish between facts, suppositions, opinions, attitudes and arguments. Integrated Skills: Description of a process; describing position, movement, and direction; narration: field/ laboratory report; description of graphs, charts and tables. Vocabulary: Common expressions for modifying statements.

SSM 22111	German Language – Part 2	T	-	-

Introduction to common language usage in the field and practice dialogues and reading general texts related to sport in order to improve vocabulary and expressions.

SSM 22112	Spanish Language – Part 2	T	-	-
Situational dialogues related to sports, Specific vocabulary related to various sports, Situational Dialogues, Phrases, Offer, Deny, Accept requests, Complaints, Giving directions, Emergencies, Injuries, Complaints, Commonly used phrases discussed.				

SSM 22113	Chinese Language – Part 2	T	-	-
Situational dialogues related to sports, Specific vocabulary related to various sports, Situational Dialogues, Phrases, Offer, Deny, Accept requests, Complaints, Giving directions, Emergencies, Injuries, Complaints, Commonly used phrases discussed.				

Year III Semester I				
SSM 31001	General Fitness	-	P	-
Practical session covers one hour moderate intensity physical activities such as brisk walking, Jogging, running, Cycling and sports such as Swimming or Soccer daily.				

SSM 31102	Movement Concept, Skill Analysis, Performance and Practices in Hockey	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

SSM 31103	Movement Concept, Skill Analysis, Performance and Practices in Baseball	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

SSM 31104	Movement Concept, Skill Analysis, Performance and Practices in Soccer	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

SSM 31105	Movement Concept, Skill Analysis, Performance and Practices in Weight Lifting	T	P	W
History of the sport, Basic movements of the sport. Basic techniques and skills of selected sport, teaching methodology of techniques for beginners, Rules of the game, Basic formation systems for beginners.				

SSM 31206	Practicum	T	P	F
Introduction to teaching/ coaching and learning: reflective teacher, on becoming a teacher, teacher's role, aims of schools, good teachers, meaning of learning, categories of learning, theories of learning, the learning environment; Teaching/ coaching practice: getting started, the four phase model (plan, teach, evaluation and reporting); Lesson planning skills: learning objectives, student outcome statements, writing and formatting of lesson plans; Developing relationship skills: personal qualities and characteristics, actions for establishing personations relationships, actions to help students feel good about themselves; Developing instructional skills: clarity of communication, beginning a lesson, other steps, questioning, concluding, learning/ teaching resources; Teaching methods/ strategies; Classroom management: preventing management problems, techniques to respond inappropriate behavior, punishment; Evaluating student learning: the purpose of evaluation, key concepts in evaluation, types of evaluation, evaluative techniques, teacher made tests, assessment, judging, making decisions and keeping records.				

SSM 31207	Advanced Theory and Methodology of Sports Training	T	P	W
Systematization of the training plan; Periodization of training: single, double and triple periodization; Annual training program for individual and team sports; Long term Training process: Basic, Advance and High performance Training stages; Monitoring and evaluation of Sports Training; Talent identification and development; Tapering for performance; Peaking for competitions; Methodological and practical principles of the altitude training.				

SSM 31208	Sport Medicine & Injury Prevention	T	-	-
Introduction to sports medicine and injury prevention: Multi-disciplinary approach of sports injury management; Arranging sports medicine unit during an event, Sports injuries: Types of injuries; Mechanism of sports injuries Prevention of sports injuries: Nutritional supplements and doping; Doping in sports: Definition of doping; History of doping; World anti-doping agency; Prohibited list of WADA; How to prevent doping; Procedure of dope testing; Blood and urine tests; Therapeutic use exemption, Special population in sports: Young athletes; Women athletes; Disable athletes Elderly person in sports.				

SSM 31209	Outdoor Recreation & Leadership	T	P	FW
History, resources, programs, facilities, operations and management philosophy of OBT; Governmental agency, private sector, and non-profit sector cooperation in nature park management & Outdoor recreation; Current issues, research and professional practice related to OBT in its programs; Committee updates and preliminary presentations by student Track Teams. Final Trip Logistics and Preparations; Outdoor Recreation Consortium Non-Perial Mountains, Natural Resource Park; Course wrap-up, conclusions and evaluation.				

SSM 31210	Sport Biomechanics	T	P	-
Digital camera and capturing; Recording the moments (Digital Videography); two-dimensional recording procedures, three-dimensional space (diving, gymnastics); Mechanical and anatomical principles that govern movements in sport; Link the structure of the human body with its function from a mechanical perspective, particularly those pertaining to exercise, sport, and physical activity; The quantitative relationships between angular and linear motion characteristics of a rotating body and software analyzing; Introduce of Force plate for sporting activities; Basic biomechanical applications to sporting activities.				

SSM 31211	Musculoskeletal Anatomy & Kinesiology	T	-	-
Kinematics and introduction to kinetics: Description of motions; introduction to forces Statics and dynamics; Translatory motion in linear and concurrent force system; Additional linear forces, Lever systems: Classes of levers, Joint structure and function: joint design; complexities of human joint designs ; joint function; Shoulder complex (joint structure, muscles and movements); Elbow joint (joint structure, muscle and movements); Wrist joint (joint structure, muscles and movements); Hip joint (joint structure, muscles and movements); Knee joint (joint structure, muscles and movements); Ankle joint (joint structure, muscles and movements); Spine and core muscles , Gait: kinematics of gait; kinetics of gait; stair and running gaits.				

SSM 31112	Women and Sports	T	-	-
Introduction to women and sport; Theoretical understanding of the body- Biological aspects of female body, Sociological aspects of female body; Women and sport in the global context- Marketing of body, Feminization of marketing; Female experiences of sports- A history of exclusion, Myths on women's participation in sports, Female participation patterns in sports, Women and violence in sports; Physiology of the menstrual cycle and issues associated with sports performance-Dysmenorrheal, Post menstrual syndrome, Manipulation of menstrual cycle; Exercise and pregnancy; Major health concerns with the menopause- Osteoporosis and coronary heart disease; Breast care in sports.				

SSM 31113	Mathematical Applications in Sports	T	P	-
Solutions of differential equations, Fourier Analysis, Advanced mathematical principle for sport, Technical analysis and corrections for sport movements, Usage of mathematical applications to sport, Mathematical applications and Coaching in sport, Mathematical applications and Judging in sport.				

SSM 31214	Health, Wellness & Lifelong Physical Activities	T	-	-
Meaning of health, fitness and Wellness: Triplex Physical activities, Fitness and Health, Fitness components, Exercise and health, Physical activities for different age groups, The right lifestyle; Barriers to lifespan physical activities Special population in sports and lifelong activities: Young athletes; Women athletes; Disable athletes; Elderly person in sports.				

SSM 31115	Sport Tourism	T	-	-
Tracing the development of the sport-tourism: History from industrial age; The sport in the twentieth century; Sport tourism at the turn of the millennium and beyond, Conceptualizing the sport tourism experience: Definition of sport; Definition of tourism; Conceptualizing sports tourism; Sport tourism places; Sport tourism activities; The motives of sport tourism, Sport tourism behaviors and the travel decision making process: The travel decision making process with sport tourism; Sport tourism as a variable in post decision travel planning; Sport tourism as a spontaneous travel behavior, Sport tourism participation model: Model of sport tourism; Developing a sport tourism participation model, Sport tourism products: Supplementary sports tourism; Sports training tourism; Event sports tourism; Luxury sports tourism.				

Year III Semester II				
SSM 32001	General Fitness	-	P	-
Practical session covers one hour moderate intensity physical activities such as brisk walking, Jogging, running, Cycling and sports such as Swimming or Soccer daily.				

SSM 32202	Specialization of a Selected Sport – Part 1	T	P	W
Tactics of the game (Attacking & Defensive), Formation systems (Attacking & Defensive). Match Systems, Planning of training, Training Sessions, Role of the Coach, Statistics especially for the sport, Different type of game situation drills. Students need to select a one sport that will be listed by the department in the assigned semester for the both specialization part 1 and part 2. Students need to do an action research minor project related to the selected sport (group project) and they need to submit the project report with a presentation. The department organizes workshops relevant to particular sports.				

SSM 32203	Advanced Practicum	T	P	F
Effective teaching: self-evaluation for self-improvement, the cycle of self-improvement, the context of effective teaching, the typical classroom, teacher classroom behaviors; Advanced relationship skills: people in classroom, contact, and the student as an individual learner; Classroom social interactions: climate, teacher messages to students, opportunities for students to interact, feedback; The teacher expectancy effect: kind of expectations, forming expectations, the Pygmalion effect, kinds of expectation effects; The students' perspectives: students' thought process, student perceptions, expectations, motivation and attribution, beliefs and attitudes; Group processes in the classroom: leadership, attraction, socio-metric techniques and sociograms, norms, communication, cohesion; Motivation in the classroom: motives and needs, expectancy vs. value theory, intrinsic and extrinsic motivation, achievement motivation.				

SSM 32204	Research Methodology	T	-	-

What is research; What is science; Methods of inquiry; Scientific method; Characteristics of research; Types of research; Research Methodology; Qualitative, quantitative and mixed-method research; Ethics of research; The process of research (identifying the problem, literature review, formulating a hypothesis, developing the research plan, collecting data, analyzing data using appropriate techniques, interpreting results and forming conclusions); Writing a research proposals; Dissemination of knowledge; Scientific writing; Citations, referencing and plagiarism; Writing of abstracts, extended abstracts and theses; Scientific publishing; Academic presentations; Introduction to action research in sports sciences.

SSM 32205	Sociology of Sports	T	-	-

The Sociology of Sport; Producing Knowledge about Sports in Society; Sports and Socialization; Sports for Children; Deviance in Sports; Sports and the Economy; Gender and Sports; Race and Ethnicity; Social Class; Age and Ability; Sports and the Media; Sports and Religions; Sports in the Future; Sport and Politics; Violence, Sport and the Law.

SSM 32106	Guidance and Counseling	T	-	W

Introduction of Education and Vocational Guidance, Meaning of guidance, need for guidance and its scope in Sri Lanka, aims of guidance; Foundations of guidance (Philosophical, Psychological and Socio-cultural); History of Guidance Movement in Sri Lanka; Types of guidance (Education, Vocational and Personal); Non-Testing Techniques in Guidance; Testing Techniques in Guidance; Guidance Services; Roles of the following in the Guidance Services; Occupational information, meaning and importance, information about education and job opportunities; Counseling.

SSM 32207	Sport Law	T	-	-

The history of the legal systems in Sri Lanka, Legal systems in Sri Lanka, A brief introduction to the constitution of Sri Lanka and the powers of the constitution, Introduction to the personal laws: Kandyan law; Muslim law; Thesawalamei law, Functions of legislative, Executive and judiciary systems of Sri Lanka, The laws relating to the sport in the world: History of sport law in the world, The laws relating to the sport in Sri Lanka: Sport law in Sri Lanka (no.25 of 1973); Sport (amendment) acts, The rule of law and principles for good governance and ethical practice: Corporate governance, Moral reasoning and ethical theory, Stakeholder relationships, Managerial ethics and the rule of law, Improving the ethical climate in organizations and code of ethics, Social responsibility and organizations.

SSM 32208	Sport Management	T	-	-

Dimensions of management application in sport and physical education, Sport and Physical Education Organization and Industry Environment, Programme Development in Sport and Physical Education, Marketing in Sport and Physical Education, Sport and Physical Education Facility Management and Facility Marketing , Sport and Physical Education Event Management, Policy and Policy Development in Sport and Physical Education, Olympic Movement and Olympism, Sport Law and Legal framework in Sport , International Issues in Sport , Financial Planning and Fiscal Management in Sport and Physical Education, Managing Sport Physical Education Projects , Talent management in Sport & Physical Education, Tournament management.

SSM 32209	Human Resource Management	T	-	-

Introduction to human resources management: Definition of human resources management; Evaluation of human resources management; Advantages of human resources management and significance; Functions of human resources management, Human recourses planning, Job analysis, Job designing, Recruitment and selection, Induction, Performance evaluation, Training and development

SSM 32110	Test and Measurements	T	P	-

Introduction to physical education measurement and evaluation: Orientation toward measurement and evaluation in physical education; a brief historical over view in the areas of physical education test and measurement. Statistic and its application in test, construction, evaluation and grading; Basic statistics techniques; Test evaluation construction and administration; Grading in physical education. Physical fitness measurements: The measurement of flexibility; The measurement of strength; The measurement of muscular endurance; The measurement of cardiovascular condition; Anthropometric measurements, body build, body composition; Physical fitness test batteries. Motor performance measurements: The measurement of power; The measurement of agility; The measurement of balance; The measurement of speed and reaction; The measurement of sports skills; The measurement of rhythm and dance; Motor performance test batteries. Other area of measurements: The measurement of social qualification and attitudes; The measurement of knowledge; The measurement of posture.

SSM 32111	Success in Sports	T	-	-

Somatotype and sport performance, Comparing sporting standard, Sport and the mind, Stress and sports, Personality and sport, Motivation and sport, Race and sport.

SSM 32112	Sport Education Model & Game Sense Approach	T	-	-

Technical approach vs. games sense approach (Bunker and Thorpe, 1984); Similarities and differences between Sports; Classification of sports according to games sense approach; Steps in game sense approach to teach sports; Phase sport educational model; Teacher engagement with teaching games for understanding; game sense in physical education, The teachers' coach role in games sense; Practical knowledge and games, Educative game and sports teaching; Moral acceptable conditions and professional ethics. Sports and values; Introduction historical perspective; Beliefs about values and sports.

SSM 32213	Strength and Conditioning	T	P	-

Discovering where to locate strength and conditioning research; Anaerobic exercise prescription: needs analysis, exercise selection, training frequency, exercise order, training load and repetitions, volume and rest periods; Strength and power development; Plyometric training: plyometric mechanics and physiology, plyometric program design and age considerations, plyometric and other forms of exercise, safety considerations, plyometric drills; Speed development; Endurance development; Core stabilization: spinal stabilizing program creation; SAQ training; Resistance training and spotting techniques; Aerobic conditioning; Anaerobic conditioning; Periodization for bio-motor abilities; Agility training; Designing strength and conditioning programs for different sports. Practical sessions covering the demonstration and evaluation of: deadlift, squat, Olympic lifts and derivatives; plyometric exercises; SAQ and speed development exercises; agility exercises; and core stabilization

SSM 32214	Sport Journalism	T	-	-

Ethics and law for the sports journalist; Writing sports stories; Sport, society and the sporting media; Sports studio TV skills; Sports news and reporting; Multi-platform sports journalism; Writing sports features; Writing criticism; Web production for sports journalists; The sports journalist's toolbox; Life as a freelance sports journalist; Presenting skills.

Year IV Semester I				
SSM 41201	Specialization of a Selected Sport – Part 2	T	P	-

Refereeing & Officiating, Match and Techniques analyzing, coaching practice, Code of Ethics of the Coaches, Coaching of the match and coach's behavior, Advance training of deferent evaluations of the techniques and tactics. Students need to continue the specializing the same sport that they selected in the Specialization of a Selected Sport – Part 1. Students need to do an action research minor project related to the selected sport (Individual mini-project) and students need to submit the project report with a presentation. The department organizes workshops relevant to particular sports.

SSM 41102	Sport Facility Design	T	-	-

Introduction to sport facility management: Management task, Demand modelling; Feasibility study; Develop a management plan and design brief, Sport and Physical Education facility design: Nature of Physical Education and Sport facility; Active design and good design; Facility design concept.

SSM 41203	Accounting and Financial Management	T	-	-

Introduction to accounting: Branches of accounting; Assets; Liabilities; Equity; Income and expenditure accounts; Accounting process; Double entry system; Final accounts for sole proprietorships; Preparing a budget and variance analysis, Accounts of non-profit making organizations: Receipt and payment account; Income and expenditure account; Balance sheet, Environment of financial management: An introduction to financial management; What is finance; How financial management differ from finance, Relationship between financial management and other retailed disciplines: Financial management & accounting; Financial management & economics; Financial management & general management, Scope and objective of financial management: Scope of financial management; Functions of financial management; Profit maximization; Wealth maximization; Agency problem; Role of financial manager, Risk & rate of return, The time value of money: Compound interest & future value; Compound interest with non-annual periods; Present value.

SSM 41204	Risk Management and Sport Safety	T	-	-

Introduction to risk management and sport safety: How to do a proper Warm-up; Importance of stretching; Taping and bracing; Protective equipment and Appropriate surfaces; Appropriate training; Adequate recovery, Introduction to sports first aids: Basic sports first aids skills; Anatomy and sport injury terminology; Emergency action steps and providing life supports; Physical assessment and first aid techniques; Moving injured or sick athlete, Sport first aids for specific injuries: Respiratory emergencies and illnesses; Closed head and spine injuries; First aids for wounds and bleeding; First aids for weather related problems; First aids for musculoskeletal injuries (upper and lower body).

SSM 41205	Sport Marketing	T	-	-

Introduction and Aspects of Marketing, Define and Aspects of Sports Marketing (Marketing of Sport), Understanding the Sport Industry, Sport industry environment, The marketing mix and the sporting industry, Segmentation, targeting, and positioning in sport business, Sport Consumer and consumer behavior, Media relations in sport (Types of media, Effective media usage), Sport event marketing, Sport promotion mix, Introduction to marketing planning, Marketing through endorsements and sponsorships, Sport product and product marketing, Sport marketing in Olympic Games, Issues in marketing Sports and ambush marketing, Final presentation.

SSM 41106	Sport Administration Structure	T	-	F

The international federations: Role of international federations, Associations of international sport federations, The national sport federations; The international Olympic committee and the national Olympic committees; The operating environment of sport organisations: Sport system in Sri Lanka, Understanding the sport environment in Sri Lanka; Governance of sport organisations: Key principles of good governance, Good governance of the Olympic and sport movement: Universal principles; Key roles in sport organisations: Introduction, Key roles, Key committees; Tools: Sample constitution of an organisation, Questionnaire for strategy development.

SSM 41107	Comparative Sports	T	-	-

Types of Public Sector Sports Organisation and Funding; The Organisation of Professional Sports Leagues; Approaches to Mega Events; Elite Sport, Elite Sport Development Systems; Sports Participation; PE and School Sport; Comparative Perspectives on Gender and Sport; Range of Countries, Specific Countries.

SSM 41208	Community Service Project	GP

This course will provide students with an opportunity to undertake a community service project in order to develop an appreciation for how their discipline knowledge intersects with community need. Students will work in multi-disciplinary teams to manage real projects and solve real problems experienced by community organizations/ area. They will work with the community to understand their needs, scope the project and develop viable and sustainable solutions. Students will complete a learning journal throughout the course which reflects on the progress of the project, their use of the knowledge and skills taught throughout their degree, and the relevance of the community service project experience to their future careers. Student need to submit a project report relevant to their project.

SSM 41109	Professional Development	T	-	W

Career exploration and Graduate school preparation: Career Development Models, Steps in the career planning/ graduate school process, Job search and graduate school search skills and strategies, Marketing Yourself, Overview of resume, Cover letter, Professionalism & First Year on the Job, Ethics and Etiquette. Money management: Financial Planning & Money Matters. Leadership and Community development, Professional/ Academics Portfolio. Students are expected to prepare Portfolio and at the end of the course need to submit for grading.

SSM 41110	Sports for differently abled Persons	T	-	-

Introduction to disability; Historical perspective of disability sports, Role of sport and adaptive physical activity for people with disabilities, The importance of the influence of biological, social and psychological factors on disability. The theoretical approaches to disability: The biomedical model; The bio-psycho-social model; The rehabilitation model (pathology, impairment, disability and handicap), Opportunities and barriers to participation, Eligibility and classification, Elite Disability Sport: International organizations and sporting events, Health benefits of physical activity for disabled person, Disability and gender in sports.

SSM 41111	Event management	T	-	-

Introduction to event studies: Event management; Event management careers and professionalism; planning events, site planning, operations and logistics: The event experience, programming, and quality management; Organization and co-ordination; Human resources management: acquiring resources and financial management; Safety, health, risk management and security; Marketing and market research; understanding the customer; communications & sales; evaluation and impact assessment.

SSM 41112	Traditional Sports in Sri Lanka	T	-	-

Introduction to Sinhala combative, Field and aquatic sports and games; Combative Sports; Field sports (with animals); Field games (religious); Aquatic sports; Asian Children's game; Traditional games and sports in Sri Lanka, Traditional games and sports in Asian countries festivals; Festivities and games associated with the Sinhala and Hindu New Year.

SSM 41113	Sport Development	T	-	-

Introduction to sports development; Sports development policy; sport, development and community; community sports development; sports development continuum; sectors and levels of provision; sports development stake holders; current system of SD; Sports Ministry and its role: Department of sports development, Provincial department of Sports, Roles and nature of duty.

SSM 41214	Teaching Practice	T	P	-

Theoretical background and analytical framework, Beliefs about the nature of teaching and learning, Classroom teaching practice, Teachers' professional activities: co-operation among staff, Classroom environment, School-level environment: school climate, Job-related attitudes: self-efficacy and job satisfaction, Understanding teachers' professionalism: first steps in linking the school context and teachers' beliefs and practices to teachers' perceived efficacy and the quality of the learning environment, Conclusions and implications for policy and practice.

SSM 41215	Long Term Athlete / Player Development (LTAD)	T	P	-

Introduction to long term athlete development(LTAD); Importance of LTAD; Growth, development and maturation: peak height velocity and peak speed velocity; Physical Literacy; LTAD model: a scientific approach for sports development; Key stages of LTAD: Fundamental stage, Learning to learn stage, Training to train stage, Training to compete stage, Training to win and Retaining; Developing key performance components; Key messages for coaching practice; characteristics of physical, Mental/ Cognitive and Emotional development; optimal windows of trainability. Practical session covers 'kids athletics' training programs suggested by IAAF.

Year IV Semester II		
SSM 42801	B.Sc. Research Project in Sport Sciences & Management	TH

Students have to be required to conduct either research or survey related to Sports Science/ Sports Management either at a relevant industry, research institution, or at the faculty. Students can conduct a product development for the research project, in which case they have to evaluate the product using a research methodology.
The thesis should compulsorily consist of the following parts:

1. Introduction
2. Literature review and the theoretical framework
3. Methodology
4. Results and Discussion
5. Conclusion and recommendations
6. References
7. Annexes

The duration of the project period should be 15 weeks. Project proposal needs to be submitted to the department for the approval through the internal supervisor within the first two weeks and the project report (Thesis) should be submitted at the end of the semester. Guidelines for the preparation of report will be given separately.
Students are advised to plan their project, review relevant literature, develop methodologies and establish links with relevant organizations during the first semester.

** Elective course units will be offered provided a minimum of five (05) of the registered students apply for the given course unit.

++ Obtaining a pass for the Professional English Program (CPE 1101, CPE 1201, CPE 2101 and CPE2201) and General Fitness (SSM 12001, SSM 21001, SSM 22001, SSM 31001 and SSM 32001) is a requirement for the award of the B.Sc. Special Degree in Sports Science and Management.

5.6. PROFESSIONAL ENGLISH FOR BACHELOR OF SCIENCE DEGREE PROGRAMMES OFFERED BY THE FACULTY

INTRODUCTION

Professional English is a non-credited compulsory component for the B.Sc. degree programs in the Faculty of Applied Sciences. It is conducted during the first four semesters and it consists of four (4) parts: Professional English I, Professional English II, Professional English III, and Professional English IV. Each part is covered in one semester with fifteen weeks and two hours per week.

It is necessary for the students to get through all the four parts. The pass mark is 40% (D+). The subject ***Professional English*** is to appear in the detailed Certificate along with the final grade calculated considering the average of all the four parts.

The course is intended to be an integrated skill, activity-based language program to familiarize non-native speakers of the language with the skills and strategies required for effective interaction in English.

It aims to facilitate the undergraduates to excel in their academic work as every subject is conducted in English in the Faculty of Applied Sciences. Emphasis is laid on both *English for General Purposes* (EGP) and *English for Academic Purposes* (EAP). It also aims to make the students confident in using the language appropriately, accurately and fluently in any given situation.

The examination rules and regulations observed in the Faculty of Applied Sciences will apply to ***Professional English*** as well.

OBJECTIVES

The Professional English Program intends:

- To make the undergraduates be familiar with basic and complex sentence structures / patterns
- To introduce word classes and their uses
- To make the students read and listen to general and academic texts for comprehension
- To let students write short and long compositions and reports
- To make them realize the importance of using dictionaries, glossaries and encyclopedias
- To give the undergraduates confidence to communicate with an acceptable degree of fluency and accuracy in any given situation

INTENDED LEARNING OUTCOMES

At the end of the Professional English Program, the students will be able to:

- handle tenses with their respective forms and uses
- use prepositions, determiners, conjunctions, “be” verbs, “have” verbs, phrasal verbs and modal verbs meaningfully
- write simple and complex sentences
- use word classes appropriately
- make the subject agree with the verb
- use conditions
- speak and write on various general / academic topics with a reasonable degree of accuracy
- use different types of greetings and leave taking
- use marks of courtesy
- differentiate between facts and opinion
- make comparisons and contrasts
- find causes and effects

- use dictionaries, glossaries and encyclopedia
- describe information presented in graphs/charts
- describe a procedure (how to do something and how something is done)
- do narrations and static descriptions
- read and comprehend simple and complex passages
- find facts and opinions
- listen to and comprehend short and long speeches / texts /dialogues
- write formal essays / compositions and official correspondences

COURSE CONTENT

Year One Semester One
Professional English I / CPE 1101
Language Structure

• Basic English sentence structures
  ○ SV, SVO, SVC, SVA, SVOO, SVOC, SVOA
• Uses, formation and types of Nouns and Pronouns (Singular / Plural)
• "Be" as full verb (am / is / are / was / were)
  ○ It + be
  ○ There + be
• "Have" as full verb (have / has / had / having)
• Prepositions (uses and omission)
• Determiners – Articles
• Forms and uses of tenses (the simple present, simple past, simple future, and their passive forms)

Speaking

• Use social English confidently
• Introduce self and others
• Communicate information; produce meaningful statements on personal / familiar topics
• Speak and discuss on general topics like family, friends, hobbies, interests, etc.
• Engage in group discussions, conversations, and dialogues
• Greeting and leave taking and responses
  ○ Formal greeting
  ○ Informal greeting
  ○ Different ways of greeting
  ○ Formal leave taking
  ○ Informal leave taking
  ○ Different ways of saying "goodbye" in different situations
• Consonant and Vowel sounds

Listening
• Listen to general conversations, dialogues, speeches, etc. and identify the topic / subject matter • Comprehend simple instructions / statements / questions • Listen to and respond to songs appropriately
Writing
• Write short descriptions on personal / familiar topics using simple sentences • Write short compositions • Improve Spelling • Use basic Capitalization and Punctuation appropriately

Reading

- Identify and understand the general meaning of simple short texts
- Read common / general texts for comprehension
- Read and understand the implied meaning
- Read with humour

Integrated Skills

- Listening, taking down notes, discussion and reading
- Read, think and discuss

Evaluation

Continuous Assessments **40%**
(Four Continuous Assessments will be held related to listening, speaking, reading, writing and grammar)

End Semester Examination **60%**
(This is a three-hour written examination)

Year One Semester Two

Professional English II / CPE 1201

Language Structure

- Forms and Uses of Tenses (the present continuous, past continuous, future continuous and their passive forms)
- Conjunctions
- Complex sentences – with special reference to the relative clauses, relative pronounce and their uses.
- Subject-verb agreement in simple and complex sentences
- Determiners – some, any, many, a lot

Speaking

- Use marks of courtesy in agreeing, disagreeing, getting permission, giving permission, thanking, apologizing, appreciating
- Ways of saying 'yes' or 'No'
- Use questions appropriately to ask for information
- Provide appropriate responses to fairly complex questions with a seasonable degree of accuracy
- Express facts and opinion on familiar topics
- Make and respond to suggestions
- Role plays
- Talking about one's family

Listening

- Listen to variety of texts (dialogues, conversations, etc)
- Comprehend fairly complex questions
- Understand internal cohesion
- Understand simple explanations and descriptions in short texts
- Identify and understand key ideas in a longer text
- Listen and take down notes
- Listen for comprehension

Writing

- Write down dictated notes
- Write short compositions on general topics with a fair degree of accuracy
- Write conversations and dialogues
- Take and convey messages
- Write Informal letters
- Do Paragraph writing

Vocabulary

- Use contextual, structural, and morphological clues to deduce meanings of unfamiliar words of phrases

Reading

- Read variety of texts and respond appropriately
- Use Skimming and scanning techniques
- Identify and understand main ideas in more complex texts
- Infer implicit information in simple texts
- Read and take down notes

Integrated Skills

- Text reconstruction (Listening, Writing, Speaking, Reading)

Evaluation

Continuous Assessments **40%**
(Four Continuous Assessments will be held related to listening, speaking, reading, writing and structure)

End Semester Examination **60%**
(This is a three-hour written examination)

Year Two Semester One

Professional English III / CPE 2101

Language Structure

- Uses, formation and classification of Adjectives and Adverbs
- Phrasal Verbs
- Functions of basic Modals
- Determiners – a few, few, a little, little, no, none
- Forms and Uses of Tenses (Present perfect, past perfect, future perfect and their passive forms)

Vocabulary

- High frequency vocabulary items required for academic purpose
- Use dictionaries and glossaries
  - Synonyms
  - Antonyms
  - Collocation
  - Pronunciation
  - Word class / part of Speech
  - Finding words quickly
  - Abbreviations
- Use clues provided by etymology, suffixes, pre-fixes, pre-modifiers and post modifiers
- Use encyclopedias

Speaking

- Express likes and dislikes
- Describe routine
- Interact in discussions on academic topics
- Take turn in various speech situations
- Communicate with confidence to an acceptable degree of fluency

Listening

- Listen and take down notes
- Understand the gist of spoken/academic texts and respond appropriately
- Identify the main idea and the supporting details
- Listen and comprehend instructions and/or information related to the field of study presented orally

Writing

- Spelling / Spelling rules
- Describe a process using sequence markers with a reasonable degree of accuracy
- Write short reports
- Be familiar with official correspondence
  - Compile a resume (Bio-data)
  - Write appropriate covering letters
  - Write official / formal letters
  - Draft memos
- Write essays
- Paraphrase texts
- Use Coherence and Cohesive devises

Reading

- Differentiate the main idea from the supporting details
- Identify and unstained functions of discourse markers / Coherence and Cohesive devises
- Read intensively for comprehension
- Read between lines / understand the implied meaning
- Read with humour

Vocabulary

- Everyday expressions
  - conversation building expressions
  - with “this” and “that”

Integrated Skills

- Static Description – description of organisms, substance, objects, people and places in relation to
  - Definition
  - Classification
  - Physical appearance
  - Chemical composition
  - Structure (location, parts and functions of parts)
  - Characteristics and use
  - Qualities and materials
- Express cause and effect relationship
- Comparison and Contrast
- Definition and exemplification

Evaluation

Continuous Assessments **40%**
(Four Continuous Assessments will be held related to listening, speaking, reading, writing and structure)
End Semester Examination **60%**
(This is a three-hour written examination)

Year Two Semester Two
Professional English IV / CPE 2201
Language Structure

• Forms and Uses of Tenses (present perfect continuous, past perfect continuous and future perfect continuous and their passive forms)
• Conditions
  o " if" types
  o unless
  o provided that
  o providing that
  o assuming that
  o as long as
  o in case
  o in the event that
  o given that
  o on condition that
  o supposing that
• Complex Modality – modals with perfective/ progressive aspects, semi-auxiliaries and catenative
  o may/might/could + be + -ing
  o may/might/could + have
  o may/might/could + have to /be able to
  o may/might/could + appear to / seem to
• Nominalization
• Focalization

Speaking

• Present and discuss matters pertaining to their field of study
  o Present information clearly
  o Ask for information / clarification
  o Express a point of view: agree / disagree politely
  o Answer questions appropriately
• Engage in debates/discussions on academic / social/ethical issues
• Use appropriate interactive strategies
• Public speaking

Listening
• Understand opinions and inferences • Take down notes appr0priately on academic texts • Identify various registers • Identify and comprehend points made by multiple speakers • Listen and take down notes • Listen for comprehension
Writing
• Summary/Précis writing • Write articles, assignments, tutorials to a considerable degree of accuracy • Write academic / formal essays

Reading

- Understand implicit information in texts by making inference
- Distinguish between facts, suppositions, opinions, attitudes and arguments

Integrated Skills

- Description of a process:
  - Instructions – how to do something
  - Procedure – how something is done
- Describing position, movement, and direction
- Narration: field/laboratory report; how something was done
  - Apparatus description (static description)
  - Description of the procedure followed (narrative)
  - Presenting the results obtained
- Graphs, Charts and tables
  - Comprehend information presented in figures
  - Present information in figures

Vocabulary

- Common expressions for modifying statements

Evaluation

Continuous Assessments **40%**
(Four Continuous Assessments will be held related to listening, speaking, reading, writing and structure)

End Semester Examination **60%**
(This is a three-hour written examination)

English for the Third Academic Year

During the third year, there will not be any formal continuous assessments or examinations. The following areas will be covered.

Language Structure

- Reported Speech
- Reported Passive
- topicalization – This kind of subject is suitable for him.
- cleft sentences – It is the grade that upsets me.
- Pseudo cleft sentences – What every wants is love.

Listening

- Identify and understand illustrations, examples and digressions and deviations in academic discourse
- Identify and understand discourse markers which signpost rhetorical structure of a fairly lengthy text / lecture
- Understand and interpret attitudes, opinions and stance of speakers in a multi speaker environment

Speaking

- Discuss / identify possibility and probability – conditional clauses
- Express thoughts and feelings
- Present arguments effectively using appropriate rhetoric
- Engage in discussions on various issues
- Make formal presentations
- Handle questions, clarifications, suggestions, comments, etc. related to the presentations
- Use a number of strategies to keep a conversation going

Writing
• Handle descriptive, narrative, expository and argumentative prose with a reasonable degree of accuracy and fluency • Summary/Précis writing • Write creatively on topics of their choice
Reading
• Identify and understand complex grammatical structures and sentence patterns • Relate one part of a text to another • Extract appropriate information from complex texts • Understand writer's intention, attitude and tone
Integrated Skills

• Read, think and discuss
• Organize and hold meetings
  o Prepare appropriate agenda
  o Take down minutes
• Read and respond to imaginative writing outside the immediate field of study
• Learn and engage in panel discussions, negotiations and interviews

Recommended Reading
• Cheryl Benz, Myra M. Medina, Linda Robinson Fellag, John D. Avery, Cynthia Schuemann 1st Edition © 2006 College Reading 1, 2, 3, 4 • CHOLIJ, TOWARDS ACADEMIC ENGLISH • Craswell, G. 2004. *Writing for Academic Success*. Sage Publications. • Donald Hall, Sven Birkerts (1997)Writing Well, Longman Publishing Group • HELGESEN ACTIVE LISTENING 1 : INTRO SKILLS : STUDENTS BOOK • Hewings, M. (1999) Advanced English Grammar, Cambridge University Press • Jansz, O. (Ed.) (2oo4) Exploration: A course in reading, thinking and communication, Foundation Boobs • Karen E.Walsh, Eileen Cotter, Gabriella Nuttall, Li-Lee Tunceren, Sharon Cavusgil 1st Edition © 2006 College Writing 1, 2,3, 4 • MCCARTHY, ACADEMIC VOCABULARY IN USE (SOUTH ASIAN EDITION) • Murray, N. 2012. *Writing Essays in English Language and Linguistics* , Cambridge University Press. • Nagasundaram. P. (2012) ESSENTIAJ GRAMMAR, CRC Press • Nagasundaram, P. COMMUNICATE IN ENGLISH, Students' Manual One & Two (Prepared for Sabaragamuwa University Students) • Swan, M. (2005) Practical English Usage, Oxford University Press • Wijesinha, R. A Handbook of English Grammar, Foundation Books • Gunawardana. L. (1984) Introductory English for Science and Technology, Book One, Open University of Sri Lanka • Gunawardana. L. (1984) Introductory English for Science and Technology, Book Two, Open University of Sri Lanka • https://www.owl.english.purdue.edu/ • http://www2.warwick.ac.uk/fac/soc/al/learning_english • http://www.englishpage.com

6. STUDENT AWARDS

PROFESSOR INDRARATNE BALASOORIYA MEMORIAL GOLD MEDAL
This will be awarded to a student who obtained a First class pass with the highest aggregate mark in the final degree examination at the first attempt in Food Science and Technology.

PROFESSOR W.S. FERNANDO CHEMICAL TECHNOLOGY GOLD MEDAL ***(Awarded by Prof. W.S. Fernando)***
This will be awarded for the best performance in Chemical Technology, to the student who obtained the highest FGPA mark with a second class upper division pass or above for the Special Degree in Chemical Technology.

D .S. RUPASINGHE MEMORIAL GOLD MEDAL ***(Awarded by Prof. M.S. Rupasighe and the family)***
This will be awarded for the best performance in Environmental Science and Natural Resources Management, to the student who obtained the highest FGPA mark with a second class upper division pass or above for the Special Degree in Environmental Science and Natural Resources Management.

MR. and MRS. M.B.S. PALIPANE MEMORIAL GOLD MEDAL ***(Awarded by Prof. K.B. Palipane)***
This will be awarded for the best performance in Food Engineering in the Department of Food Science and Technology, to the student who obtained the highest FGPA mark with a first class or a second class upper division pass in the final degree examination

PROFFESOR K.K.D.S. RANAWEERA GOLD MEDAL ***(Awarded by GTS Active (Pvt.) Ltd.)***
Awarded to the student the best performance in the final year research project in BSc (Special) Degree Programme in the Department of Food Science and Technology

PROFFESOR JAN WRIGHT GOLD MEDAL ***(Awarded by Ms. T.P. Liyanage)***
Awarded to the student with the best performance in the Degree of Physical Education

PROFFESOR MAHINDA S RUPASHINGHE GOLD MEDAL ***(Awarded by Mr. S. Joniton)***
Awarded to the student with the best performance in the Degree of Sport Sciences & Management

THAMBIPPILLAI THAMBIRATNAM (J.P.U.M) – ATTORNEY AT LAW MEMORIAL GOLD MEDAL ***(Awarded by Mr. S. Vasanthapriyan)***
Awarded to the student with the best performance in Computing & Information Systems

7. EXTERNAL PROGRAMS

The following program is conducted by the Faculty through the External Degree Program and Extension Services Unit of the University

EXTENSION PROGRAMS IN ENGLISH

- **Certificate Course in English** for Government and Private Sector Employees
- **Diploma Course in English** for Government and Private Sector Employees

EXTENSION PROGRAM IN COMPUTER AWARENESS

- **Certificate Course in Computer Awareness** of six-month duration offered for School Leavers.
- **Short term crash program in Computer Awareness** for personnel of private and public sector

8. EXAMINATION CRITERIA

8.1. GENERAL

A student who satisfies the following conditions will be awarded a degree in B.Sc. in (Food Science and Technology / Environmental Sciences and Natural Resource Management / Physical Sciences (general) / Applied Physics / Chemical Technology / Computer Science & Technology / Information Systems / Sport Science & Management / Physical Education).

- Be registered at the University as a candidate for the relevant degree program.
- Have completed the program of studies for each Semester to the satisfaction of the Senate.
- A satisfactory completion of the program of studies will include at least 80% attendance for tutorials and practical assignments, etc.

Every registered student who wishes to sit the examination should submit an application in the appropriate form within the stipulated period. Each eligible student will be issued an admission card/form to sit the relevant examination.

Every candidate should sit the examination in respect of all the relevant subjects studied during the semester.

A candidate will be given a question paper for each subject at the examination conducted at the end of the semester, which is called the End Semester Examination.

The End Semester Examination of each subject will carry a minimum of 60% of the final marks. An appropriate proportion of marks not exceeding 40% will be assigned to Mid

Semester Examination and/or Assignments and/or Quizzes that are conducted throughout the semester. Finally, the subject is evaluated at the end of the semester based on all above mentioned evaluations, totaling up to 100 marks. However, depending on the course unit, the form of evaluation could be varied and will be informed prior to commencement of the course.

8.2. GRADES AND GRADE POINTS

A letter grade shall be awarded to each course. The cut-off marks for each grade and the corresponding grade points are given below.

Grade	Marks	Grade Point
A+	≥ 90	4.00
A	80-89	4.00
A-	75-79	3.70
B+	70-74	3.30
B	65-69	3.00
B-	60-64	2.70
C+	55-59	2.30
C	50-54	2.00
C-	45-49	1.70
D+	40-44	1.30
D	30-39	1.00
E	≤ 29	0.00

Students can repeat the examination of a subject **only twice** for upgrading the grade of a course.

All **E** grades should be improved at the **first available opportunity**.

The **maximum grade** given for a repeated examination shall be **C**.

A student who obtains any grade less than a **C** has the option to repeat the exam of a subject and upgrade to a maximum of **C**.

In granting a grade at a successful **repeat examination**, all previous less satisfactory grades will be eliminated and a "pass grade" of "C" will be awarded at the successful attempt, irrespective of the marks scored by the candidate.

8.3. GRADE POINT AVARAGE

The GPA of the year will be computed as the sum of the products of the credits assigned per year and the grade point granted for each subject divided by the total number of credits assigned per year.

$$\textbf{Grade Point Avarage } (GPA) = \frac{\sum_{i=1}^{n} GP(i).CP(i)}{N}$$

n = *Number of Subjects assigned per year*
$GP(i)$ = *Grade Point of i^{th} Subject*
$CP(i)$ = *Credit Points of i^{th} Subject*
N = *Number of Credits assigned per year*

Example:

Subject	*Credit Points assigned (CP)*	*Grade*	*Grade Point (GP)*	*(CP)*(GP)*
I	*2*	A^+	*4.00*	*8.00*
II	*1*	B^-	*2.70*	*2.70*
III	*2*	A^+	*4.00*	*8.00*
IV	*2*	*C*	*2.00*	*4.00*
V	*1*	A^+	*4.00*	*4.00*
VI	*2*	B^+	*3.30*	*6.60*
VII	*3*	*B*	*3.00*	*9.00*
VIII	*3*	*A*	*4.00*	*12.00*
IX	*3*	*A*	*4.00*	*12.00*
	19			***65.30***

$$\sum_{i=1}^{n} GP(i).CP(i) = \mathbf{65.30}$$

$$GPA = \frac{65.3}{19}$$

$$= \mathbf{3.43}$$

8.4. FINAL GPA (FGPA)

The Final GPA (FGPA) of the four year degree program will be calculated considering the GPA of the year 1, year 2, year 3 and year 4, which will be weighted by 0.2, 0.2, 0.3 and 0.3 respectively, as well as the total number of credits earned in each year.

$$FGPA = \frac{\sum_{j=1}^{4} a_j T_j P_j}{\sum_{j=1}^{4} a_j T_j}$$

a_j = 0.2, 0.2, 0.3 and 0.3 for j = 1st year, 2nd year, 3rd year and 4th year respectively.
T_j = total credits earned in year j
P_j = GPA in year j

For the three year degree program, FGPA will be calculated considering the GPA of the year 1, year 2 and year 3, which will be weighted by 0.3,0.3 and 0.4 respectively, as well as the total number of credits earned in each year.

$$FGPA = \frac{\sum_{j=1}^{3} a_j T_j P_j}{\sum_{j=1}^{3} a_j T_j}$$

a_j = 0.3, 0.3 and 0.4 for j = 1st year, 2nd year and 3rd year respectively.
T_j = total credits earned in year j
P_j = GPA in year j

The FGPA will be rounded to the second decimal place, and the FGPA for the degree program will be calculated at the completion of all requirements for the degree.

8.5. PASS

A candidate must obtain at least the minimum grade (D) for all courses in each semester securing FGPA $\geq$ 2 at the end of the degree program to complete the degree and to be eligible to award of a degree certificate.

8.6. AWARD OF CLASSES

Classes will be awarded on successful completion of the degree program, entirely on the Final GPA (FGPA) of the student, on the following basis:

FGPA	CLASS AWARDED
4.00 - 3.70	FIRST CLASS
3.69 - 3.30	SECOND CLASS (UPPER DIVISION)
3.29 - 2.70	SECOND CLASS (LOWER DIVISION)
2.69 - 2.00	PASS

9. EXAMINATION PROCEDURES, OFFENCES AND PUNISHMENTS

9.1. RULES & REGULATIONS GOVERNING THE HOLDING OF EXAMINATIONS

Candidates should be at the examination hall 15 minutes before the commencement of the relevant examination. They should enter the examination hall only when informed to do so by the supervisor.

After entering the examination hall the candidates should be seated at the desk/table bearing their Index No.

Candidates are permitted to bring useful items such as pens, pencils, erasers, ink, rulers, geometrical instruments, coloured pencils etc. to the examination hall. No candidate is allowed to bring in any written paper or notes or any other item, which may be misused at the examination.

Candidates are not allowed to enter the examination hall 30 minutes after the commencement of an examination and they will not be allowed to leave the examination hall before the lapse of 30 minutes from the commencement of the examination and during the last 15 minutes of the examination

Every candidate must bring the Examination Entry Form, Student Record Book and the Student Identity Card to the examination hall. While the Student Record Book and the Identity card should carry the student's photograph and signature, it should also be certified either by the Registrar or an officer authorized by the Registrar. If the names appearing in the Student Record Book/ Identity card and those in the Examination Entry form differs, the candidate has to submit an affidavit to the Registrar. In the event of such certification not being available, the candidate has to submit either the National Identity Card or a recent photograph certified by an authorized officer.

When requested by the Supervisor of the examination, candidates must surrender all documents in their possession.

No candidate should ask another for anything, exchange anything, engage in conversation, copy from another or help or encourage another candidate to copy.

Candidates should write their answers in the answer sheets or answer books issued on the particular date of the examination.

Writing paper such as answer sheets, graph paper, drawing paper, ledger and journal sheets required by the candidates will be issued to them at the examination center. Candidates are advised not to tear, bend crumple or destroy any paper or answer sheet given to them. Writing paper issued only by the supervisor should be used at the examination. Log tables should be used carefully and left on the table after use. All stationery supplied to the candidates, both used and unused, should be left on the desks when candidates leave the examination hall.

Before answering the question paper, candidates should write their Index No. and the name of the examination in the relevant place in the answer script. The Index No. Should also be written in all other sheets used for answering questions. No candidate should write his/her name or place any identification mark on the answer script. It should also be noted that using the Index No. of another is a breach of examination rules.

All paper used for rough work should be crossed with a line and annexed to the answer script. Rough work should not be done on the Examination Entry Form, timetable or question paper.

All candidates must maintain strict silence both inside and outside the examination hall and not disturb the supervisor, invigilators and other candidates.

Except for a practical or field note book or assignment written by himself/ herself, no candidate is allowed to submit any other document written partly or wholly by someone else, with the answer script.

Impersonation of any kind is strictly prohibited.

The supervisor or the invigilators have the authority to call for a written statement from a candidate regarding any incident that takes place in the examination hall. Candidates should not refuse to make such a statement or sign such a statement.

Answer scripts should be personally handed over to the Supervisor or an Invigilator. Answer scripts should not be handed over to anyone else for whatever reason. All candidates should remain seated until all answer scripts are collected.

Candidates must make sure that they don't have in their possession any document, note or device which can be misused at the examination. They must also ensure that they do not indulge in acts, which can give rise to their being suspected of misconduct at the examination.

9.2. SUBMITTING MEDICAL CERTIFICATES FOR ABSENCE AT EXAMINATION

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.

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.

9.3. EXAMINATION MALPRACTICES

- Possession of unauthorized documents.
- Copying
- Cheating
- Removal of examination stationery from the examination hall.
- Inappropriate behaviour
- Impersonation
- Gaining or attempting to gain unlawful access to the contents of a question paper.
- Aiding or abetting someone to cheat or receiving assistance from someone to cheat.
- Using undue influence on supervisors, invigilators and other examination officials.
- Any other action considered as an examination malpractice by the University Senate.

9.4. 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.

9.5. PUNISHMENT FOR EXAMINATION MALPRACTICES

Possession of unauthorized documents

Penalty:

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

Copying

Penalty:

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

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.

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.

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.

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.

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.

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.

Attempting to unduly influence examination supervisors and other officials

Penalty:

Any punishment prescribed by the Senate.

Being guilty of an examination malpractice for the second time

Penalty:

Cancellation of registration as a student of the University.

Compulsory punishments

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

- Withholding a class for the degree.
- Limiting the maximum marks obtainable to 40% when re-sitting cancelled question papers.
- Either cancelling or withholding scholarships and bursaries.
- Withdraw residential facilities.
- Withholding invitation to graduation ceremony
- 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

10. CODE OF DISCIPLINE FOR STUDENTS

SECTION I - GENERAL STUDENTS DISCIPLINE

Acts of Indiscipline and Insubordination

1. The conduct of every student should at all times be exemplary throughout his/her period of Studentship.
2. Every Student should apply himself to his academic work in such manner as to satisfy the University. No student may absent himself from lectures or practical work for a period exceeding three weeks in one academic year unless he has obtained special permission or has a valid reason for such absence.
3. No student must commit any of the acts of indiscipline and insubordination listed below:
   (i) Behaving in such a manner as to bring into disrepute or endanger the good name of the University: to obstruct the proper functioning of the educational, examination, or administrative activities of the University, to prevent or obstruct a member of the academic or non-academic staff, or an employee of the University from carrying out his duties: to ridicule or humiliate such person.
   (ii) Failure or inability to produce the students' record book, which will be issued to students, when called upon to do so by the Vice-Chancellor or the Registrar, or failure to identify himself/herself.
   (iii) Causing damage to University property, removing University 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.
4. Causing, or aiding, abetting, encouraging, or sanctioning others to cause injury or harm to the self-respect 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.
5. Establishing, organizing, conducting or assisting in any activity an organization or society within the University, apart from those registered in terms of Clauses 112,114,115,116,117 and 118 of part III of the Universities Act No. 165 of 1978 as amended by the Universities (Amendment) Act. No. 7 of 1985.
6. Behaving is such a 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, cultural or social event, which may have been organized with prior approval from the Vice-Chancellor by any society or organization which has been registered under the provisions laid out in Section (05) above.
7. Behaving in such a 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, or by the University administration, or by the academic or non-academic staff, or by an external organization.
8. 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 of the University.

9. Holding meetings, picketing demonstrating, participating in processions, or fetes publishing, drawing, writing, putting up or distributing handbills, 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 of some cause outside the University.
10. Ragging in any form. (N.B. any person found ragging is liable to be expelled from the University without any inquiry being held.)
11. Collecting, or encouraging to collect, or sanctioning the collection of money or any other item from students or employees or visitors 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 be with the full written consent of the ice-Chancellor.
12. Writing, printing, publishing, distributing, exhibiting, or pasting, either within the University or in its vicinity, any poster, notice, pamphlet, or other writings slanderous to any individual or detrimental to the reputation of the University, to discipline, or to peace.
13. 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 of the Universities Act No 16 of 1978, as amended by the Universities (Amendment) Act No 7 of 1985, and even if such notice or poster has been approved by the Vice-Chancellor, the relevant teacher, or the Chief Students Counselor.
14. Publishing, broadcasting, telecasting, or releasing to the mass media, whether by the student on his own responsibility, or on behalf or another student or group of students, or on behalf of a society, any statement, article or notice, detrimental to the reputation of the University or insulting or humiliating the University authorities, or any official or employee of the University, or any other person connected with the University.
15. Consumption, distribution, sale or storage of drugs within or bringing such drugs into the University, or being under the influence of liquor or drugs within the University, or encouraging, assisting or sanctioning such action by any other person.
16. Consumption, distribution, sale or storage of liquor anywhere within the premises other than those permitted by the authorities.
17. Bringing into, or keeping, or storing within the University any weapon, explosives, or dangerous items, or encouraging or assisting such action.
18. Non-provision or the avoidance of provision of information needed by or requested by the University, or the provision of false or distorted information.
19. Abuse or misuse of University buildings, grounds, equipment or the property belonging to the University, or their use for unsuitable, unsanctioned, or improper purposes, or non-observation of the rules for their use.
20. Remaining within the University premises during times when the University is closed to students. (Such times may be subject to periodic changes.)
21. 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

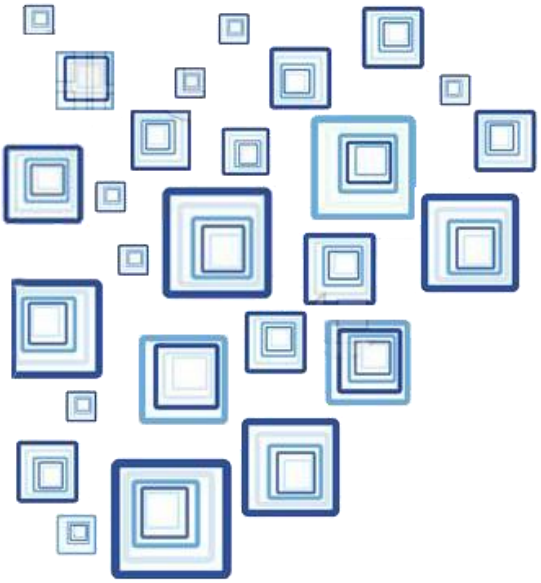
1. Any student found guilty of any offence specified as an act of indiscipline or insubordination in Section I above or of attempting to subvert the provision of this section (Section 11 - Punishments) may be subjected to one or more of the punishments listed below, as deemed

sufficient by the Vice Chancellor, acting in accordance with the findings and recommendation of the Disciplinary Committee.

(i) A caution or a severe warning.
(ii) A fine, not exceeding Rs.500/=
(iii) Recovery of any loss sustained by the University. Suspension from classes, examinations, and from the use of all University facilities for a specified period.
(iv) Suspension from sitting examinations of the University for an unspecified period.
(v) Cancellation, postponement, or suspension of the release of examination results for an indefinite period
(vi) Regarded as having relinquished the course and/ or the studentship of University.
(vii) Expulsion from the University.

(The imposition of any one or more of the above 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 student could lead to a breakdown of discipline of the University or render difficulty in the normal running of the University, or lead to a breach of the peace.
3. Any student dissatisfied by the imposition upon him of one or more of the punishments listed in section 11, 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 decision of the Vice-Chancellor in consultation with the Council shall be final.
5. Apart from the imposition of the punishments listed in Section 11, No.01 (i) to (viii), if a student has been found guilty of any offence referred to in section 1, the University reserves for itself the right to review and re-evaluate the conduct of such a student during his/her period in the University, before conferring upon him/her any degree, diploma or certificate.



Published By

Deans Office
Faculty of Applied Sciences
Sabaragamuwa University of Sri Lanka

Book Designed By

Wiraj Udara Wickramaarachchi

Cover Designed By

Salinda Wijayabandara