

B.Sc in Computer Science and Technology



Department of Computer Science and Technology Faculty of Science and Technology Uva Wellassa University

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Introduction

The Computer Science and Technology degree programme leads to Bachelor of Science in Computer Science and Technology (B.Sc in CST) designed for four academic years according to the Sri Lankan Qualification Framework (SLQF) Level 6 as Bachelor of honors degree and under the Classification of Computer Science in Computing Degrees. The entry requirement of this course will be minimum at least "S" passes for Chemistry and Physics and Combine Mathematics or Biology in G.C.E Advance Level. This programme to offers a modern and technology – integrated curriculum ensuring an interdisciplinary learning environment where students are exposed to a multitude of related disciplines broadening their skills needed for a competitive market. The curriculum is further updated with the emerging trends, requirement and guidelines of professional computing bodies such as IEEE/ACM Curriculum Guidelines. The course units evolve from fundamentals through more advanced topics whereby the students will have adequate preparation for engaging in real-world projects during their industrial training. Individual, group and other projects throughout the degree programme will allow the students to explore various horizons in the IT arena. The department has close links with industries that enhance our teaching and research. Furthermore, our collaboration with industries provides opportunities to the students to find training placements and industry relevant projects.

Our Aim to provide the complete and durable knowledge in computing necessary to becomes a future expert in developing and rapid changing computer science discipline. Furthermore, we aim to make graduates who learn lifelong to solve computational problems and able to contribute emerging computing research. Each graduate will be given adequate knowledge to be real computing professionals in the rapid changing software and IT related fields. The degree program further aims to produce IT professionals add value to local industries to support the national economic development process with the knowledge obtained by research and independent studies.

Computer Science and Technology Graduates should:

be able to use a range of programming languages and tools to develop computer programs that are effective solutions to problems

be equipped with a range of fundamental principles of computer science that will provide the basis for future learning and enable them to adapt to the constant rapid development of the field.

be able to work as an effective member or leader of diverse teams within a multi-level, multi-disciplinary and multicultural setting

have entrepreneurial skills

be able to communicate ideas and results clearly, concisely and more efficiently both orally, by giving presentations, and in writing, for instance in the production of technical reports

The Documents Referred

IEEE Guidelines of Computer Science curriculum 2013

UGC Commission Circular 995

Curriculum Design Guideline Computer Society

Sri Lankan Quality Frame work-Initial and Updated Version (Credits, Training, Research Project)

Computer Science Benchmark (Draft By UGC Computing Standing Committee)

The Course Code Design

| | Interpretation | | Seq |
|-------|----------------------------|--|-----|
| Digit | (Proposed) | Courses | No |
| | | Basic Electricity and Electronics (1,1) | 1 |
| | Introductory / | Introduction to Computer Science & Technology (1,1) | 2 |
| 0 | Basic | Structured Programming (1,1) | 3 |
| | Dusie | Database Management Systems(1,2) | 4 |
| | | Fundamentals of Computer Networks(1,2) | 5 |
| | Mathematics 9 | Discrete Mathematics I(1,2) | 1 |
| 1 | Statistics | Quantitative Techniques (2,1) | 2 |
| | 5181151165 | Discrete Mathematics II(2,2) | 3 |
| | | Object Oriented Analysis & Design (2,1) | 1 |
| | | Object Oriented Programming (2,1) | 2 |
| | Drogramming | Data Structures & Algorithms (2,2) | 3 |
| | Programming Paradigms & | Software Engineering (2,2) | 4 |
| 2 | Software Designing | Advanced Database Management Systems(3,1) | 5 |
| | | Rapid Application Development(3,1) | 6 |
| | | Web Development Technology(3,2) | 7 |
| | | Software Quality Assurance(4,1) | 8 |
| | | Software Design Using Design Patterns (4,1) | 9 |
| | | Data Communication & Networking (2,1) | 1 |
| | | Cryptographic Systems (3,1) | 2 |
| 2 | Networking & Communication | Advance Networking and Applications (4,1) | 3 |
| 5 | | Mobile Computing(4,1) | 4 |
| | | System Administration and Maintenance (4,1) | 5 |
| | | Wireless Communication Systems and Sensor Networks (4,1) | 6 |
| | High | Middleware Architecture (3,2) | 1 |
| 4 | Performance | Parallel & Distributed Computing (3,2) | 2 |
| | Computing | Cloud Computing(4,1) | 3 |
| | System | Microcomputer Architecture & Logic Design (1,2) | 1 |
| | | Operating Systems Concepts & Design (2,2) | 2 |
| 5 | Architecture & | Computer Systems Architecture (3,2) | 3 |
| | Logic Design | Embedded Systems and Device Interfacing (3,2) | 4 |
| | | Systems Level Programming (3,2) | 5 |

| | | Artificial Intelligent Systems (3,1) | 1 |
|---|---------------------------|---|---|
| | | Human Computer Interaction (3,1) | 2 |
| | Artificial | Augmented Reality (4,1) | 3 |
| c | Intelligence & | Bioinformatics (4,1) | 4 |
| 0 | Machine | Biometrics & Computer Forensic (4,1) | 5 |
| | Learning | Data Warehousing & Data Mining (4,1) | 6 |
| | | Fuzzy Logic & Neural Networks (4,1) | 7 |
| | | Robotics(4,1) | 8 |
| | | Web Designing (2,1) | 1 |
| | Graphics & | Computer Graphics (2,2) | 2 |
| 7 | Image | Digital Image Processing (3,1) | 3 |
| | Processing | Multimedia & Hypermedia Technology (3,2) | 4 |
| | | Remote Sensing and Image Interpretation (4,1) | 5 |
| | Information | Management Information Systems(4,1) | 1 |
| 8 | Systems & Localization | Software Localization (4,1) | 2 |
| | | Group project (2,2) | 1 |
| | Projects, | Entrepreneurship (4,1) | 2 |
| 9 | Research & | Research Methodology and Scientific Writing (3,2) | 3 |
| | Training | Industrial Training(4,2) | 4 |
| | | Research Project (4,2) | 5 |

The Course Outline of the Curriculum

Level 100

First Semester

| Course Code | Subject | Credits | Type of |
|-------------|---|---------|---------|
| | | | Credits |
| CST 102-2 | Introduction to Computer Science & Technology | 2 | С |
| CST 101-3 | Basic Electricity and Electronics | 3 | С |
| ESD 121-1 | English Language-I | 1 | С |
| ESD 103-2 | Information Technology | 2 | С |
| CST 103-3 | Structured Programming | 3 | С |
| ESD 151-1/ | Sinhala Language-I / | 1 | C |
| ESD 161-1 | Tamil Language-I ¹ | - | C |
| BGE 121-2 | Ethics and Law basics | 2 | С |
| SCT 101-1 | Essential Mathematics / | 1 | C |
| SCT 121-1 | Introductory Biology ² | L T | C |
| | Total Credits | 15 | |

Second Semester

| Course Code | Subject | Credits | Type of Credits |
|-------------|---|---------|--------------------|
| CST 104-3 | Database Management Systems | 3 | С |
| ESD 141-2 | Quantitative Reasoning | 2 | С |
| CST 151-3 | Microcomputer Architecture & Logic Design | 3 | С |
| CST 105-2 | Fundamentals of Computer Networks | 2 | С |
| ESD 111-1 | Communication Skills - I | 1 | С |
| CST 111-2 | Discrete Mathematics - I | 2 | С |
| ESD 122-1 | English Language-II | 1 | С |
| ESD 152-1 | Sinhala Language-II / | 1 | C |
| ESD 162-1 | Tamil Language-II | | |
| | Total Credits | 15 | |

Total credits of Level 100 = 30

¹ ESD 151-1, ESD152-1 Sinhala is compulsory for the students who having Tamil as first language

¹ESD 161-1, ESD162-1 Tamil is compulsory for the students who having Sinhala as first language

² SC101 Essential Mathematics Compulsory for all Non Mathematics (A/L) students and SC12-1 Introductory Biology Compulsory for Mathematics (A/L) students

<u>Level 200</u>

First Semester

| Course Code | Subject | Credits | Type of Credits |
|-------------|-----------------------------------|---------|--------------------|
| CST 221-3 | Object Oriented Analysis & Design | 3 | С |
| CST 222-3 | Object Oriented Programming | 3 | С |
| CST 271-1 | Web Designing | 1 | С |
| CST 231-3 | Data Communication & Networking | 3 | С |
| ESD 221-1 | English Language-III | 1 | С |
| CST 212-3 | Quantitative Techniques | 3 | С |
| BGE 211-2 | Aesthetic Studies | 2 | С |
| | Total Credits | 16 | |

Second Semester

| Course Code | Subject | Credits | Type of Credits |
|-------------|-------------------------------------|---------|--------------------|
| CST 213-2 | Discrete Mathematics - II | 2 | С |
| CST 224-3 | Software Engineering | 3 | С |
| CST 223-3 | Data Structures & Algorithms | 3 | С |
| CST 252-2 | Operating Systems Concepts & Design | 2 | С |
| ESD 222-1 | English Language-IV | 1 | С |
| CST 226-3 | Rapid Application Development | 3 | С |
| BGE 213-1 | History | 1 | С |
| BGE 214-1 | Geography | 1 | С |
| | Total Credits | 16 | |

Total credits of Level 200 =32

<u>Level 300</u>

First Semester

| Course Code | Subject | Credits | Type of Credits |
|-------------|--------------------------------------|---------|--------------------|
| CST 362-2 | Human Computer Interaction | 2 | С |
| CST 373-3 | Digital Image Processing | 3 | С |
| CST 361-3 | Artificial Intelligent Systems | 3 | С |
| CST 325-2 | Advanced Database Management Systems | 2 | С |
| CST 372-3 | Computer Graphics | 3 | С |
| ESD 311-1 | Communication Skills-II | 1 | С |
| CST 391-2 | Group Project | 2 | С |
| CST 332-2 | Cryptographic Systems | 2 | С |
| | Total Credits | 18 | |

Second Semester

| Course Code | Subject | Credits | Type of Credits |
|-------------|---|---------|--------------------|
| CST 327-3 | Web Development Technology | 3 | С |
| CST 381-3 | Management Information System | 3 | 0 |
| CST 353-2 | Computer Systems Architecture | 2 | С |
| CST 374-2 | Multimedia & Hypermedia Technology | 2 | С |
| CST 342-3 | Parallel & Distributed Computing | 3 | С |
| CST 355-3 | Systems Level Programming | 3 | С |
| CST 393-2 | Research Methodology and Scientific Writing | 2 | С |
| IIT 311-3 | Operational Research | 3 | 0 |
| | Total Credits | 18 | out of 21 |

15(core) + 3(Optional) =18 (out of 21)

Total credits of Level 300 = 36

Note: The **minimum** number of students must be 10 for each optional subject.

<u>Level 400</u>

First Semester

| Course Code | Subject | Credits | Type of Credits |
|-------------|---|---------|--------------------|
| CST 475-3 | Remote Sensing and Image Interpretation | 3 | 0 |
| CST 464-2 | Bioinformatics | 2 | 0 |
| IIT 452-3 | GIS for Business | 3 | 0 |
| CST 466-2 | Data Warehousing & Data Mining | 2 | С |
| CST 468-2 | Robotics | 2 | 0 |
| CST 482-2 | Software Localization | 2 | 0 |
| CST 434-2 | Mobile Computing | 2 | 0 |
| CST 443-2 | Cloud Computing | 2 | 0 |
| CST 463-2 | Augmented Reality | 2 | 0 |
| CST 465-3 | Biometrics & Computer Forensic | 3 | 0 |
| CST 467-3 | Fuzzy Logic & Neural Networks | 3 | 0 |
| CST 436-2 | Wireless Communication Systems and Sensor Networks | 2 | 0 |
| CST 454-2 | Embedded Systems & Device Interfacing | 2 | 0 |
| CST 429-2 | Software Design Using Design Patterns | 2 | С |
| CST 492-2 | Entrepreneurship | 2 | С |
| CST 428-2 | Software Quality Assurance | 2 | С |
| CST 441-2 | Middleware Architecture | 2 | 0 |
| CST 435-3 | System Administration and Maintenance | 3 | 0 |
| CST 433-2 | Advance Networking and Applications | 2 | 0 |
| | Total Credits | 14 | Out of 43 |

8(Core) + 6(Optional) =14 (out of 43)

Note: The **minimum** number of students must be 10 for each optional subject.

Second Semester

| Course Code | Subject | Credits | Type of Credits |
|-------------|----------------------------------|------------------|--------------------|
| CST 494-6 | Industrial Training ³ | 6 ⁴ | С |
| CST 495-8 | Research Project ⁴ | 8 | С |
| | Total Credits | 8+6 ⁴ | |

Total credits of Level 400 =22

Total Credits of the Degree Program BSc in CST=30+32+36+22+6⁴= <u>120+6*</u>

³ Non-GPA Course (Non GPA Courses are not considered for GPA Calculations)

⁴ Start on the beginning of Level 400 and evaluated in end of the Level 400

The Curriculum Development Team

This document present the revisions made to the curriculum of Computer Science and Technology (CST) degree programme. These revisions include modifications to the credit distribution of broad general subjects, essential skills subjects, and core subjects during first year and second year of study. Course contents for all the course units are included in this document. Following staff members have developed the modules for core subjects in the all four levels of CST degree programme.

| Course Un | its – First Year | Developed by |
|-----------|---|---------------------------|
| CST 102-2 | Introduction to Computer Science and Technology | Ms.M.Ramashini |
| CST 101-3 | Basic Electricity and Electronics | Dr.W.K.I.L. Wanniarachchi |
| CST 103-3 | Structured Programming | Mr.S.T.C.I.Wimaladharma |
| CST 104-3 | Database Management Systems | Mr. D.R.V.L.B. Thambawita |
| CST 151-3 | Microcomputer Architecture and Logic Design | Mr. D.R.V.L.B. Thambawita |
| CST 105-2 | Fundamentals of Computer Networks | Mr.I.K.K.B.Ihalagedara |
| CST 111-2 | Discrete Mathematics – I | Dr.K.W.S.N.Kumari |
| ESD 103-2 | Information Technology | Ms. C.S.D. Ellepola |
| Course Un | its – Second Year | Developed by |
| CST 221-3 | Object Oriented Analysis and Design | Mr.H.M.S.N.Ariyadasa |
| CST 222-3 | Object Oriented Programming | Mr.S.T.C.I.Wimaladharma |
| CST 271-1 | Web Designing | Mr.H.M.S.N.Ariyadasa |
| CST 231-3 | Data Communication and Networking | Mr.I.K.K.B.Ihalagedara |
| CST 212-3 | Quantitative Techniques | Dr.K.W.S.N.Kumari |
| CST 213-2 | Discrete Mathematics - II | Dr.K.W.S.N.Kumari |
| CST 224-3 | Software Engineering | Ms.M.Ramashini |
| CST 223-3 | Data Structures and Algorithms | Mr.S.T.C.I.Wimaladharma |
| CST 252-2 | Operating Systems Concepts and Design | Ms.M.Ramashini |
| CST 226-3 | Rapid Application Development | Mr.H.M.S.N.Ariyadasa |
| Course Un | its – Third Year | Developed by |
| CST 362-2 | Human Computer Interaction | Mr.H.M.S.N.Ariyadasa |
| CST 373-3 | Digital Image Processing | Mr.T.Kartheeswaran |
| CST 361-3 | Artificial Intelligent Systems | Mr.K.P.P.S.Pathirana |
| CST 325-2 | Advanced Database Management Systems | Mr.T.Kartheeswaran |
| CST 372-3 | Computer Graphics | Mr.K.P.P.S.Pathirana |
| CST 391-2 | Group Project | Mr.T.Kartheeswaran |
| CST 332-2 | Cryptographic Systems | Mr. D.R.V.L.B. Thambawita |
| CST 327-3 | Web Development Technology | Mr.H.M.S.N.Ariyadasa |
| CST 353-2 | Computer Systems Architecture | Mr.T.Kartheeswaran |
| CST 381-3 | Management Information System | Ms.J.Sutha |
| CST 374-2 | Multimedia and Hypermedia Technology | Mr.I.K.K.B.Ihalagedara |
| CST 342-3 | Parallel and Distributed Computing | Mr.T.Kartheeswaran |
| CST 355-3 | Systems Level Programming | Mr.H.M.S.N.Ariyadasa |
| CST 393-2 | Research Methodology and Scientific Writing | Dr.E.P.S.K. Ediriweera |
| IIT 311-3 | Operational Research | Dr.K.W.S.N.Kumari |

| Course | Units – Fourth Year | Developed by |
|---------|--|------------------------|
| CST 47 | 5-3 Remote Sensing and Image Interpretation | Dr.E.P.S.K. Ediriweera |
| CST 46 | 4-2 Bioinformatics | Mr.T.Kartheeswaran |
| IIT 452 | -3 GIS for Business | Dr.E.P.S.K. Ediriweera |
| CST 46 | 6-2 Data Warehousing and Data Mining | Mr.T.Kartheeswaran |
| CST 48 | 2-2 Software Localization | Ms. C.S.D. Ellepola |
| CST 43 | 4-2 Mobile Computing | Ms.M.Ramashini |
| CST 44 | 3-2 Cloud Computing | Ms.M.Ramashini |
| CST 46 | 3-2 Augmented Reality | Mr.K.P.P.S.Pathirana |
| CST 46 | 5-3 Biometrics and Computer Forensic | Mr.K.P.P.S.Pathirana |
| CST 46 | 7-3 Fuzzy Logic and Neural Networks | Mr.K.P.P.S.Pathirana |
| CST 43 | 6-2 Wireless Communication Systems and Sensor Networks | Mr.I.K.K.B.Ihalagedara |
| CST 45 | 4-2 Embedded Systems and Device Interfacing | Mr.K.P.P.S.Pathirana |
| CST 42 | 9-2 Software Design Using Design Patterns | Ms.S.H.D.Senanayake |
| CST 44 | 1-2 Middleware Architecture | Ms.S.H.D.Senanayake |
| CST 43 | 5-3 System Administration and Maintenance | Mr.I.K.K.B.Ihalagedara |
| CST 43 | 3-2 Advance Networking and Applications | Mr.I.K.K.B.Ihalagedara |
| CST 46 | 8-2 Robotics | Mr.K.P.P.S.Pathirana |
| CST 49 | 2-2 Entrepreneurship | Ms.W.M.P.G.C.Weerakoon |
| CST 42 | 8-2 Software Quality Assurance | Ms.S.H.D.Senanayake |
| CST 49 | 4-6 Industrial Training | Dr.E.P.S.K. Ediriweera |
| CST 49 | 5-8 Research Project | Dr.E.P.S.K. Ediriweera |

Coordination and Compilation by

Mr.T.Kartheeswaran

Ms.R.M.I.S Ranasinghe

Department of Computer Science and Technology Faculty of Science and technology Uva Wellassa University

Credit Distribution Table

| | First year | Second Year |
|------------|--|--|
| Semester 1 | BGE/ESS = 6 | ESS = 3 |
| | ESD 121-1 English Language-I | ESD 221-1 English Language-III |
| | ESD 103-2 Information Technology | BGE 211-2 Aesthetic Studies |
| | ESD 151-1 Sinhala Language-I | |
| | OR | |
| | ESD 161-1 Tamil Language-I* | |
| | BGE 121-2 Ethics and Law basics | |
| | CST 102-2 Introduction to Computer | CST 221-3 Object Oriented Analysis and |
| | Science and Technology | Design |
| | CST 101-3 Basic Electricity and | CST 222-3 Object Oriented |
| | Electronics | Programming |
| | CST 103-3 Structured Programming | CST 271-1 Web Designing |
| | SCT 101-1 Essential Mathematics [@] | CST 231-3 Data Communication and |
| | OR | Networking |
| | SCT 121-1 Introductory Biology [#] | CST 212-3 Quantitative Techniques |
| | Total credits = 6 + 9 = 15 Credits | Total credits = 3 + 13 = 16 Credits |
| Semester 2 | BGE/ESD = 5 | BGE/ESD = 3 |
| | ESD 111-1 Communication Skills - I | ESD 222-1 English Language-IV |
| | ESD 141-2 Quantitative Reasoning | BGE 213-1 History |
| | ESD 122-1 English Language-II | BGE 214-1 Geography |
| | ESD 152-1 Sinhala Language-II | |
| | OR | |
| | ESD 162-1 Tamil Language-II | |
| | CST 104-3 Database Management | CST 213-2 Discrete Mathematics - II |
| | Systems | CST 224-3 Software Engineering |
| | CST 151-3 Microcomputer | CST 223-3 Data Structures and |
| | Architecture and Logic | Algorithms |
| | Design | CST 252-2 Operating Systems Concepts |
| | CST 105-2 Fundamentals of Computer | and Design |
| | Networks | CST 226-3 Rapid Application |
| | CST 111-2 Discrete Mathematics - I | Development |
| | | |
| | Total credits = 5 + 10 = 15 Credits | Total credits = 3 + 13 = 16 Credits |

[@] The course unit **SCT101-1 Essential Mathematics** compulsory for non-mathematics (A/L) students of Computer Science and Technology

[#] The course unit **SCT121-1 Introductory Biology** is compulsory for mathematics (A/L) students of Computer Science and Technology

ESD 151-1, ESD152-1 Sinhala is compulsory for the students who having Tamil as first language

1ESD 161-1, ESD162-1 Tamil is compulsory for the students who having Sinhala as first language

| | | Third year | | Fourth Year |
|------------|------------|------------------------------|-------------|---------------------------------------|
| Semester 1 | ESS = 1 | | | |
| | ESD 311-1 | Communication Skills-II | | |
| | CST 362-2 | Human Computer | CST 475-3 | Remote Sensing and Image |
| | | Interaction | | Interpretation * |
| | CST 373-3 | Digital Image Processing | CST 464-2 | Bioinformatics* |
| | CST 361-3 | Artificial Intelligent | IIT 452-3 | GIS for Business * |
| | | Systems | CST 466-2 | Data Warehousing and Data Mining |
| | CST 325-2 | Advanced Database | CST 482-2 | Software Localization * |
| | | Management Systems | CST 434-2 | Mobile Computing* |
| | CST 372-3 | Computer Graphics | CST 443-2 | Cloud Computing* |
| | CST 391-2 | Group Project | CST 463-2 | Augmented Reality* |
| | CST 332-2 | Cryptographic Systems | CST 465-3 | Biometrics and Computer Forensic* |
| | | | CST 467-3 | Fuzzy Logic and Neural Networks* |
| | | | CST 436-2 | Wireless Communication Systems and |
| | | | | Sensor Networks* |
| | | | CST 454-2 | Embedded Systems and Device |
| | | | | Interfacing* |
| | | | CST 429-2 | Software Design Using Design Patterns |
| | | | CST 441-2 | Middleware Architecture* |
| | | | CST 435-3 | System Administration and |
| | | | | Maintenance* |
| | | | CST 433-2 | Advanced Networking and Applications* |
| | | | CST 468-2 | Robotics* |
| | | | CST 492-2 | Entrepreneurship |
| | | | CST 428-2 | Software Quality Assurance |
| | Total cred | its = 1+17=18 credits | Total credi | ts = 14 credits out of (43) |
| Semester 2 | | | | |
| | CST 327-3 | Web Development | CST 494-6 | Industrial Training ** |
| | | Technology | CST 495-8 | Research Project |
| | CST 353-2 | Computer Systems | | |
| | | Architecture | | |
| | CST 381-3 | Management | | |
| | | Information System* | | |
| | CST 374-2 | Multimedia and Hypermedia | | |
| | | Technology | | |
| | CST 342-3 | Parallel and Distributed | | |
| | | Computing | | |
| | CST 355-3 | Systems Level | | |
| | | Programming | | |
| | CST 393-2 | Research Methodology | | |
| | | and Scientific Writing | | |
| | IIT 311-3 | Operational Research* | | |
| | Total cred | its = 18 credits (out of 21) | Total credi | ts = 8+6 credits |

* Optional Course Units

** Non-GPA Course units (Non GPA Courses are not considered for GPA Calculations)

Level – 100

First Semester

| Course Code | CST 102-2 | | |
|-----------------------|---|-----|--|
| Course Title | Introduction to Computer Science and Technology | | |
| Objective: | To provide the fundamental aspects in Computer Science | | |
| Learning outcomes: | At the end of the course, the students will be able to describe the nature of computing explain the basics of Computer Science recognize solutions to problems by developing different techniques | | |
| Contents: | Introductions to operating systems and Its major functions, Interaction between human and computers, Machine language, Assembly language, High level languages ,Computational Representation of Information, Quantitative data -Binary, Octal , Decimal and Hexadecimal numeral system, Number base conversion, Digital Logic, Logic Gates, Boolean Algebra,Karnough map, Data representation standards, Qualitative data, ASCII, EBCDIC, Unicode, Computer Organization, Components of computer, Computer memory architecture, Servers, Translators, Compiler, Interpreter, Assembler, Software, Types of software, Introduction to system software, Introduction to application software, Introduction to utility software, Basic Problem Solving techniques, Need for logical analysis and thinking, Problem solving with pseudocode, algorithms and flow charts (sequence, iteration (counting loops, while loops, file pointers), conditional (if-then-else statements, case statements)), execution pathway of a | | |
| Recommended Texts: | Brookshear, J.G, 2007, Computer Science: An Overview, 9th Edition, Business & Economics | | |
| Scheme of Evaluation: | 1: Continuous Assessment End Semester Examination | | |
| | 60% | 40% | |
| Methodology: | 30 hours of theory | | |
| Type of Credits: | Compulsory | | |
| Prerequisites: | None | | |

CST 102-2 Introduction to Computer Science and Technology

CST 101-3 Basic Electricity and Electronics

| Course Code | CST 101-3 | | |
|-----------------------|---|---|--|
| Course Title | Basic Electricity and Electronics | | |
| Objective: | To provide the basic knowledge about electricity, and electronics | | |
| Learning outcomes: | At the end of the course, the students - describe the different electron - demonstrate basic understand principles and behavior by exp - develop analytical capabilities - explore mathematical and con | s will be able to hic components ling of electrical and electronic circuits, plaining their functions for simple electrical circuits nputer-based circuit analysis methods | |
| Contents: | Introduction to Electricity, DC cir Resistors, Ohms Law, Kirchhoff's L Power Transfer theorem, Capacitor capacitor, Capacitor charging/dis Generators, DC Motors, Production Square Value, Average Value, For System, Star Connection, Delta Con Measurements, Introduction to Forward and Reversed Biased I rectification, Power Supply, LED, regulator, Bipolar junction trans configurations, Operating point, Fro Field Effect Transistors, Amplifier I Amplifiers, Analysis of the Co Operational amplifiers, Feedback-ar summing, Follower, Comparator | cuits, Active and Passive Elements, aws, Thevenin's Theorem, Maximum and Capacitance, Energy Stored in a scharging, Inductors, Transformers, n of Alternating Current, Root Mean m Factor, peak Factor, Three-Phase nection, Domestic Wiring Installation, Electronics, Basic Diode Operation, Modes, Half wave and Full wave Photo Diode, Zener-Diode voltage istors, Characteristics of transistor equency response, Transistor biasing, Fundamentals, Small-Signal Transistor pommon Emitter Amplifier, Q-point, mplifiers, Inverting, Non-inverting and | |
| Recommended Texts: | Hambley, A.R ,2010, Electrical Engineering: Principles and Applications, 5th Edition, Prentice Hall International Metha, V,K , 1998 , Principles of Electrical Engineering and Electronics, S.Chand Horowitz, P and Hill, W, 1997 , The Art of Electronics, 2nd Edition, Cambridge University Press | | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination | |
| | 60% | 40% | |
| Methodology: | 30 hours of theory , 45 hours of practical | | |
| Type of Credits: | Compulsory | | |
| Prerequisites: | None | | |

| Uva Wellassa University, Faculty of Management COURSE SYLLABL | | | | |
|---|---|----------------------|--|--|
| Course Code | ESD 121-1 | | | |
| Course Title | English Language – I | English Language – I | | |
| Credits | 1 | | | |
| Status: Compulsory /Optional | Status: Compulsory /Optional Compulsory | | | |
| Degree Programme (s) | Degree Programme (s) All | | | |
| Prerequisites, if any | rerequisites, if any Basic English Language Skills | | | |
| Time Allocation (hrs) | Ilocation (hrs) Lectures [15] Discussions [] Practical [] Field Work [] | | | |
| | ASSESSMENTS/EVALUATI | ONS | | |
| Continuous Assessments: | | | | |
| Oral Test 20% | | | | |
| Grammar Assignment | Grammar Assignment 20% | | | |
| Writing Assignment | Writing Assignment 20% | | | |
| End Semester Examination:40% | | | | |
| INTENDED LEARNING OUTCOMES | | | | |
| By end the of this course, the students will be able to | | | | |
| 1. Listen and respond to different types of questions in different contexts | | | | |
| 2 Present short speeches on selected tonics | | | | |

ESD 121-1 English Language-I

- 2. Present short speeches on selected topics
- 3. Read and respond to simple electronic and other types of messages
- 4. Transfer information from dictionaries, manuals and glossaries
- 5. Engage in interactions via social media
- 6. Read and identify the general meaning of different types of simple texts
- 7. Identify and use different parts of speech

COURSE DESCRIPTION/CONTENT

This course hopes to provide a foundation for the English Language course offered by the University. It will focus on the four primary skills of reading, writing listening and speaking. The course hopes to familiarize the students with the different question types and well as the clause elements in simple sentences. The course will include basic activities in vocabulary development with a special focus on using technology for everyday communication.

SELECTED READINGS

Murphy, Raymond. (2001). Basic Grammar in Use. Cambridge: Cambridge University Press

Lynch, Tony. (2004). *Study Listening: A Course in Listening to Lectures and Note Taking*. Cambridge: Cambridge University Press

ESD 103-2 Information Technology

| Course Code | ESD 103-2 | | |
|-----------------------|---|--------------------------|--|
| Course Title | Information Technology | | |
| Objective: | To provide the necessary and essential information technology skills and knowledge. | | |
| Learning outcomes: | At the end of the course, the students will be able to describe the importance of information and how technology is being used to produce and share information. recognize the essential hardware components, existing varieties of operating systems and networking concepts describe the basic computer applications and Internet resources for study, work and recreation develop the skill to use the computer as a tool to accomplish learning activities and other data processing needs | | |
| Contents: | What is information, information sharing methods, Technology as a tool to produce and share information, What is a computer, Parts of a computer, input/output devices, Eras in computer development, Types of computers, Electricity and Computer, Storage devices, File Systems basics, Microprocessors, Motherboards, What is an Operating System, Importance of an Operating System, Commonly used Operating Systems, Main types of application software, Word processing software, Spreadsheet applications, multimedia presentations, Simple databases and their applications, What is a network, Types of networks, Network devices, Network structures, Components of a network, Cables used in networking, Broadband and baseband transmission, MAC and IP addresses, Internet and | | |
| Recommended Texts: | Bott, E and Carl, S , 2013 , Microsoft Office Inside Out, 2013 Edition Bible, H and Rosch, W.L, 2006 ,PC Hardware: A Beginner's Guide, 6th Edition | | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination | |
| | 60% | 40% | |
| Methodology: | 15 hours of theory, 30 hours of practical | | |
| Type of Credits: | Compulsory | | |
| Prerequisites: | None | | |

CST 103-3 Structured Programming

| Course Code | CST 103-3 | | |
|-----------------------|---|-------|--|
| Course Title | Structured Programming | | |
| Objective: | To provide the basic programming skills and knowledge using structured programming | | |
| Learning outcomes: | At the end of the course, the students will be able to demonstrate the concepts of structured programming describe the core concepts about programming solve problems with the aid of programming language. write programming using data types and structures | | |
| Contents: | Introduction to computer programming, Machine language and different translators (Assembler, Compiler and Interpreter) ,Program design techniques, Pseudocodes and top-down design (flow charts),Programming concepts, Data Types, Variables, Constants, Operators, Control structures, Functions, Library functions, User defined functions, Passing arguments by value and reference, Derived Data Types, Structures, One dimensional and multidimensional arrays, String, Pointers, Dynamic memory allocation and referencing, I/O operations, Input/ Output streams and file handling. Tosting, Excention handling and debugging | | |
| Recommended Texts: | Deitel, P and Deitel, H.M, 2009, C: How to Program, 6th Edition Kernighan, B.W, Ritchie, D.M and Ritchie D, 1988, The C Programming Language, 2nd Edition, Prentice Hall Kelley, A and Pohl, I, 2001, C by Dissection: The Essentials of C Programming ,4th Edition, Addison and Wesley Griffiths, D and Griffiths, D. 2012, Head First C. First Edition, O Reilly | | |
| Scheme of Evaluation: | 1: Continuous Assessment End Semester Examination | | |
| | 60% | 40% | |
| Methodology: | 30 hours of theory , 30 hours of prac | tical | |
| Type of Credits: | Compulsory | | |
| Prerequisites: | None | | |

| Uva Wellassa University, Faculty of Management | | | COURSE SYLLABUS |
|--|--|------------|-----------------|
| Course Code | ESS - 151-1 | | |
| Course Title | Sinhala Language-I | | |
| Credits | 1 | | |
| Status: Compulsory /Optional | Compulsory for Tamil Speaking Students | | |
| Degree Programme(s) | All | | |
| Prerequisites, if any | Nil | | |
| Time Allocation (hrs.) | Lectures [15] P | ractical [| 15] |
| ASSESSMENTS/EVALUATIONS | | | |
| Continuous Assessments: | | | |
| Assignments | | 20% | |
| Student presentations | | 20% | |
| Spot test | | 20% | |
| End Semester Examination: 40 | | | |
| INTENDED LEARNING OUTCOMES | | | |

ESD 151-1 Sinhala Language-I

On successful completion of the Sinhala Language course students will develop the Sinhala language, Reading, Writing, Listening, and Speaking forms to use in different situations of their lives.

COURSE DESCRIPTION/CONTENT

Reading: Identify the Sinhala alphabet including Vowels and consonants. Read simple text in Sinhala, and understand meaning. Identify main ideas of a given primary reading context.

Writing: understand vocabulary and use basic tenses to convey meaning. Nouns, pronouns, conjunctions, punctuation, plural forms, guided writing.

Listening: understand general conversations of day to day life, Main ideas of News reading. Handling communication in general.

Speaking: provide appropriate answers to general conversations. Conducting introductory speeches. Provide appropriate responses to ordinary questions. Express opinions on familiar topics with a reasonable degree of accuracy.

SELECTED READINGS

- 1. Dissanayake J.B. (1993) Say it in Sinhala/ Lake House, Colombo.
- 2. Department of Official Languages, (2006) Tamil made Easy, Department of Official Languages, Rajagiriya, Sri Lanka.
- 3. Dissanayake J.B. (2003) Let's Learn Sinhala 1(Vowels And Consonants)), Sridevi Printers(Pvt) Ltd, Dehiwala
- 4. Dissanayake J.B (2003) Let's Learn Sinhala2(Vowels and their Strokes)), Sridevi Printers(Pvt) Ltd, Dehiwala
- 5. Dissanayake J.B. (2003) Let's Learn Sinhala 4(Special Letters and Strokes) Sridevi Printers(Pvt) Ltd, Dehiwala

ESD 161-1 Tamil Language -I

| Uva Wellassa University, Faculty of Management COURSE SYLLABUS | | | |
|--|---|-----|--|
| Course Code | ESD 161-1 | | |
| Course Title | Tamil Language-I | | |
| Credits | 1 | | |
| Status: Compulsory /Optional | Compulsory for Sinhala Speaking Students | | |
| Degree Program (s) | All | | |
| Prerequisites if any | N/A | | |
| Time Allocation (hrs) | Lectures [10] Discussions [] Practical [10] Field Work [] | | |
| ASSESSMENTS/EVALUATIONS | | | |
| Continuous Assessments: | | | |
| Writing Assignments | Writing Assignments 30% | | |
| Oral/Speech | 30% | | |
| | | | |
| End Semester Examination: | | 40% | |
| INTENDED LEARNING OUTCOMES | | | |

By the end of this course students will be able to

- 1. make themselves understood in basic everyday communicative situations
- 2. speak in Tamil
- 3. have listening and oral proficiency in Tamil language

COURSE DESCRIPTION/ CONTENT

Speaking : Make and respond to basic statement related to personal information, ask questions in order to find out about a limited range of personal information day to day communication, use words and phrases to describe people and object, express basic like and dislikes.

Listening: Understand a limited range of short, basic, supported, class room instruction, question which ask for personal information and recognized the sound of letters and pronunciation of words, phrases.

Writing: Write Tamil latters, family words to identify people, places and spell some familiar high – frequency words accurately during guided writing activities.

Reading: Recognize, identify, sound and name the letters of the alphabet and pronouns familiar words and sentence. Understand the meaning of very simple familiar phrases or sentences on familiar general and curricular topic by rereading them.

SELECTED READINGS

Geir J.W, S. Suseenthiraraja and W.S. Karunathilake, (1999): *Vivahara Demala Basha Praveshaya,* University of Kelaniya, Kelaniya, Sri Lanka.

Department of Official languages, (2006):Tamil Made Easy, Department of Official Languages, Rajagiriya, Sri Lanka

BGE 121-2 Ethics and Law basics

| Uva Wellassa University, Faculty of Management | | COURSE SYLLABUS | |
|--|---|-----------------|--|
| Course Code | BGE 121 -2 | | |
| Course Title | Ethics and Law | | |
| Credits | 2 | | |
| Status: Compulsory /Optional | Compulsory | | |
| Degree Programme (S) | All degree programmes | | |
| Prerequisites if any | None | | |
| Time Allocation (hrs) | Lectures [] Discussions [05] Practical [25] Field Work [] | | |
| ASSESSMENTS & EVALUATION | | | |
| Continuous Assessments 60% | | | |
| | | | |
| Written Exam 40% | | | |
| INTENDED LEARNING OUTCOMES | | | |

To provide an overall understanding and conceptual explanations of the fundamentals of ethics and Law in order to develop the ability of the student to assimilate ethical framework, legal theories, concepts and data in any working environment.

COURSE DESCRIPTION/CONTENT

Introduction to Ethics, Ethics in religious context, Ethics in social context, Ethics in global context

Introduction to Laws of Sri Lanka, Constitutional law, Constitutional developments, sovereignty/ franchise/ election, fundamental rights, Administrative law: judicial control writs, law of delict/ tort, law of contracts, dispute resolution mechanisms, environmental industrial law

SELECTED READINGS

- Buddha Jayanthi Tripitaka Series Volume 1-40, Government of Ceylon.
- The Bible- revised Standard Version (1971), Harper Collins Publishers, Glasgow.
- Pickthall M, the glorious Qur'an- text and Explanatory translation, Taj Complny, Karachi.
- Cooray L.J.M. (1992), An Introduction to the Laws of Sri Lanka, Colombo, Lake House Investments
- Democratic Socialist Republic of Sri Lanaka (2007), Government Constitution of Sri Lanka

SCT 101-1 Essential Mathematics

| Course Code | SCT 101-1 | | |
|-----------------------|---|--------------------------|--|
| Course Title | Essential Mathematics | | |
| Objective: | To provide the basic knowledge of mathematics. | | |
| Learning outcomes: | At the end of the course, the students will be able to - use mathematical concepts - define and identify the abstract concepts in mathematics | | |
| Contents: | Functions, Composition of functions, Exponential and logarithmic functions, Trigonometry, Inequalities, Permutation and combination, Binomial Theorem, Coordinate Geometry, Set theory and applications | | |
| Recommended Texts: | Backhouse J.K , Houldsworth S.P.T & Cooper BED, 1987 , Pure Mathematics 2, Longman Safier, F,2002 , Pre Calculus, Tata McGraw-Hill Cummings | | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination | |
| | 60% | 40% | |
| Methodology: | 15 hours of theory | | |
| Type of Credits: | Compulsory | | |
| Prerequisites: | None | | |

SCT 121-1 Introductory Biology

| Course Code | SCT 121-1 | | |
|-----------------------|--|-----|--|
| Course Title | Introductory Biology | | |
| Objective: | To provide the background knowledge for further study in advanced biology courses. | | |
| Learning outcomes: | At the end of the course, the students will be able to describe the basic components of biological macromolecules explain both the chemical and molecular composition of a cell demonstrate an understanding of the fundamental properties of living systems . by explaining the properties of its components | | |
| Contents: | The nature of living systems, Structure and function of biological macromolecules, Basics of cellular structure and functions, Cell growth and development, Fundamentals of Mendelian Genetics, Introduction to diversity of life (Viruses, Prokaryotes, Eukaryotes) | | |
| Recommended Texts: | Reece, J.B. et al, 2010, Campbell Biology, 9th Edition, Benjamin Cummings | | |
| Scheme of Evaluation: | Continuous Assessment End Semester Examination | | |
| | 60% | 40% | |
| Methodology: | 15 hours of theory | | |
| Type of Credits: | Compulsory | | |
| Prerequisites: | None | | |

Second Semester

CST 104-3 Database Management Systems

| Course Code | CST 104-3 | | |
|-----------------------|---|---------------------------------------|--|
| Course Title | Database Management Systems | | |
| Objective: | To provide fundamentals aspects of o practically | database management systems to use it | |
| Learning outcomes: | At the end of the course, the students will be able to describe fundamental concepts of relational database management systems design databases for real world scenarios using ER model implement databases for real world applications using SQL represent relationships using relational algebra write queries using SQL make normalized tables | | |
| Contents: | Introduction to database , Databases and Database Users, Database System Concepts and Architecture ,The Relational Data Model and Relational Database Constraints, Basic SQL, Complex Queries, Triggers, Views, Schema Modification, The Relational Algebra and Relational Calculus, Conceptual Modeling and Database Design, Data Modeling Using the Entity-Relationship (ER) Model, The Enhanced Entity-Relationship (EER) Model, Relational Database Design by ER and EER-to-Relational Mapping, Database Design Theory and Normalization, Basics of Functional Dependencies and Normalization for Relational Databases, Relational Database Design Algorithms and Further Dependencies | | |
| Recommended Texts: | Ramez,E, Shamkant and Navathe, B , 2011, Fundamentals of Database Systems,6th Edition Silberschatz, A, Korth, H.F and Sudarshan, S , 2008, Database System Concepts, 6th Edition | | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination | |
| | 60% | 40% | |
| Methodology: | 30 hours of theory, 30 hours of practi | ical | |
| Type of Credits: | Compulsory | | |
| Prerequisites: | None | | |

ESD 141-2 Quantitative Reasoning

| Uva Wellassa University, Faculty of Management | | | |
|---|--------------------------|---|--|
| Course Code | ESD 141-2 | | |
| Course Title | Quantitative Reasoning | | |
| Credits | 2 | | |
| Status: Compulsory /Optional | Compulsory | | |
| Degree Programme (s) | All | | |
| Prerequisites, if any | N/A | | |
| Time Allocation (hrs.) | Lectures [-] Discussio | ns [-] Practical [30] Field Work [-] Workshop [-] | |
| | ASSESSMENTS/EV/ | ALUATIONS | |
| Continuous Assessments: | 60% | | |
| End Semester Examination: | | 40% | |
| | INTENDED LEARNING | GOUTCOMES | |
| At the end of this course student w | vill be able to, | | |
| develop an intuitive ser | se of numbers and | understand their scale and meaning through | |
| comparisons, stories, and p | pictures | | |
| use graphical, symbolic, and numerical methods to analyze, organize, and interpret natural phenomenon calculate and interpret measure of Central Tendency, Dispersion, Skewness, kurtosis, for a given | | | |
| data set discriminate between association and causation, and identify the types of evidence used to establish causation | | | |
| think critically about the line | nitations of science and | quantitative analysis | |
| communicate with integrity and persuasion to a wide variety of audiences about quantitative information, statistical analysis, and scientific findings | | | |
| use SPSS/ MINITAB software to solve the statistical tools and methodology which are learned under Quantitative Reasoning | | | |
| | COURSE DESCRIPTIC | DN/CONTENT | |
| Course overview, different type of number, basic numeracy and measurement, exploratory data analysis and visualization, measures of central tendency, variability, skewness and kurtosis, cross-tabulations and χ^2 tests, scatterplots, correlation analysis, cause and effect, confounding variables | | | |
| | SELECTED REA | DINGS | |
| R. R. Johnson, P. Kuby, Elementary Statistics, 10th edition (Thomson), 2007 A.G. Bluman , Elementary Statistics, 6th edition (McGraw Hill), 2007 | | | |

| CST 151-3 Microcomputer | Architecture and Logic Design |
|-------------------------|-------------------------------|
|-------------------------|-------------------------------|

| Course Code | CST 151-3 | |
|-----------------------|--|--------------------------------------|
| Course Title | Microcomputer Architecture and Log | gic Design |
| Objective: | To provide the fundamental knowled logic design. | ge of microcomputer architecture and |
| Learning outcomes: | At the end of the course, the students will be able to describe basic combinational circuits and sequential circuits analyze combinational and sequential circuits design logic circuits using real components design logic circuits using a HDL describe deferent computer architectures | |
| Contents: | Combinational Logic, Combinational Circuit Design and Analysis, Binary Adder-Subtractor, Decoders, Encoders, Multiplexers, Sequential Logic, Latches, Flip-Flops, Sequential Circuit analysis and Design Procedure Digital Circuit Design and Implementation, Organization and Implementation of Different Architectures, 8086 architecture, Instructions memory organization Buses Interrupt IO operations | |
| Recommended Texts: | David Money Harris and Sarah L. Harris ,2012, Digital Design and Computer Architecture, Latest Edition Morris Mano, M and Michael D. Ciletti , 2013, Digital Design with an Introduction to the Verilog HDL, Latest Edition | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory , 30 hours of practical | |
| Type of Credits: | Compulsory | |
| Prerequisites: | None | |

CST 105-2 Fundamentals of Computer Networks

| Course Code | CST 105-2 | | |
|-----------------------|--|-----------------------------|--|
| Course Title | Fundamentals of Computer Networks | | |
| Objective: | To provide sound knowledge on Com | puter Networks Fundamentals | |
| Learning outcomes: | At the end of the course, the students will be able to describe the principles and fundamentals of data communications and networking analyze the characteristics of transmission media describe communication techniques define the characteristics of ISO-OSI layers Identify the Network devices | | |
| Contents: | Overview of Communication and Networks, Principles of computer networks, Data Communication Fundamentals, Transmission Media Characteristics, Digital Data Communication Techniques ,ISO-OSI Layers, Wide Area Network (WAN), Local Area Network (LAN), Topologies, Network Devices and Internetworking, Introduction to Internet, Client Server Application, Medium, Ports, Type of Cables | | |
| Recommended Texts: | Stallings, W, 2013, Data and Computer Communications, 10th Edition Tanenbaum , A.S, 2010 , Computer Networks, 5th Edition | | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination | |
| | 60% | 40% | |
| Methodology: | 30 hours of theory | | |
| Type of Credits: | Compulsory | | |
| Prerequisites: | None | | |

ESD 111-1 Communication Skills – I

| Uva Wellassa University, Faculty o | Uva Wellassa University, Faculty of Management | | |
|--|---|------|--|
| Course Code | ESD 111-1 | | |
| Course Title | Communication Skills-I | | |
| Credits | 1 | | |
| Status: Compulsory /Optional | Compulsory for all students | | |
| Degree Programme (s) | All | | |
| Prerequisites, if any | N/A | | |
| Time Allocation (hrs.) | Lectures [-] Discussions [-] Practical [30] Field Work [-] Workshop [-] | | |
| ASSESSMENTS/EVALUATIONS | | | |
| Continuous Assessments:Interpersonal Communication (Group Presentation)90%90%30% | | | |
| End Semester Examination: 40% | | | |
| | INTENDED LEARNING OUTCO | OMES | |
| Duthe and of this source, it is supported that the student will be able to: | | | |

By the end of this course, it is expected that the student will be able to:

- 1. Communicate effectively both verbally and non-verbally in different communication settings.
- 2. Eliminate barriers of communication.
- 3. Enhance the level of communication skills.

COURSE DESCRIPTION/CONTENT

The course will provide an introduction to Communication Skills and the process of communication, Communication Barriers, Nonverbal and Verbal Communication, Interpersonal Communication, Public Speaking, Effective Listening Skills.

SELECTED READINGS

As Other See Us: Body Movement and the Art of Successful Communication, Allen Goldman. Routledge, 2004

The Art of Public Speaking , Lucas, S.E. (2004) 8th ed. Mcgrew Hill

Human Communication in everyday Life: Explanation and application. Wrench, J.S, Mccroskey, J.C. & Richmond, V.P. (2008) Boston, MA: Pearson

| CST 111-2 | Discrete | Mathematics – | l |
|-----------|----------|---------------|---|
|-----------|----------|---------------|---|

| Course Code | CST 111-2 | | |
|--------------------------|--|---|--|
| Course Title | Discrete Mathematics-I | | |
| Objective: | To provide theoretical concepts and applic backbones of computer science | ations in calculus and algebra that are | |
| Learning outcomes: | At the end of the course, the students will be able to describe basic concepts in algebra describe theoretical concepts in calculus apply calculus concepts into the real world problems solve real world problems using differentiation and integration extend their qualities of critical thinking | | |
| Contents: | Vectors, matrices, Introduction to Fourier transformations and polynomial expansion, Limits, Functions and sequences, Convergence of sequences, Series, convergence of series, Power series, Taylor series, derivatives, anti- derivatives, Integration, Real world application of differentiation and integration | | |
| Recommended Texts: | Wrede R and Spiegel R, 2012, Advance Calculus, 2nd Edition, McGraw Hill Publishing Co. Himonas, H and Howard, A ,2003, Calculus ideas and applications Bronson and Richard, 1989, schaum's outline of theory and problems of matrix operations, McGraw Hill Publishing Co. Rosen, K.H, 2012, Discrete Mathematics and Its Applications, 7th Edition, McGraw Hill Publishing Co. | | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination | |
| | 60% | 40% | |
| Methodology: | 30 hours of theory | | |
| Type of Credits: | Compulsory | | |
| Prerequisites: | None | | |

ESD 122-1 English Language-II

| Uva Wellassa University, Faculty of Management | | | COURSE SYLLABUS | |
|--|---|------------|-----------------|--|
| Course Code | ESD 122-1 | | | |
| Course Title | English Language–II | | | |
| Credits | 1 | | | |
| Status: Compulsory /Optional | Compulsory | Compulsory | | |
| Degree Programme (s) | All | | | |
| Prerequisites, if any | Skills gained by English Language– Level 01 | | | |
| Time Allocation (hrs) | Lectures [15] Discussions [] Practical [] Field Work [] | | | |
| ASSESSMENT/EVALUATIONS | | | | |
| Continuous Assessments: | | | | |
| Grammar assignments | Grammar assignments 20% | | | |
| Speaking Assignments | 20% | | | |
| Writing Assignment | 20% | | | |
| End Semester Examination: | 40 | 0% | | |
| INTENDED LEARNING OUTCOMES | | | | |

By end the of this course, the students will be able to

- 1. Listen and respond to short phone conversations.
- 2. Give their opinion on a particular issue.
- 3. Describe, in a 3-5 minute talk, a past experience or event and briefly explain how it affected life, thinking or feeling.
- 4. Scan and skim for main ideas and supporting information in a variety of small academic texts.
- 5. Make short notes from a written sources; on-line and/or other.
- 6. Transfer information from tables or graphs and convey the information in a paragraph.
- 7. Identify the functions of parts of speech and different types of phrase

COURSE DESCRIPTION/CONTENT

This course will be a continuation of the English course of the last semester. It will focus on the skills of reading, writing, listening & speaking while giving more emphasis to grammar and vocabulary.

SELECTED READINGS

Lynch, Tony. (2004). *Study Listening: A Course in Listening Lectures and Note Taking*. Cambridge: Cambridge University Press

Guffy, Mary Ellen. (2001). Essentials of Business Communication. Ohio: South-Western College Publishing
ESD 152-1 Sinhala Language-II

| Uva Wellassa University, Faculty of | Management | | COURSE SYLLABUS |
|--|----------------------|---------------|---|
| Course Code | ESD – 152-1 | | |
| Course Title | Sinhala Language-II | | |
| Credits | 1 | | |
| Status: Compulsory /Optional | Compulsory for | Tamil Speaki | ng Students |
| Degree Programme (s) | All | | |
| Prerequisites, if any | ESD 151-1 | | |
| Time Allocation (hrs) | Lectures [15] | Practica | l[15] |
| | ASSESSMENT/E | VALUATION | S |
| Continuous Assessments: | | | |
| Assignments | | 20% | |
| Student presentations | | 20% | |
| Spot test | | 20% | |
| End Semester Examination: | | 40% | |
| I | NTENDED LEARN | ING OUTCON | ЛЕS |
| At the end of the successful comple | tion of Sinhala co | urse, Studen | ts are expected to have ability in Read |
| academic text in Sinhala, and unders | stand meaning. | | |
| Identify main aspects of given acade | emic disciplines in | Sinhala Whe | n necessary. |
| | COURSE DESCRIP | TION/CONTE | NT |
| Reading: Identify main ideas of a given intermediate reading context. Understand the formal and | | | |
| informal expressions of daily reading | gs. Ability to read | variety of co | ntextual readings. |
| Writing: handle all basic tenses, ide | ntify the first pers | on, second p | erson and third person categorical and |
| grammatical writing. Use of adverbs, adjectives, feminine, and articles. | | | |
| Listening: understanding academic conversations. Identifying main concepts of academic use of | | | |
| language. | | | |
| Speaking: Pronunciation. Handling presentations on given topics. Express of personal views. Managing | | | |
| language in formal contexts (debates). | | | |
| | SELECTED R | EADINGS | |
| 1. Dissanayake J.B. (1993) Say it in Sinhala/ Lake House, Colombo. | | | |
| 2. Department of Official Languages, (2006) Tamil made Fasy. Department of Official Languages | | | |
| Rajagiriya. Sri Lanka. | | | |
| 3. Kumarthunga Munidasa (2000)Vyakarana viyaranaya.Godage Colombo | | | |
| | | | |
| 4. National educational institute (2000) Lechana reethiya | | | |
| 5. Dissanayake J.B. (2003) Let's Learn Sinhala 4(Special Letters and Strokes) Sridevi Printers(Pvt) Ltd, Dehiwala | | | |
| | | | |

ESD 162-1 Tamil Language-II

| Uva Wellassa University, Faculty of Management | | | COURSE SYLLABUS |
|--|-------------------------------|-------------|--------------------------------|
| Course Code | ESD 162-1 | ESD 162-1 | |
| Course Title | Tamil Language-II | | |
| Credits | 1 | | |
| Status: Compulsory /Optional | Compulsory for Sin | ihala speal | king students |
| Degree Programme (s) | All | | |
| Prerequisites, if any | N/A | | |
| Time Allocation (hrs) | Lectures [10]Discus | ssions []F | Practical [10] Field Work [] |
| ASSESSMENT/EVALUATIONS | | | |
| Continuous Assessments: | | | |
| 1. Written assignments | 2 | 20% | |
| 2. Mid semester exam | 2 | 20% | |
| 3. Oral/ Speech | 2 | 20% | |
| | | | |
| End Semester Examination: | End Semester Examination: 40% | | |
| INTENDED LEARNING OUTCOMES | | | |

By the end of this course students will be able to

- 1. improve reading and writing skills
- 2. grow students' ability to understand Tamil language and express themselves on it

COURSE DESCRIPTION/CONTENT

Reading: Read and follow, with support, familiar instructions for classroom activities, begin to read, with support, very short simple texts with confidents and enjoyment, understand the meaning of very short, simple texts.

Writing: Write, with support, a sequence of short sentences in a paragraph. Use simple present, past and future forms to describe actions and narrate simple events. Use adjectives, adverbs and conjunctions.

Speaking: Describe basic present and past actions on a limited range of general and curricular topics. Communicate meaning clearly using phrases and simple sentences and link comments to what others say at sentence.

Listing: Understand and recognize some specific information and detail of short, supported talk on an increasing range of general topics.

SELECTED READINGS

1. Geir J.W, S. Suseenthiraraja and W.S. Karunathilake, (1999): *Vivahara Demala Basha Praveshaya*, University of Kelaniya, Kelaniya, Sri Lanka

2. Department of Official languages, (2006): *Tamil Made Easy, Department of Official Languages*, Rajagiriya, Sri Lanka

Level – 200

First Semester

CST 221-3 Object Oriented Analysis and Design

| Course Code | CST 221-3 | |
|-----------------------|--|---|
| Course Title | Object Oriented Analysis and Design | |
| Objective: | To provide the object-oriented appro and software solutions | ach to analyze and design systems |
| Learning outcomes: | At the end of the course, the students describe object oriented analy develop OOAD documents for demonstrate the importance of life cycle employ the UML notation to condesigns apply OOAD concepts to solve | s will be able to ysis and design (OOAD) concepts a given problem using UML of modeling in software development create effective and efficient system e problems |
| Contents: | Introduction to object oriented concepts, Introduction to Object Oriented Analysis (OOA), Introduction to UML, System Development Life Cycle (SDLC), Process models, Rational Unified Process (RUP), Creating use case diagrams, Identifying classes, Visualizing a class, Associations, Inheritance and generalization, Class diagrams and object diagrams, Package diagrams, Understanding aggregations and compositions, Interfaces and realizations, Design of an object oriented system, The process of object oriented design, Object reusability and design patterns, State diagrams, Sequence diagrams, Communication diagrams, Activity diagrams, Component diagrams, | |
| Recommended Texts: | Joseph , S.S , 2004, Teach Yourself UML in 24 Hours, 3rd Edition, Pearson Education Ian ,S, 2011 ,Software Engineering, 9th Edition, Addison Wesley Jeffrey, L.W, Lonnie, D .B , 2007 , Systems Analysis and Design Methods, 7th Edition, Tata McGraw-Hill | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory, 30 hours of practical | |
| Type of Credits: | Compulsory | |
| Prerequisites: | None | |

CST 222-3 Object Oriented Programming

| Course Code | CST 222-3 | | |
|-----------------------|--|-----|--|
| Course Title | Object Oriented Programming | | |
| Objective: | To provide the knowledge to use the principles of object orientation in programming | | |
| Learning outcomes: | At the end of the course, the students will be able to describe the key features of the object oriented programming language apply essential object oriented programming concepts and techniques in programming apply the exceptions to handle run time errors | | |
| Contents: | Primitive data types, Casts and conversions, Control structures, Operators, Instance variables and instance methods, Superclass, Subclass, Inheritance, Polymorphism, Encapsulation, Dynamic method binding, Access specifiers, Packages, Method overloading and overriding, Set (mutator), Get (accessor), Predicate methods Constructors, overloaded constructors, Abstract class, Concrete class, Standard Streams, Keyboard Input, File I/O Using Streams, Buffered Streams, Writing text files, Creating Threads, Advantages of using Threads, Thread States, Thread Problems, Synchronization, Exception handling | | |
| Recommended Texts: | Deitel, H.M and Deitel, P.J, 2011, Java: How to program, 9th Edition, Deitel and Associates Sierra, K, Bates, B, 2005, Head First Java, 2nd Edition, O Reilly' | | |
| Scheme of Evaluation: | Continuous Assessment End Semester Examination | | |
| | 60% | 40% | |
| Methodology: | 30 hours of theory, 30 hours of practical | | |
| Type of Credits: | Compulsory | | |
| Prerequisites: | None | | |

CST 271-1 Web Designing

| Course Code | CST 271-1 | | |
|-----------------------|---|--|--|
| Course Topic | Web Designing | | |
| Objective: | To provide knowledge, skills and proj | ject-based experience needed basic web | |
| Learning outcomes: | At the end of the course, the students will be able to - design, create, and maintain simple web pages and websites - evaluate critically the website quality - apply web design standards when creating web pages | | |
| Contents: | Internet and world wide web, WWW concepts and how it works, Static vs. dynamic web pages, Browsing and browser software, Web browsers, Cross browser compatibility and web page validation, Web development tools, Basic web design concepts, Designing and planning web pages, Web programming for front end, Control style and layout of web pages with CSS, Program behavior of web pages with Scripts, Use of other techniques in web design. Responsive web design | | |
| Recommended Texts: | Thoriq, F, 2013, Responsive Web Design by Example, Packt Publishing. Jason, B, 2010. The Principles of Beautiful Web Design. Second Edition, SitePoint. Deitel, H.M, Deitel, P.J and Tem, R.N, 2004, Internet & World Wide Web: How to program | | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination | |
| | 60% | 40% | |
| Methodology: | 30 hours of practical | | |
| Type of Credits: | Compulsory | | |
| Prerequisites: | None | | |

CST 231-3 Data Communication and Networking

| Course Code | CST 231-3 | |
|-----------------------|--|-----------------------------|
| Course Title | Data Communication and Networking | |
| Objective: | To provide the fundamental concepts Computer Networking | s of Data Communication and |
| Learning outcomes: | At the end of the course, the studen | its will be able to |
| | - describe basic functions of ne | tworks |
| | identify network technologies | ; |
| | - describe the OSI reference mo | odel |
| | estimate and configure IP add | Iresses, subnets |
| | design simple networks | |
| Contents: | Introduction to networking, Network Architecture, Network Type, Network Topologies, Reference models and protocols, IP Addressing, IPV4, IPV6, IPV6 Conversion, Subnetting, Theoretical basis for Data transmission, Physical layer data transmission, The public switched telephone network (PSTN), The Data link layer, Error detection and correction, NAT, Fragmentation, Checksum, Wireless networks | |
| Recommended Texts: | 1. Tanenbaum ,A.S , 2010 ,Computer Networks,5 th Edition | |
| | 2. James Kurose and Keith Ross, 2012, Computer Networking: A Top- | |
| | Down Approach, 6 th Edition, Pearson | |
| | | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 45 hours of theory | |
| Type of Credits: | Compulsory | |
| Prerequisites: | None | |

ESD 221- 1 English Language-III

| Uva Wellassa University, Faculty of Management | | | COURSE SYLLABUS |
|--|--|----|-----------------|
| Course Code | ESD 221-1 | | |
| Course Title | English Language–II | II | |
| Credits | 1 | | |
| Status: Compulsory /Optional | Compulsory | | |
| Degree Programme (S) | All | | |
| Prerequisites if any | Skills gained by English Language Level 1 & 2 | | |
| Time Allocation (hrs) | Lectures [15] Discussions []Practical [] Field Work [] | | |
| ASSESSMENTS & EVALUATION | | | |
| Continuous Assessments: | | | |
| Grammar assignments | 209 | % | |
| presentation 20% | | | |
| Writing Assignment | gnment 20% | | |
| End Semester Examination:40% | | | |
| INTENDED LEARNING OUTCOMES | | | |

By the end of the course students will be able to

- 1. Listen and identify the key points
- 2. Agree or disagree on a particular point of view
- 3. Compare and contrast situations, people
- 4. Identify directly and indirectly stated information
- 5. Identify discourse markers in written and spoken discourse

COURSE DESCRIPTION/CONTENT

The course will be the first of the advanced courses in English where it hopes to focus on the complex areas of English language learning.

SELECTED READINGS

<u>Glendinning</u>, Eric H. & Holmström, <u>Beverly. (2004). Study Reading:</u> A Course in Reading Skills for Academic Purposes. Cambridge: Cambridge University Press.

CST 212-3 Quantitative Techniques

| Course Code | CST 212-3 | | | |
|--------------------------|--|--|--|--|
| Course Title | Quantitative Techniques | Quantitative Techniques | | |
| Objective: | To provide the knowledge of a variety of a applicable to a wide range of computer in | statistical and quantitative techniques ndustry | | |
| Learning outcomes: | At the end of the course, the students will be able to select the quantitative technique or model appropriate in problem solving and decision making situations. interpret results and the impacts they have upon the problems being studied. decide the appropriate course of action based on the quantitative analysis performed. integrate the quantitative methods learned for making decisions within an organization. explain decisions based on quantitative elements. | | | |
| Contents: | Basic principles of quantitative analysis, Development of a quantitative model, Concepts of applied probability and its application, Probability distributions, Population and sample estimation, Confidence interval and hypothesis testing, , Simple and multiple regression analysis, One-way (CRD) and two-way (RCBD) ANOVA. Time Series Analysis | | | |
| Recommended Texts: | Neter, J , Kuter, M.H ,Nachtsheim, C.J and Wasserman,W , 1996, Applied Linear Statistical Models, 4th edition ,McGraw-Hill Bluman,A.G, 2007 , Experimental Design, 6th edition , John Wiley | | | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination | | |
| | 60% | 40% | | |
| Methodology: | 30 hours of theory, 30 hours of practical | | | |
| Type of Credits: | Compulsory | | | |
| Prerequisites: | None | | | |

BGE 211-2 Aesthetic Studies

| Uva Wellassa University, Faculty | of Management | | COURSE SYLLABUS | |
|----------------------------------|--|-------------------|-----------------|--|
| Course Code | BGE 211 - 2 | | | |
| Course Title | Aesthetic Studies | Aesthetic Studies | | |
| Credits | 2 | | | |
| Status: Compulsory /Optional | Compulsory for a | all students | | |
| Degree Programme (S) | All | All | | |
| Prerequisites if any | | | | |
| Time Allocation (hrs) | Lectures [15] Discussions [-]Practical [30] Field Work [-] | | | |
| ASSESSMENTS & EVALUATION | | | | |
| Continuous Assessments: | | | | |
| Presentations (Group) | | 30% | | |
| Writing Assignment (Group) | | 30% | | |
| | | | | |
| End Semester Examination:40% | | | | |
| INTENDED LEARNING OUTCOMES | | | | |

By the end of the course, it is expected that the student will be able to:

- 1. Develop critical philosophical aesthetic thinking skills
- 2. Develop Understanding the important influence of context upon one's judgments and opinions

COURSE DESCRIPTION/CONTENT

The course will provide an introduction to Aesthetic Studies, philosophy of art and aesthetic, philosophy of music, dance, photography, philosophy of art and architecture. The nature of beauty, the relation between art and reality, creativity, art and criticism, art and life,

SELECTED READINGS

Piaget, Jean. The Psychology of Intelligence. New York: Harcourt, Brace & Company, 1950.

Lipman, Mattew, and Ann M. Sharp. Growing up with Philosophy. Philadelphia: Temple University Press, 1978.

Second Semester

CST 213-2 Discrete Mathematics – II

| Course Code | CST 213-2 | | |
|--------------------------|---|--------------------------------------|--|
| Course Title | Discrete Mathematics-II | | |
| Objective: | To provide the knowledge of problem sol | ving skills in ordinary differential | |
| | equations, partial differential equations, g | graph theory and Boolean algebra | |
| Learning | At the end of the course, the students wil | l be able to | |
| outcomes: | explain the concepts of ordinary differential equations | differential equations and partial | |
| | - recognize the importance of grav | oh theory and its applications | |
| | recognize the importance of grad recognize the concepts of Boolea | n algebra | |
| | - apply Boolean algebra in problem | n solving | |
| Contents: | Ordinary differential equations, First order ordinary differential equations, Linear equations, Separable equations, Integrating factors, Homogeneous ,Equations, Partial differential equations, First order linear and non- linear PDEs, Finite state machines, Graph theory, Graphs, Paths, Circuits, Eulerian graphs, Hamiltonian graphs, Shortest path problem, Chinese postman problem, Graph colouring and applications of graph theory | | |
| Recommended Texts: | Diprima, E, 2004, Elementary Differential Equations & Boundary value Problems, 7th edition, Wiley Simons, F, Krantz,S.G, 2006, Differential equations, Tata McGraw-Hill Wilson, R.J, 1996, Introduction to graph theory, Addison- Wesley Longman | | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination | |
| | 60% | 40% | |
| Methodology: | 30 hours of theory | | |
| Type of Credits: | Compulsory | | |
| Prerequisites: | None | | |

| Course Code | CST 224-3 | | |
|-----------------------|--|---|--|
| Course Title | Software Engineering | | |
| Objective: | To provide the knowledge to apply the concepts and get familiar with the artifacts associated with a typical software development process | | |
| Learning outcomes: | At the end of the course, the student | s will be able to | |
| | - apply the software engineerin | g principles and techniques in developing | |
| | quality software products | | |
| | recognize artifacts in software | e design process | |
| | explain the software quality a | ssurance process used within the software | |
| | engineering paradigm | a | |
| Contonts | - estimate the quality of the so | Itware using quality assurance process | |
| Contents. | Introduction to software, Software Engineering Paradigm, Verification, Validation, Life Cycle Models, System Engineering, Computer Based System, Business Process Engineering Overview, Product Engineering Overview, Functional and Non-Functional requirements, Software Document, Requirement Engineering Process, Feasibility Studies, Prototyping in the Software Process, Data, Functional and Behavioral Models, Structured Analysis and Data Dictionary, Systems Engineering and Analysis Concepts, Design Process and Concepts, Modular Design, Design Heuristic, Architectural Design, Data Design, User Interface Design, Real Time Software Design, System Design, Real Time Executives, Data Acquisition System, Monitoring And Control System. Taxonomy Of Software Testing, Types Of software Test, Testing Boundary Conditions, Structural Testing, Test Coverage Criteria Based On Data Flow Mechanisms, Black box , White box, Regression, Unit , Integration, Validation and System Testing, Debugging , Software Implementation Techniques Measures, ZIPF's Law, Software Cost Estimation, Function Point Models, COCOMO Model, Delphi Method, Scheduling , Earned Value Analysis, Error Tracking, Software Configuration Management, Program Evolution Dynamics, Software Maintenance, Project Planning, Project | | |
| Recommended Texts: | 1. Sommerville, I, 2011, Software Engineering, 9 th Edition, Addison Wesley | | |
| | 2. Daniel,G ,2004, Software Quality Assurance: From Theory to | | |
| | Implementation, Pearson Education India | | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination | |
| | 60% | 40% | |
| Methodology: | 45 hours of theory | | |
| Type of Credits: | Compulsory | | |
| Prerequisites: | None | | |

CST 224-3 Software Engineering

CST 223-3 Data Structures and Algorithms

| Course Code | CST 223-3 | | |
|-----------------------|--|-----|--|
| Course Title | Data Structures and Algorithms | | |
| Objective: | To provide the essential knowledge on different data structures and how to design and analysis algorithms | | |
| Learning outcomes: | At the end of the course, the students will be able to design and develop efficient data structures and algorithms explain the purpose and mathematical background of algorithms apply the algorithm analysis techniques to compare algorithms implement the abstract data types analyze various sorting algorithms and the run-time analysis | | |
| Contents: | Arrays, Stacks, Queues, Deque, Link list, Doubly Linked Lists, Trees, Binary trees, 2-3-4 Trees, Graphs, Importance of Spatial and Temporal complexity of computer programming, Growth of functions, Recurrences, Analysis of Algorithms, Best/Worst/Average Cases, Big Oh-notation, omega and theta notations, Recursion, Factorial, Fibonacci, Bubble sort, Selection sort, Insertion sort, Divide and Conquer method and complexity, Merge sort, Quick sort, Backtracking, Alfa-Beta pruning, Branch and Bound Search, Binary Search Trees, Hash tables, Hash functions, Collision and Collision Resolution, Heap sort | | |
| Recommended Texts: | Lafore, R, 2003, Data Structures and Algorithms in Java, 2nd Edition, Sams Publishing Standish, T.A, 2005, Data Structures in Java, Prentice Hall Dasgupta, S, Papadimitriou, C.H and Vazirani, U.V 2006 Algorithms, Mcgraw-Hill Kleinberg, J and Tardos, E, 2006, Algorithm Design, Addison-Wesley Eckel, B, 2000, Thinking in C++, Volume 1: Introduction to Standard C++, 2nd Edition, Prentice Hall | | |
| Scheme of Evaluation: | Continuous Assessment End Semester Examination | | |
| | 60% | 40% | |
| Methodology: | 30 hours of theory , 30 hours of practical | | |
| Type of Credits: | Compulsory | | |
| Prerequisites: | None | | |

| Course Code | CST 252-2 | |
|-----------------------|---|---|
| Course Title | Operating Systems Concepts and Designs | |
| Objective: | To provide the knowledge in basic operating systems concepts and design | |
| Learning outcomes: | At the end of the course, the stude - demonstrate various sche - define deadlock, preventio - compare and contrast var - explain the concepts of fil - perform administrative ta | ents will be able to duling algorithms. on and avoidance algorithms. ious memory management schemes. e systems and management. sks on Linux Servers. |
| Contents: | Operating systems overview, Objectives and functions, Evolution of operating system, Operating system structure and operations, System calls, System programs, System boot, Process management, Process concept, Process scheduling, Operations on processes, Inter- process communication, Threads overview, Multicore programming, Multithreading models, Thread and SMP management, Process synchronization, Critical section, Race condition, Semaphores, Monitors, CPU scheduling and deadlocks, Storage management, Main memory and contiguous memory allocation, Segmentation, Paging, 32 and 64 bit architecture examples, Virtual memory, Demand paging, Page replacement, Allocation, Thrashing, Allocating kernel memory, OS examples, I/O Systems, Mass storage structure overview, Disk scheduling and management, File system storage, File concepts, Directory and disk structure, Sharing and protection, File system implementation, File system structure, Directory structure, Allocation methods, Free space management, I/O systems, Case study, Linux System basic concepts, System administration, Requirements for Linux system administrator, Setting up a LINUX multifunction server, Domain name system, Setting up local network services, Virtualization basic concepts, | |
| Recommended Texts: | 1. Abraham,S , Peter,B , Galvin and Greg,G ,2012 , Operating System | |
| | Concepts, 9th Edition, John Wiley and Sons Inc. Andrew S. Tanenbaum and Herbert Bos ,2014, Modern Operating Systems, 4th Edition | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory | |
| Type of Credits: | Compulsory | |
| Prerequisites: | None | |

CST 252-2 Operating Systems Concepts and Design

ESD 222-1 English Language-IV

| Uva Wellassa University, Faculty of Management | | | COURSE SYLLABUS |
|--|--|---|-----------------|
| Course Code | ESD 222-1 | | |
| Course Title | English Language–IV | | |
| Credits | 1 | | |
| Status: Compulsory /Optional | Compulsory | | |
| Degree Programme | All | | |
| Prerequisites | Skills gained by English Language Level 1, Level 2 & Level 3 | | |
| Time Allocation (hrs) | Lectures [15] Discussions [] Practical [] Field Work [] | | |
| ASSESSMENT/EVALUATIONS | | | |
| Continuous Assessments: | | | |
| Grammar assignments | | % | |
| Academic presentations | | % | |
| Writing Assignment 20% | | | |
| End Semester Examination 40% | | | |
| INTENDED LEARNING OUTCOMES | | | |

By the end of the course students will be able to

- 1. Listen & summarise academic and public lectures
- 2. Listen, identify and respond to differences in accent
- 3. Read and identify the different rhetorical patterns
- 4. Read and summarise a text verbally
- 5. Write a summary of a spoken discourse or written extract

COURSE DESCRIPTION/CONTENT

This course will focus on the basic foundations of academic English. This is meant to prepare students to continue their academic activities confidently in the English medium

SELECTED READINGS

Yadugiri, M.A.(2006). *Making Sense of English: A Textbook of Sounds, Words and Grammar*. Delhi: Viva Books Private Limited.

CST 226-3 Rapid Application Development

| Course Code | CST 226-3 | |
|-----------------------|--|---------------------------------|
| Course Title | Rapid Application Development | |
| Objective: | To provide theoretical knowledge and Application Development (BAD) | d practical experience in Rapid |
| Learning outcomes: | At the end of the course, the students will be able to - define the concept of rapid development - apply prototyping in RAD context - use RAD tools and techniques in rapid development environment | |
| Contents: | Introduction to RAD, Rapid development considerations, RAD teams, Software prototyping, GUI and web application development using RAD tools, Web frameworks for rapid development, Use of hibernate ORM in rapid development environment, Content Management Systems (CMSs) for rapid development. Best practices of RAD | |
| Recommended Texts: | Steve, M, 1996, Rapid development, WP Publishers & Distributors (P) Ltd. | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory , 30 hours of practical | |
| Type of Credits: | Compulsory | |
| Prerequisites: | None | |

BGE 213-1 History

| Uva Wellassa University, Faculty of Management | | COURSE SYLLABUS | |
|--|--|-----------------|--|
| Course Code | BGE 213-1 | | |
| Course Title | History | | |
| Credits | 1 | | |
| Status: Compulsory /Optional | Compulsory | | |
| Degree Programme (s) | All | | |
| Prerequisites, if any | N/A | | |
| Time Allocation (hrs) | Lectures [15] Discussions [] Practical [] Field Work [] | | |
| ASSESSMENTS/EVALUATIONS | | | |
| | | | |
| Continuous Assessments: | | | |
| Assignment | | 30% | |
| Class Room Test/Presentation | | 30% | |
| End Semester Examination: | | 40% | |
| INTENDED LEARNING OUTCOMES | | | |

This Course is designed generally based on the disciplines of Agriculture, Science and Technology and Management with the objective of giving an understanding of the historical background of Sri Lanka. At the completion of this course students will understand the historical value of the agricultural and technological achievements and socio-economic development (Ancient Agricultural methods, Irrigation technology, Science and technological achievement and Political Economics etc.)

COURSE DESCRIPTION/CONTENT

Introduction to History, Historical background of Sri Lanka, Ancient Agricultural methods (Slash – and – burn, Wet – rice cultivation, Mixed home gardens and monocarp cultivation, Cattle Husbandry and Fisheries, Traditional *Kem* Practices). Development of Plantation Industry, Development of Scientific concepts, Technological Development and Manufacturing Industries, Irrigation Development and its Technology

The Political Economy in ancient Sri Lanka, Crisis of the Sixteen Century, Trade and Agriculture under the Portuguese and Dutch, Economic and Social Changes in early 19th Century, Constitutional Development and Economic Changes, Economic and Social Changes in early 20th Century, In the Donoughmore Era, 1931-47, The Political Economy and Policy after 1948

SELECTED READINGS

Silva De K. M. A (2005): *History of Sri Lanka*, Vijithayapa Colombo.

Siriweera, W. I, (2004): *History of Sri Lanka*, Dayawansa Jayakody Colombo.

Selected Articles

BGE 214-1 Geography

| UvaWellassa University, Faculty of Management | | | |
|---|---|--|--|
| Course Code | BGE 214-1 | | |
| Course Title | Geography | | |
| Credits | 1 | | |
| Status: Compulsory /Optional | Compulsory | | |
| Degree Program (s) | All | | |
| Prerequisites if any | N/A | | |
| Time Allocation (hrs) | Lectures [15] Discussions [] Practical [] Field Work [] | | |
| ASSESSMENTS/ EVALUATIONS | | | |
| | | | |
| Continuous Assessments: | 20% | | |
| Quizzes | 40% | | |
| Continuous Assessment | | | |
| End Semester Examination 40% | | | |
| INTENDED LEARNING OUTCOMES | | | |

After completing this course, the student will be able to

1. proficient in basic concepts in climate, natural resources, Morphological foundation distribution of minerals location of human activities, globalization and its impact and distribution and inter relationship.

COURSE DESCRIPTION/ CONTENT

Introduction to Geography, The basic concept in geography, Geography and society, Geography and development, Geological and morphological foundation, Climatological foundation, Natural resources and their distribution, Major environmental issues, Environmental conservation, Population distribution and its implications, Factors of location of human activities, Globalization and its impact tools and techniques of spatial distribution and interrelationship.

SELECTED READINGS

Fellman, G & Malikowski, G. (2005): *Human Geography: Landscape of Human Activities*, (8th edition), The McGraw-Hill, Companies, New York.

Gabler, R.E., Sajer, R.J., Brazier, S and Damiel, W. (1976): *Essentials of physical Geography*, (2nd Edition), Saunders college publishing, New York.

Peet, R. (1998): *Modern Geographical Thought*. Blackwell Publishers, Oxford.

Robert, B.P., Binns, T., Jenifer, A.E., and David, S. (1999): Geography of Development, Pentice Hall, London.

Strahler, A.H., & Strahler, A. (2003): *Physical Geography: Science and Systems of the Human Environment*, (2nd Edition), John Wiley and Sons, New York.

Level -300

First Semester

CST 362-2 Human Computer Interaction

| Course Code | CST 362-2 | | |
|-----------------------|---|--|--|
| Course Title | Human Computer Interaction | | |
| Objective: | To provide a detailed understanding of and practices of interface design for c | of the underpinning theories, principles computer-based systems | |
| Learning outcomes: | At the end of the course, the students will be able to describe theories relevant to HCI apply principles and practices of HCI in designing user interfaces define importance and role of usability and evaluation in systems design recognize issues relating to user diversity, different types of systems, interaction styles, devices and environments | | |
| Contents: | Contexts for HCI, Processes for user-centered development, Interaction design basics, Principles of graphical user interfaces, Elements of visual design, Task analysis, Paper prototyping, Help and documentation, User interface standards, Approaches and characteristics of the design process, Usability and Accessibility Guidelines, Techniques for data gathering, Prototyping techniques, Evaluation without users, Evaluation with users Internationalization | | |
| Recommended Texts: | Yvonne,R and Hoboken,N.J, 2011, Interaction design: beyond human-computer interaction, Wiley Dix,A, 2004, Human-computer Interaction, Pearson/Prentice-Hall Shneiderman, B, and Plaisant, B, 2010, Designing the User Interface: Strategies for Effective Human-computer Interaction, Addison- Wesley | | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination | |
| | 60% | 40% | |
| Methodology: | 30 hours of theory | | |
| Type of Credits: | Compulsory | | |
| Prerequisites: | None | | |

| Course Code | CST 373-3 | | |
|-----------------------|--|--------------------------|--|
| Course Title | Digital Image Processing | | |
| Objective: | To provide the knowledge on Images and its representation, Types and manipulations. | | |
| Learning outcomes: | At the end of the course, the students will be able to describe Image representation perform Basic Operation on images perform Enhancement in images using filters perform Extraction and Processing the Region of Interest (ROI) | | |
| Contents: | Human vision, resolution, vector, raster images, Color models (RGB, Grey Scale, Black and White), Image sampling, Quantization, threshold, Image representation, Image files types, Image Enhancement, Intensity Transformations and Spatial Filtering, Histogram, Filters (mean, median, etc.) Smoothing, Color image enhancement, Noise distributions ,connected components, Fourier Transform, Image Restoration & Reconstruction, Image deformation and geometric transformations, Restoration techniques, Noise characterization, Noise restoration filters, Adaptive filters, Linear, Position invariant degradations, Morphological Image Processing, Structuring Elements, Image Segmentation, Edge detection, Edge linking ,Object detection , Region growing, Region splitting and Merging , Watershed method, Color Image Processing , Image Compression, Medical Image Processing ECG,MRI ,CTScan, Images Analysis | | |
| Recommended Texts: | Gonzalez ,R.C and Woods,R.E ,2007, Digital Image Processing, 3rd Edition, Pearson Education Gonzalez ,R.C , Woods,R.E and Eddins ,S.L , 2009 ,Digital Image Processing using MATLAB' 2nd Edition, Gatesmark Publishing | | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination | |
| | 60% | 40% | |
| Methodology: | 30 hours of theory ,30 hours of practical | | |
| Type of Credits: | Compulsory | | |
| Prerequisites: | None | | |

CST 373-3 Digital Image Processing

| Course Code | CST 361-3 | |
|-----------------------|---|--------------------------|
| Course Title | Artificial Intelligent Systems | |
| Objective: | To provide the essential knowledge to understand, design & implement intelligent solutions for scientific, industrial & ordinary community | |
| Learning outcomes: | At the end of the course, the students will be able to demonstrate and explain the concepts and techniques used for implementations of intelligent systems. apply intelligent programming as a problem solving paradigm. identify various trans-disciplinary applications of AI in order to value | |
| Contonto | addition for products in differ | ent domains |
| Recommended Texts: | Introduction to AI, History, Four Schools of Thoughts, Significance of AI, Turing Test, "Chinese room" argument, Search, Uninformed Search (BFS, DFS), Heuristic Search, Depth-limited search, Best-first (greedy) search, Iterative deepening DFS, Bidirectional search. Knowledge Representation (KR),Semantic nets, Frames, Rules, Introduction to Ontology Engineering, Ontologies, Software Tools, Reasoning, Theorem provers, Classifiers, Deductive Reasoning and Logic Programming, Predicate calculus (First order logic), Introduction to Prolog, Evolutionary Computing, Introduction to Genetic Algorithms ,Artificial Cognitive Systems, Defining Cognition, Early Expert Systems, Expected features of ES, KR, Rules and Inference, Prolog based ES, Swarm Intelligence, Rational agents, BDI Model; Agent Frameworks, Semantic Web, Natural Language Processing (NLP), Emotional Intelligence / Kansei Systems, Robotics 1. Russell, S and Norvig, P, 2009, Artificial Intelligence: A Modern | |
| Scheme of Evaluation: | | |
| | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory,30 hours of practical | |
| Type of Credits: | Compulsory | |
| Prerequisites: | None | |

CST 361-3 Artificial Intelligent Systems

CST 325-2 Advanced Database Management Systems

| Course Code | CST 325-2 | |
|-----------------------|--|--------------------------------|
| Course Title | Advance Database Management Systems | |
| Objective: | To provide advance knowledge Data Concepts | base Management System Advance |
| Learning outcomes: | At the end of the course, the students will be able to define Indexing and index structures map query into query tree and graph perform query optimization apply transactions management in databases ensure concurrency control in databases | |
| Contents: | Indexing, File Structure, Primary ,Secondary B+ trees , Introduction to OODBMS, Object and Classes , Class hierarchy , Comparison of Data Models, Query Tree , Query Graph, Query Optimization, Cost Estimation in Query Execution, Transactions Scheduling ,Deadlock , Concurrency Control, Recoverability, Serializable Schedule, Locking Methods , Time Stamping, | |
| Recommended Texts: | Raghu Ramakrishnan, 2003, Database Management Systems, , 3rd Edition, McGraw-Hill Elmasri, Navathe, Somayajulu, and Gupta, 2006, Fundamentals of Database Systems, 4th Edition, Pearson Education | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory | |
| Type of Credits: | Compulsory | |
| Prerequisites: | None | |

| Course Code | CST 372-3 | |
|-----------------------|---|--------------------------|
| Course Title | Computer Graphics | |
| Objective: | To provide fundamental knowledge in two dimensional and three dimensional graphics approach in computing | |
| Learning outcomes: | At the end of the course, the students will be able to explain Rendering functions and applicability of them in trans- disciplinary context perform graphical relate the knowledge obtained for other disciplines | |
| Contents: | Graphics systems, Personal computers vs. Graphic workstations, Display Hardware, Display devices, Graphic adopter, Hardware & Communication Protocols, IEEE & VESA Standards, Display Data Channel (DDC), HDMI, Fire-Wire, RFC, Color models (RGB, HSV, HSL, CMYK), Line Drawing Algorithms, Basic & Bresenham's line algorithm, 2D & 3D Transformations, Translation, Scaling, Rotation, Compound Rotations, Orthographic & Perspective projections, Ray-tracing, Illumination models, Radiosity, Quadtree, Octree, Curves, Non-Uniform Rational Basis Spline (NURBS), Spatial database, Fonts, Computer languages for creating Vector graphics, PostScript, Texture mapping, Linear interpolation, Perspective correctness, Multi texturing, Software standards, GKS, PHIGS, OpenGL and DirectX, OpenGL Transform Operations | |
| Recommended Texts: | Folly, J.D, Van-Dam, A, Feiner, S.K and Hughes, J.F,2013, Computer Graphics: Principles and Practice in C, Addison-Wesley Professional, Boston. | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory , 30 hours of practical | |
| Type of Credits: | Compulsory | |
| Prerequisites: | None | |

CST 372-3 Computer Graphics

ESD 311-1 Communication Skills-II

| Uva Wellassa University, Faculty of Management | | COURSE SYLLABUS | |
|--|---|-----------------|--|
| Course Code | ESD 311-1 | | |
| Course Title | Communication Skills-II | | |
| Credits | 1 | | |
| Status: Compulsory /Optional | Compulsory for all students | | |
| Degree Programme (s) | All | | |
| Prerequisites, if any | Pass ESD 111-1 | | |
| Time Allocation (hrs) | Lectures [-] Discussions [-] Practical [30] Field Work [-] Workshop [-] | | |
| ASSESSMENTS/EVALUATIONS | | | |
| | | | |
| Continuous Assessments: | | | |
| Business Presentations (Group) | 3 | 30% | |
| Interview Skills (Group) | 3 | 30% | |
| | | | |
| End Semester Examination: | | 10% | |
| | INTENDED LEARNING C | DUTCOMES | |
| | | | |

By the end of this course, it is expected that the student will be able to:

- 1. Develop presentation skills required for the world of work.
- 2. Develop confidence in facing interviews and business meetings.

COURSE DESCRIPTION/CONTENT

The course will provide an introduction to Effective presentation skills, Delivering Business and Academic Presentations, Interview skills.

SELECTED READINGS

Effective Communication in Organizations, Fielding, M. (1997) 2nd ed. Kenywyn : Juta+Co Interpersonal Communication & Human Relationships, Knapp, Vangelisti & Caughlin, 2014, Pearson

CST 391-2 Group Project

| Course Code | CST 391-2 | |
|----------------------|---|--------------------------------------|
| Course Title | Group Project | |
| Objective | Provide an opportunity to enhance knowledge, experience in information | |
| | technology applications in industry. | |
| Learning outcomes | At the successful completion of the c | ourse, the student will be able to |
| | identify computer-based solu | itions for a given problem. |
| | select the best solution from | the identified set of solutions. |
| | implement a system for a pro | pposed solution. |
| | - define the use of Level1 and | Level2 courses through the project |
| | build Team spirit and synergy | / |
| Content | A group of students (with limited nu | umber) works to implement a system |
| | for a given case study or to solve a real word problem. The work includes | |
| | planning, designing and implementation of the system. An academic staff | |
| | is assigned as a supervisor with | the mutual interest of the project. |
| | Students are responsible for organized | zing themselves and their work, with |
| | advice from their supervisor with whom they should meet on a regular | |
| | basis, as agreed with the supervisor | |
| Recommended Texts | 1. Robson, C, 2007, How to do a Research Project: A Guide for | |
| | Undergraduate Students, First Edition, Wiley-Blackwell | |
| | 2. Group Project Guidelines | |
| | 3. Sample Report Format | |
| Scheme of Evaluation | Continuous Evaluation | End Semester Evaluation |
| | 60% | 40% |
| Methodology | Oral Presentation , Report Evaluation | |
| Type of credits | Compulsory | |
| Prerequisites | None | |

CST 332-2 Cryptographic Systems

| Course Code | CST 332-2 | |
|-----------------------|--|--------------------------|
| Course Title | Cryptographic Systems | |
| Objective: | To gather knowledge about cryptographic protocols and their applications. | |
| Learning outcomes: | At the end of the course, the students will be able to identify advantages and disadvantages of cryptographic protocols improve the security of a system using cryptographic techniques apply cryptographic protocols to enrich systems security | |
| Contents: | History and overview of cryptography ,Basic symmetric-key, encryption, Classical Encryption Techniques, Lock Ciphers and the Data Encryption Standard, Advanced Encryption Standard, Pseudorandom Number Generation and Stream Ciphers, Asymmetric Ciphers ,Public-Key Cryptography and RSA, Diffie-Hellman Key Exchange, ElGamal Cryptosystem, Elliptic Curve Cryptography, Cryptographic Data Integrity Algorithms, Cryptographic Hash Functions, Message Authentication Codes, Digital Signatures, Mutual Trust, Key Management and Distribution, User Authentication Protocols | |
| Recommended Texts: | Katz,J and Lindell,Y, 2007, Introduction to Modern Cryptography Stallings ,W, 2013 Cryptography and Network Security: Principles and Practice , 6th Edition | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory | |
| Type of Credits: | Compulsory | |
| Prerequisites: | None | |

Second Semester

CST 327-3 Web Development Technology

| Course Code | CST 327-3 | |
|-----------------------|--|--------------------------|
| Course Title | Web Development Technology | |
| Objective: | To provide a better understanding of how front page design and server side scripting with databases together to produce dynamic pages in World Wide Web | |
| Learning outcomes: | At the end of the course, the students will be able to apply the basics of the server side scripting describe how web pages are developed deliver web pages including OOP concepts develop dynamic pages in web development | |
| Contents: | Introduction server side scripting, data types, Identifiers, Variables, Constant, Expressions, String interpolation, Control structures, Functions and arrays, Object-oriented Concepts, Error and exception handling, Working with databases, Creating enhanced features with additional libraries and technologies, Securing the web site, Session and cookies | |
| Recommended Texts: | Gilmore, W. J, 2010, Beginning PHP and MySQL: from novice to professional, New York: Apress | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory ,30 hours practical | |
| Type of Credits: | Compulsory | |
| Prerequisites: | None | |

CST 381-3 Management Information Systems

| Course Code | CST 381-3 | |
|-----------------------|---|--------------------------|
| Course Title | Management Information Systems | |
| Objective: | To provide the knowledge to explore the various different ways in which information technology relates to organizational objectives and goals in an organizational context, given the increasing inter-relationship between these two in today's global world. | |
| Learning outcomes: | At the end of the course, the students will be able to demonstrate the fundamental principles associated with the strategic adoption, implementation, use and evaluation of information systems in organizations. comprehend the significant managerial aspects of treating information as an organizational resource and its increasing impact on today's organization. | |
| Contents: | Introduction to Information Systems ,Organizational Information Systems and Their Impact, Electronic Commerce, Strategic Information Systems Planning, Value Creation with Information Systems, Appropriating IT- Enabled Value Over Time, Information System Trends and Security, Privacy, and Ethics | |
| Recommended Texts: | Laudon, K. C. & Laudon, J. P., 2010, Management Information Systems, 11th Edition, Pearson | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory, 30 hours of practical | |
| Type of Credits: | Optional | |
| Prerequisites: | None | |

CST 353-2 Computer Systems Architecture

| Course Code | CST 353 -2 | |
|-----------------------|---|--------------------------|
| Course Title | Computer Systems Architecture | |
| Objective: | To study the Computer Organization and Architecture | |
| Learning outcomes: | At the end of the course, the students will be able to demonstrate how a computer is organized and designed analyze a computer system based on performances perform effective program in assembly language using the MIPS ISA describe the Processors and data path, Peripheral Devices differentiate pipelined and non-pipelined processors | |
| Contents: | Computer Abstractions, Computer System and Components, Computer Revolution, Performance Matrices, Instruction Execution, Execution Cycle, Instruction set Architectures, Registers, Computer arithmetic's, Practical MIPS Assembly Programming, Processor, Processor Design, Data path, Control Path, Pipeline, Superscalar, Memory Architecture, Memory hierarchy, RAM, Cache, Cache mapping, Cache replacement algorithms Input and Output, Peripheral Devices, IO Modules, Interrupts, Direct Memory Access, Multiprocessor, Core technology, Multi-Threading, Parallel Processing | |
| Recommended Texts: | Patterson,D.A ,Hennesy,L.H, 2005, Computer Organization and design , 3rd Edition, Elsevier Mano,M.M, 1993, Computer System Architecture M.Moris Mano , 3rd Edition | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory | |
| Type of Credits: | Compulsory | |
| Prerequisites: | None | |

CST 374-2 Multimedia and Hypermedia Technology

| Course Code: | CST 374-2 | |
|-----------------------|--|--------------------------|
| Course Title: | Multimedia and Hypermedia Technology | |
| Objective: | To provide the basic knowledge in the area of Multimedia and Hypermedia Technology and its applications. | |
| Learning outcomes: | At the end of the course, the students will be able to describe most of the concepts and applications of the multimedia and hypermedia technology the multimedia authoring tools | |
| Contents: | Introduction to Multimedia and Hypermedia, Multimedia Fundamentals ,Vector Graphics, Bitmapped Images, Compression methods, Color, Video, Video on demand, Animation, Sound, Hypermedia, Visual Design, Networks, Multimedia authoring tools (practical), Latest trends and applications in multimedia | |
| Recommended Texts: | Gross,T , 2010,Plone 3 Multimedia, Packt Publishing Ltd, United Kindom Chapman,N, Chapman,J 2009, Digital Multimedia,3rd edn, John Wiley & Sons, Ltd, USA | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory | |
| Type of Credits: | Compulsory | |
| Prerequisites: | None | |

CST 342-3 Parallel and Distributed Computing

| Course Code | CST 342-3 | |
|-----------------------|--|--------------------------|
| Course Title | Parallel and Distributed Computing | |
| Objective: | To provide the knowledge on Parallel and Distributed Processing of Task and Speedup the Processing | |
| Learning outcomes: | At the end of the course, the students will be able to - define Parallel Algorithms - recognize parallel speedup and performance analysis - identify task decomposition techniques - perform Parallel Programming - apply acceleration strategies for algorithms | |
| Contents: | Sequential Computing, History of Parallel Computation, Flynn's Taxonomy, Process, threads, Pipeline, parallel models, Shared Memory UMA,NUMA, CCUMA, Ring ,Mesh , Hypercube topologies, Cost and Complexity analysis of the interconnection networks, Task Partition , Data Decomposition, Task Mapping, Tasks and Decomposition , Processes and Mapping ,Processes Versus Processors, Granularity, processing, elements, Speedup , Efficiency , overhead, Practical ,Introduction to Pthered library , CUDA program , MPICH, Introduction to Distributed Computing, Centralized System , Comparison , mini Computer ,Workstation models, Process pool , analysis, Distributed OS, Remote procedure call ,RPC, Sun RPC, Distributed Resource Management, Fault Tolerance | |
| Recommended Texts: | Ananth,G, Anshul,G, Karypis,G and Kumar,V, 2003, Introduction to Parallel Computing , 2nd Edition , Addison Wesley | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory , 30 hours of practical | |
| Type of Credits: | Compulsory | |
| Prerequisites: | None | |
| Course Code | CST 355-3 | |
|-----------------------|--|---------------------------------------|
| Course Title | Systems Level Programming | |
| Objective: | To provide the knowledge and experience in using a high-level language to interface with an operating system | |
| Learning outcomes: | At the end of the course, the student | ts will be able to |
| | apply UNIX concepts, including files, processes, inter process | |
| | communication, and shells | |
| | perform shell programming in | system level |
| | gain experiences in writing an | d testing programs using UNIX editors |
| | and programming tools | |
| Contents: | Unix System Overview, Commands in Unix Environment, Programming | |
| | Shell Scripts, Decision making and loops in shell scripts, File I/O and Filters, | |
| | Make files and Arguments, File Manipulation, Terminal I/O, Signals and | |
| Pacammandad Taxts: | 1 Craham Class and King Ables 2002 LINUX for Drogrammers and | |
| Recommended Texts. | 1. Granam Glass and King Ables, 2005, ONIX for Frogrammers and | |
| | Osers, Pearson Education | |
| | 2. Richard Stevens, W and Stephen A. Rago , 2013, Advanced | |
| | Programming in the UNIX Environment, Addison-Wesley | |
| | 3. Sriranga Veeraraghavan, 2002, Sams Teach Yourself Shell | |
| | Programming in 24 Hours, 2 nd Edition, Sams Publishing. | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory ,30 hours of practical | |
| Type of Credits: | Compulsory | |
| Prerequisites: | None | |

CST 355-3 Systems Level Programming

| Course Code | CST 393-2 | |
|-----------------------|--|---|
| Course Title | Research Methodology and Scientific Writing | |
| Objective: | To provide students with the tresearch terminology and asset To identify the types of method types of problems and questions To develop research questions critical appraisal of existing re To design a research proposal To begin initial preparations for | tools and skills required to understand ess published research ods best suited for investigating different ons s that are based on and build upon a search or embarking on a new research project |
| Learning outcomes: | At the end of the course, the students will be able to understand research terminology be aware of the ethical principles of research, ethical challenges and approval processes describe different type of research methods identify the components of a literature review process | |
| Contents: | Introduction to Research Methodology, Overview of the Research Process, Development of Research Topics/Questions, Formulating testable Hypothesis, Literature review, Research Designs and Experiments, Methods of data collection, Processing and analysis of data, Report generation (content, style and grammar, reference and citations), Ethical issues in conducting research. Scientific Writing: Overview of scientific communication, Principles of Clear Scientific Writing, Writing reports and peer-review papers, The peer-review process and publishing, Poster and Oral presentation, Research Proposals | |
| Recommended Texts: | 1. Zobel, J , 2014, Writing for Computer Science, 3 rd Edition, Springer | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory | |
| Type of Credits: | Compulsory | |
| Prerequisites: | None | |

CST 393-2 Research Methodology and Scientific Writing

IIT 311-3 Operational Research

| Course Code | IIT 311-3 | |
|-----------------------|--|--------------------------|
| Course Title | Operational Research | |
| Objective: | To solve the real life problems and obtaining the right solution requires understanding and modeling the operation research problems correctly and applying appropriate optimization tools and skills to solve the mathematical models. | |
| Learning | At the end of this course, student will be a | ble to |
| outcomes: | understand the characteristics of different types of decision-making environments formulate a real-world problem as a mathematical programming model understand the theoretical workings of the graphical and simplex method for linear programming perform sensitivity analysis to determine the direction and magnitude of change of a model's optimal solution as the data change solve specialized linear programming problems like the transportation and assignment problems solve network models like the shortest path, minimum spanning tree, and maximum row problems | |
| Contents: | - implement and solve the differen | |
| contents. | Linear programming model (graphical method and simplex method), Duality and sensitivity analysis, Transportation and assignment problems, Network models and algorithms, Real life application | |
| Recommended Texts: | Wayne L Winston, 2004, Operations Research: Applications and Algorithms, 4th edition, Indian University David G. Luenberger, 1997, Linear and Nonlinear Programming | |
| Scheme of | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory, 30 hours of practical | |
| Type of Credits: | Optional | |
| Prerequisites: | None | |

Level – 400

First Semester

CST 475-3 Remote Sensing and Image Interpretation

| Course Code | CST 475-3 | |
|-----------------------|--|--------------------------|
| Course Title | Remote Sensing and Image Interpretation | |
| Objective: | To provide the basics of remote sensing and applications in academic disciplines and professional industries | |
| Learning outcomes: | At the end of this course, student wi | l be able to |
| | define and describe remote sensing and explain its applications and history. | |
| | define and describe basics of electromagnetic spectrum and interactions with various types of media. | |
| | describe sensors and image acquisition methods. | |
| | describe basic characteristics of remote sensing imagery | |
| | apply basic image analysis techniques | |
| Contents: | - describe industry-specific image sources. A brief bistory of remote sensing for earth observation. Permete Sensing | |
| | Basics, Frame Captured Sensors and Line Scanners, Satellite-based Sensors in Visible and Infrared Wavelengths, Active Sensors: Radar and LiDAR, Fundamentals of image processing techniques and image interpretation, Remote Sensing Applications | |
| Recommended Texts: | 1. Jensen, J. R., 2007, Remote Sensing of the Environment, 2 nd edition, | |
| | Pearson, New York. | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory, 30 hours of practical | |
| Type of Credits: | Optional | |
| Prerequisites: | None | |

CST 464-2 Bioinformatics

| Course Code | CST 464-2 | |
|-----------------------|--|------------------------------|
| Course Title | Bioinformatics | |
| Objective: | To provide the knowledge on Biological Data Analysis using computational programs and tools | |
| Learning outcomes: | At the end of the course, the stude | nts will be able to |
| | describe basic Computational | Biology |
| | recognize Biological Data's and Databases | |
| | perform Biological Data Analysis | |
| | use Bioinformatics Algorithms | s with programming Languages |
| Contents: | Introduction to Molecular Biology ,Cell, DNA, RNA ,Amino Acid , Protein , Motif, Mitosis , Meiosis, Genetic information , Some genetic diseases, Biotechnology , Bioinformatics tools ,, Molecular Docking tools, Biological Data and online Databases ,Nucleic acid databases, Protein databases (Primary, Composite, and Secondary), Phylogeny ,Tree view and Multiple sequence alignment, Phylogeny Comparison, Reconstruction, Bioinformatics algorithms and Implementation ,Local, global alignment , Longest Common Subsequence , Motif finding, Sequence Alignment ,Scoring matrix Global, Local ,Multiple sequence alignment ,FAST, BLAST, Homology Modeling , Amino Acid , Ramchandran plot , Protein 3D structure,. Genomic Analysis. DNA Microarray analysis , Normalization ,Clustering, Pathway and Survival analysis tools, Introduction to Oncogenomics , Next Generation sequencing, Emerging trends in Bioinformatics | |
| Recommended Texts: | 1. Mandoiu, I.I, Zelikovsky, A, 2008, Bioinformatics Algorithms Techniques | |
| | and Applications , Wiley | |
| | 2. Xiong, J, 2006, Essential Bioinformatics, Cambridge | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory | |
| Type of Credits: | Optional | |
| Prerequisites: | SCT 121-1 Introductory Biology | |

IIT 452-3 GIS for Business

| Course Code | IIT 452-3 | |
|-----------------------|--|-------------------------------|
| Course Title | GIS for Business | |
| Objective: | To provide key topics of GIS as they a | are used in business settings |
| Learning outcomes: | At the end of the course, the students will be able to define the underlying principles and functions of GIS demonstrate spatial analysis and modeling in business contexts identifying the steps in developing and implementing a GIS system analyze real world cases involving GIS and spatial analysis consider the ethical, legal, and security implications of GIS utilize spatial data to create maps for business decision making understand the management, planning, and strategy challenges for uses GIS in organizations | |
| Contents: | Geographic information and its importance in organizations, Basics of GIS and maps, Decision-making with GIS, Spatial and non-spatial data: Sources, Accuracy, Availability, Costs, Spatial analysis and modeling, Investment in and value of GIS, GIS software and how to use it effectively, Case applications of GIS and spatial data in businesses, Management of GIS in organizations, Ethical issues, The future of geographic information and spatial decision making. | |
| Recommended Texts: | Paul V. Bolstad, 2012, GIS Fundamentals: A First Text on Geographic Information Systems 4th Edition, Eider Press, ISBN-13: 978- 0971764736 Pick, J. B., 2008, Geo-Business: GIS in the digital organization. New York, NY: John Wiley and Sons. ISBN 978-0-471-72998-3. | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory, 30 hours practical | |
| Type of Credits: | Optional | |
| Prerequisites: | None | |

| Course Code | CST 466 -2 | |
|-----------------------|--|--|
| Course Title | Data Warehousing and Data Mining | |
| Objective: | To provide the knowledge on data, design aspects on data management and mining | |
| Learning outcomes: | At the end of the course, the student | s will be able to |
| | describe and demonstrate dat | a processing |
| | recognize data models | |
| | define and apply data mining techniques | |
| | recognize the hidden pattern | from the datasets |
| | identify the design aspects of | Data Warehousing |
| • • • | design large-scale data wareh | ouses |
| Contents: | History , Data Warehouse, OLAP tech | hnology , Data types , Multidimensional |
| | Data Mode, Preprocessing, Mining | Primitives, Query Language, Graphical |
| | User Interfaces, Architectures, Data Generalization, Characterizations, | |
| | Class Comparisons, Classification methods, Bayesian Classification, Naive | |
| | Single-Dimensional Boolean Assoc | in trees, ANN, SVIVI, Apriori Algorithm, |
| | Bules Descriptive Mining of Com | nlex Data Objects Snatial Databases |
| | Multimedia Databases, study of | Government and Companies Data |
| | warehouses | |
| Recommended Texts: | 1. Dunham, M.H, 2004 , Data Mining: Introductory and Advanced Topics, | |
| | Pearson Education | |
| | 2. Anahory S and Murry D. 2003 Data Warehousing in the real world. | |
| | Pearson Education | |
| Scheme of Evaluation: | Li Continuous Assessment End Semester Examination | |
| | 60% | 40% |
| Methodology: | 30 hours of theory | |
| Type of Credits: | Compulsory | |
| Prerequisites: | None | |

CST 466-2 Data Warehousing and Data Mining

CST 468-2 Robotics

| Course Code | CST 468-2 | |
|-----------------------|---|--|
| Course Title | Robotics | |
| Objective: | To provide the fundamental knowle intelligent machines to automate m | dge of designing & implementation of anual tasks of day today life & industry. |
| Learning outcomes: | At the end of the course, the studer - design intelligent machines for - apply simulators to design and - programming for robots with a - implement robots to meet req | nts will be able to various application domains test postulated robot models appropriate optimizations uirements of the industry |
| Contents: | Introduction, Karel Čapek's Rossum's Universal Robots, Maschinenmensch ("machine-human"/ gynoid humanoid robot), Isaac Asimov's Three Laws of Robotics, Mechanical construction, Electrical/Pneumatic control, computer programming, Applications, Manufacturing, Automation, Health care, Mining /Underwater/ Volcanoes, Defense, Bomb disposal robots, firefighting robots, Cybernetics, UAVs / Quadcopters. Robot Classification, Manipulator robot arms (Industrial Robots), Mobile robots, Humanoid robots, Pet robots, Exoskeletons, Robot Design, Actuators and effectors, Sensors, Manipulator robots kinematics, Robot dynamics, DOF, Forward and Inverse kinematics, Trajectory planning, Serial and parallel manipulators, Mobile Robots locomotion / Navigation, Self-localization, Path planning, Vision-Based Navigation, Map-building and map interpretation, Optimized algorithms, Multi Agent Systems, Social impacts, | |
| Recommended Texts: | Siciliano, B, Sciavicco, L, Villani, L, Oriolo, G , 2009, Robotics Modelling, Planning and Control, Springer, New York, | |
| | Russell, S, Norvig, P, 2009, Artificial Intelligence: A Modern Approach , 3rd Edition, Prentice Hall, New Jersey | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 15 hours of theory , 30 hours of practical | |
| Type of Credits: | Optional | |
| Prerequisites: | None | |

CST 482-2 Software Localization

| Course Code | CST 482-2 | | |
|-----------------------|---|---|--|
| Course Title | Software Localization | | |
| Objective: | To provide necessary knowledge to a attention to cultural adaptation. | translate and localize software with special | |
| Learning outcomes: | At the end of the course, the studen | ts will be able to | |
| | define and understand what is localization | | |
| | define and describe the im | pact of culture and language on global | |
| | software design | software design | |
| | apply software localization best practices when developing new or | | |
| | existing applications | | |
| - | define and describe the importance of quality in localization | | |
| Contents: | Introduction to localization, Machine Translation, Control Languages, Process | | |
| | of graphic localization, Website I | ocalization, Cultural customization for the | |
| | web, Role of software localization | on in organizational competitiveness and | |
| | success. , What is quality in localiza | ition, lechnical problems in localization | |
| Recommended Texts: | 1. Microsoft ,2002, Developing I | nternational Software, 2 nd Ed., Microsoft | |
| | | | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination | |
| | 60% | 40% | |
| Methodology: | 30 hours of theory | | |
| Type of Credits: | Optional | | |
| Prerequisites: | None | | |

CST 434-2 Mobile Computing

| Course Code | CST 434-2 | |
|-----------------------|---|--------------------------|
| Course Title | Mobile Computing | |
| Objective: | To provide the knowledge to apply the concepts and get familiar with the basic concepts of mobile computing | |
| Learning outcomes: | At the end of the course, the students will be able to define the basics of mobile telecommunication system choose the required functionality at each layer for given application identify solution for each functionality at each layer | |
| Contents: | Introduction to Mobile Computing, Applications, Characteristics, Structure, MAC Protocols, Wireless MAC Issues, Fixed Assignment Schemes, Random Assignment Schemes, Reservation Based Schemes. Overview on Mobile IP, Features, Mechanism, route Optimization, Architecture of TCP/IP, Adaptation of TCP Window and Improvement in TCP Performance. Overview on GSM, GPRS and UMTS. Mobile Ad-Hoc Basic Concepts, Characteristics, Applications, Design Issues, Routing, Essential of Traditional Routing Protocols, Popular Routing Protocols and VANET, Security. Operating Systems for mobile device, Special Constrains and Requirements , Commercial Mobile Operating Systems, Overview on Software Development Kit, MCommerce, Security Issues | |
| Recommended Texts. | Agarvar, D.P. Qing and Zeng, A. 2005 introduction to Wireless and Mobile systems, Thomson Asia Pvt Ltd Hansmann, U, Merk, L, Nicklons , M, S and Stober, T , 2003 Principles of Mobile Computing, Springer | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory | |
| Type of Credits: | Optional | |
| Prerequisites: | None | |

CST 443-2 Cloud Computing

| Course Code | CST 443-2 | |
|--------------------------|--|--------------------------|
| Course Title | Cloud Computing | |
| Objective: | To provide the broad perceptive of cloud architecture model and virtualization | |
| Learning outcomes: | At the end of the course, the students will be able to compare the strengths and limitations of cloud computing identify the architecture, infrastructure and delivery models of cloud computing apply suitable virtualization concept. choose the appropriate cloud player, Programming Models and approach. address the core issues of cloud computing such as security, privacy and interoperability | |
| Contents: | Technologies for Network-Based System, System Models for Distributed and Cloud Computing, Reference Architecture. Cloud Models, Characteristics, Cloud Services, Public vs Private Cloud, Cloud Solutions, Cloud ecosystem, Service management, Computing on demand, Virtualization: Overview, Types, Implementation Levels, Structures, Tools and Mechanisms, Virtualization of CPU, Memory, I/O Devices Virtual Clusters, Resource management and Data-center Automation. Architectural Design of Compute and Storage Clouds, Layered Cloud Architecture Development, Design Challenges, Inter Cloud Resource Management, Resource Provisioning and Platform Deployment, Global Exchange of Cloud Resources , Parallel and Distributed Programming Paradigms ,Twister and Iterative Map Reduce, Mapping Applications, Programming Support, Cloud Software Environments , Security Overview, Challenges and Risks, Security Governance, Risk Management, Security Monitoring, Security Architecture Design Identity Management and Access Control | |
| Recommended Texts: | Hwang, K, Fox,G.C and Dongarra,J, 2012 G, Distributed and Cloud Computing, From Parallel Processing to the Internet of Things, Morgan Kaufmann Publishers Rittinghouse,J.W, Ransome,J.F,2010 Cloud Computing: Implementation, Management, and Security, CBC Press | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory | |
| Type of Credits: | Optional | |
| Prerequisites: | None | |

CST 463-2 Augmented Reality

| Course Code | CST 463-2 | |
|-----------------------|---|--|
| Course Title | Augmented Reality | |
| Objective: | To provide the elementary knowled Augmented Reality (AR). | ge of theory and applications of |
| Learning outcomes: | At the end of the course, the studen describe the concepts of Augme applu design & implement virtus scientific studies, industrial simu identify and postulate improven technologies with perspectives of performance & to have more re | its will be able to ented Reality for real world applications al modeling environments useful for ulations for cost effective reasons nents to existing models and of enhancing computing efficiency over alistic virtual reality experience |
| Contents: | Virtual Environment, Virtual Reality, Recognition, Optical/Speech ,Spatial Augmented Reality, HUDs (Head-Up Display), Wearable Displays, Head- Mounted displays, Virtual tables, Smart projectors Marker-based & Markerless implementation , Quick Response (QR) codes, Marker incl. Fiducial markers, Embedding, 3D Virtual Model, Recognition and Tracking techniques, Image Registration, Visual Odometry , Virtual Worlds, Gesture Recognition & Control, AR Smart Glasses, AR Windshields ARML Applications in Architecture and Construction, Industrial design, Medical, Public Safety, Military, Augmented Legality, Archaeology, AR Bionics, Visual Prosthesis (Bionic eyes), AR Contact Lenses, Virtual Retinal Display (VRD) ,Desktop metaphor, Spatial immersion and interaction, Navigation, Translation, Holograms, Augmented ID, Crime finders, Economics, Kondratieff Waves, Social Impacts: Generation C, The Outernet Emerging Trends in Gaming & Interactive Multimedia i.e. Exergames, Internet of Things, Nanatash AB | |
| Recommended Texts: | 1. Kipper, D, Rampolla, J, 2012, Augmented Reality An Emerging | |
| Scheme of Evaluation: | Continuous Assessment End Semester Examination | |
| | 60% | 40% |
| Methodology: | 30 hours of theory | |
| Type of Credits: | Optional | |
| Prerequisites: | None | |

CST 465-3 Biometrics and Computer Forensics

| Course Code | CST 465-3 | |
|-----------------------|---|--------------------------|
| Course Title | Biometrics and Computer Forensics | |
| Objective: | To provide the elementary knowledge of Biometrics & Forensics, including the concepts, theories and practical implementation of applications with computer programming | |
| Learning outcomes: | At the end of the course, the students will be able to describe the fundamental concepts of Biometrics as a technique for uniquely identifying a person implement, improve & evaluate existing and proposed biometric systems recover evidences of electronic crimes using deeper knowledge of computing & using software tools | |
| Contents: | Introduction to Biometrics, Functionalities, Identification and Verification, Biometric Characteristics, Universality, Uniqueness, Permanence, Collectability, Performance, Acceptability, Circumvention, Biometric Traits, Signature, Fingerprint, Iris, Facial Thermogram, Hand Geometry, Gait, Keystroke Dynamics, Vein Pattern, Voice, Ear, Four main modules of a typical biometric systems, Sensor module, Feature extraction, Matching and decision making module, System database module, Enrollment and recognition, Design Cycle, Choice of biometric trait, Data collection, Evaluation and Performance measures ,Applications of Biometric Systems, Security and Privacy Issues, Introduction to Computational Forensics, Forensic Soundness, Investigative Methodology, Crime Reconstruction, Electronic Discovery, Intrusion Investigation, Forensic Analysis, Digital Forensics, Analyzing Digital Evidence, Data Gathering and Observation, Hypothesis Formation, Evaluating Hypotheses, Electronic Discovery, Legal Context, Preservation of Data, Data Processing & Information Recovery, Windows & UNIX Forensic Analysis, Embedded Systems | |
| Recommended Texts: | Jain, A.K, Ross, A.A and Nandakumar, K, 2011, Introduction to Biometrics, Springer, New York Casey, F. 2010, Handbook of Digital Economics and Investigation, Elsevier. | |
| | Casey, E. 2010, Handbook of Digital Forensics and investigation, Elsevier Academic Press, Burlington Britz, M.T, 2013, Computer Forensics and Cyber Crime An Introduction, Pearson, London | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory , 30 hours of practical | |
| Type of Credits: | Optional | |
| Prerequisites: | None | |

CST 467-3 Fuzzy Logic and Neural Networks

| Course Code | CST 467-3 | |
|-----------------------|---|---|
| Course Title | Fuzzy Logic and Neural Networks | |
| Objective: | To provide essential knowledge of N | leuro computing and Fuzzy Systems to |
| | aspects | |
| Learning outcomes: | At the end of the course, the student | s will be able to |
| | describe the building blocks o | f neural networks |
| | apply function approximation | s to cope with error functions |
| | identify the practical applications of Neural Network and Fuzzy | |
| | - make inference relying on fuz | zy systems, to have more reliable & |
| Contents: | sustainable outcomes | und neurol network. Food Dook neurol |
| contents. | network Radial basis function (RB | Ard neural network, Feed-Back neural E) Network Learning Supervised learning |
| | Vs Unsupervised learning Rei | of orcement learning Back Propagation |
| | algorithm . Perceptron. Binary cla | assifiers. Bias and Momentum. Activation |
| | Function, Recurrent neural networ | ks, Hopfield network, Boltzmann machine, |
| | , Bi-directional RNN, Kohonen Self- | Organizing maps, Applications of NN, Data |
| | mining, Time Series Prediction, Fit | ness approximation, Classification, Pattern |
| | and Sequence Recognition, Novelty detection, Sequential decision making | |
| | Introduction to Fuzzy, Comparison to probability, Membership functions, | |
| | propositional & Predicate Tuzzy logic Fuzzy sets, Fuzzy set Operations, | |
| | Complement, Intersection, Union, | aggregation; Fuzzy sub-algebra, Multiset, |
| | Models Mamdani Takagi Sug | eno Tsukamoto Euzzy models Euzzy |
| | Controllers, Defuzzification, Feedb | pack controllers. Applications & Emerging |
| | Trends of Fuzzy, Antilock brakes, | Adaptive Fuzzy Systems, Introduction to |
| | Fuzzy 2, Level 2 fuzzy sets, Neuro-Fuzzy networks | |
| Recommended Texts: | 1. Fausett, L, 1994, Fundamentals of Neural Networks : Architectures, | |
| | Algorithms and Applications, Prentice Hall, New Jersey, | |
| | 2. Bishop, CM 1996, Neural Networks for Pattern Recognition, Oxford | |
| | press, Oxford | |
| | 3. Ross, TJ 2010, Fuzzy Logic with Engineering Applications, Willy | |
| | Publications, Hoboken | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 45 hours of theory | |
| Type of Credits: | Optional | |
| Prerequisites: | None | |

| Course Code: | CST 436-2 | |
|-----------------------|---|---|
| Course Title: | Wireless Communication Systems and Sensor Networks | |
| Objective: | To provide the prior knowledge in the area of wireless communication systems and the sensor networks. | |
| Learning outcomes: | At the end of the course, the students will be able to describe the concepts and the application in wireless networks describe most of the concepts and the applications in sensor networks develop and apply the wireless technology to solve emerging problems | |
| Contents: | Introduction to Wireless Networks, Wireless network architecture, Security in wireless systems, Wide area wireless networks (WANs),GSM Evolution, Wide area wireless networks, Wireless application protocol, Wireless personal area network, Bluetooth, Wireless personal area networks, Low rate and High rate, wireless local area networks, Fourth generation networks and new technologies, Introduction to sensor Networks ,Wireless sensor network architecture, Sensor technology, Sensor network standards, Sensor network algorithms. Real world scenarios | |
| Recommended Texts: | Iyengar,S.S. et al. , 2011,Funda Programming, John Wiley & So Garg,V.K , 2007,Wireless Comminc.,USA Molisch,F.M, 2011, Wireless Contended | mentals Of Sensor Network ons, Inc, USA nunications And Networking, Elsevier ommunications,2 nd edn, John Wily & Sons |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory | |
| Type of Credits: | Optional | |
| Prereguisites: | None | |

CST 436-2 Wireless Communication Systems and Sensor Networks

| Course Code | CST 454-2 | |
|-----------------------|--|--------------------------|
| Course Title | Embedded Systems and Device Interfacing | |
| Objective: | To provide essential knowledge to design & implement embedded systems for industrial, laboratory & domestic usage. | |
| Learning outcomes: | At the end of the course, the students will be able to do requirement analysis, determine the appropriate configuration, design implement embedded systems considering the expected level of accuracy, performance, mobility and cost apply Real Time Operating Systems knowledge to perform real time processing solve real time problems | |
| Contents: | Introduction to Atmel AVR and Microchip PIC microcontrollers, Memory Mappaed Vs. I/O Mapped, IO ports, Compilers & Simulation IDEs, Applications of Embedded Systems, Embedded Systems Classification, High Performance Embedded Systems (HPES), Smart Devices Embedded Systems Design, Concerns: Requirement Analysis, Sensors & Actuators, PCB Design, Human interaction, Communication protocols, Backup, Output Devices & Displays, Timers, interrupts, ADCs and DACs, PWMs, Memory (Flash, SRAM), EPROM, EEPROM, Matrix Keyboards, Motor Control: DC Servo, Stepper motors, Encoders, Introduction to Control Theory, Feed-Back Control / Loops, PID, Industry standard bus types (I ² C, SPI, OneWire, SMBus, CAN bus), RS 232 (Serial), USB, Control over BT/Wi-Fi, High Performance Embedded Systems (HPES) Architecture, Real Time Operating Systems (PTOS) | |
| Recommended Texts: | Barnett, RH, Cox, S and O'Cull, L , 2006, Embedded C Programming and the Atmel AVR, Thomson Learning, Stamford, Wilmshurst, T , 2009, Designing Embedded Systems with PIC | |
| Scheme of Evaluation: | Microcontrollers, Newnes (Elsevier Inc), Amsterdam | |
| Scheme of Evaluation. | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 15 hours of theory ,30 hours of practical | |
| Type of Credits: | Optional | |
| Prerequisites: | None | |

CST 454-2 Embedded Systems and Device Interfacing

CST 429-2 Software Design Using Design Patterns

| Course Code | CST 429-2 | |
|-----------------------|--|--|
| Course Title | Software Design Using Design Patterns | |
| Objective: | To learn the basic concepts of variou | is patterns and apply them in practice |
| Learning outcomes: | At the end of the course, the students will be able to design software using design patterns. identify the importance of design pattern. apply patterns while designing the solution for the problems. get awareness about the minimizing the coding using OO principals. apply more Object Oriented concepts in coding | |
| Contents: | Introduction to design patterns , OO Design Principles, Anti-patterns, Introduction of GOF patterns, Types of GOF patterns, Difference between patterns., Creational patterns, Factory pattern, Abstract factory pattern, Singleton pattern Builder pattern, Prototype pattern, Structural pattern, Adaptor pattern, Bridge pattern, Composite pattern, Decorator pattern, Facade pattern, Flyweight pattern, Proxy pattern., Behavioral patterns, Chain of responsibility pattern, Command pattern, Interpreter pattern, Iterator pattern, Mediator pattern, Momento pattern, Observer pattern, State pattern, Strategy pattern, Template pattern, Visitor pattern. | |
| Recommended Texts: | Gamma, Helm, Johnson and Vissides, Design Patterns: Elements of Reusable Object-Oriented Software, Addison-Wesley Pree,W, Design Patterns for Object-Oriented Software Development, Addison-Wesley/ACM Press Freeman,E, Robson,E, Bates,B and Sierra,K, Head First Design Patterns , O'Reilly Media | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 15 hours of theory, 30 hours of practical | |
| Type of Credits: | Compulsory | |
| Prerequisites: | None | |

CST 492-2 Entrepreneurship

| Course Code | CST 492-2 | |
|-----------------------|---|--------------------------|
| Course Title | Entrepreneurship | |
| Objective: | To provide the knowledge on the elements of entrepreneurship as an introductory course mainly. Specifically, it is expected to advocate the students about the role of entrepreneurship in economic development, emphasize the role of marketing elements in entrepreneurial ventures, advocating the students about entrepreneurial life cycle of the venture and the role of an entrepreneur during the phases of development and introducing business planning basics and emphasize the need of planning. | |
| Learning outcomes: | At the end of the course, the students will be able to identify the characteristics of an entrepreneur, demonstrate the interrelationship between opportunity, creativity and innovation and their roles in entrepreneurship, develop a mind map for opportunity identification in service and product ventures, To determine the competitive factors of a business, identify the nature of organizational life cycle and role of an entrepreneur in each stage and identify the growth and diversification strategies needed for revival of a business. | |
| Contents: | Introduction to entrepreneurship, Opportunity, Creativity and innovation, Corporate entrepreneurship, Production and service ventures and capturing opportunities, Product development process, Marketing and new venture development, Competitor analysis and implications for market research, Organizing new ventures and capturing business opportunities, Venture development path and Feasibility planning, Strategies that capture business opportunities Internationalization of business ventures Venture life cycle and entrepreneurial role during transition stages, Growth and diversification as | |
| Recommended Texts: | Holt, D.H ,1992, Entrepreneurship: New venture creation. Prentice Hall. Kuratko, D.F and Hodgetts, R.H, 2003, Entrepreneurship: Theory, Process and Practice, 6th Edition. South Western Collage Publications. Dollinger Mark J,2004, Entrepreneurship: Strategies and Resources. Prentice Hall. Ed Paulson & Marcia Layton, 2000, The Complete Idiot's Guide to Starting Your Own Business, 3rd Edition. Prentice Hall. | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory | |
| Type of Credits: | Compulsory | |
| Prerequisites: | None | |

CST 428-2 Software Quality Assurance

| Course Code | CST 428-2 | |
|-----------------------|--|--------------------------|
| Course Title | Software Quality Assurance | |
| Objective: | To guide students to apply the concepts and get familiar with the artifacts associated with a typical software quality assurance process | |
| Learning outcomes: | At the end of the course, the students will be able to define software quality factors and software quality assurance components in the project life cycle describe the basics of software testing, test generation, assessment and enhancement discuss about various testing types, methods and levels of testing apply test automation tools in OA process | |
| Contents: | Introduction to software quality assurance, Testing overview (What is testing?, Who does testing?, When to start testing?, When to stop testing?, Difference between verification and validation, Testing types, Testing methods, Levels of testing, Development and quality plans, Introduction to test automation tools | |
| Recommended Texts: | Galin,D, 2004, Software quality assurance: from theory to implementation, Harlow, Essex: Pearson/Addison Wesley Lewis, William,E and Raton,B, 2008, Software testing and continuous quality improvement, FL: Auerbach Publications | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory | |
| Type of Credits: | Compulsory | |
| Prerequisites: | None | |

CST 441-2 Middleware Architecture

| Course Code | CST 441-2 | |
|-----------------------|---|--------------------------|
| Course Title | Middleware Architecture | |
| Objective: | To provide the fundamental concepts behind Middleware and Middleware technologies with their features to apply in computer based solutions | |
| Learning outcomes: | At the end of the course, the students will be able to discuss the role and importance of middleware, and capture the essence of distributed object technology compare and Contrast the different Middleware Architectures available develop simple distributed applications list the differences between component and distributed object technologies | |
| Contents: | Review of object oriented programming, Introduction to middleware architectures, Overview of network and distributed computing, Distributed objects, Remote Procedure Call (RPC), Remote Method Invocation (RMI), The Common Object Request Broker Architecture (CORBA), MW design patterns, SOA and web services, Application of middleware. Current trends in middleware | |
| Recommended Texts: | Judith,M,. M, 2002, The Complete Book of Middleware, : AUERBACH Britton,C, 2004, IT architectures and middleware: strategies for building large, integrated systems, Boston: Addison-Wesley | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 30 hours of theory | |
| Type of Credits: | Optional | |
| Prerequisites: | None | |

CST 435-3 System Administration and Maintenance

| Course Code: | CST 435-3 | |
|-----------------------|--|--------------------------|
| Course Title: | System Administration and Maintenance | |
| Objective: | To provide the best practice of System Administration and Maintenance | |
| Learning outcomes: | At the end of the course, the students will be able to describe setup and basic network architecture, configure and maintain of servers and client computers define the system security, server backups and documentation learn best practice in system administration including security policies and communication strategies with users | |
| Contents: | Introduction to System Administration and Maintenance ,Data center standards, Basic network architecture, Linux/Unix Operating Systems, Server/client installation, server /client configuration, server/client maintenance, Server services, Client services, Network monitoring and monitoring tools, Administrative Activities, Server management, Security management, User and group management, Backup management, Disaster recovery, Automation management, User support and education, ,Administrative Domains, Support domains, Introduction to virtualization and cloud computing, Shell Scripting The system administrator code of othics. | |
| Recommended Texts: | Limoncelli, T.A,Hogan,C.J & Chalup, S.R, 2007, The Practice of System & Network Administration, 2nd edn, Addison-Wesley, USA Frisch, A, 2002, Essential System Administration, 3rd edn, O'Reilly,USA Nemeth,E, Snyder,G,Hein,TR & Whaley,B , 2001, Unix and Linux System Administration Handbook, 4thedn,Prentice Hall,USA Nelson,S , 2010,Pro Data Backup & Recovery , Apress | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination |
| | 60% | 40% |
| Methodology: | 45 hours of theory | |
| Type of Credits: | Optional | |
| Prerequisites: | None | |

| Course Code: | CST 433-2 | | |
|-----------------------|---|--------------------------|--|
| Course Title: | Advance Networking and Applications | | |
| Objective: | To provide knowledge in networking with practical aspects. | | |
| Learning outcomes: | At the end of the course, the students will be able to get depth knowledge in computer networking with the data communications and latest technologies including practical aspects. | | |
| Contents: | Network layer design issues, Routing algorithms, Congestion control algorithms, Quality of service internetworking, The network layer in the internet, The transport service, Elements of transport protocols, The internet transport protocols ,UDP, The internet transport protocol, TCP, Performance issues, Delay tolerant networking, DNS, the domain name system, The world wide web, content delivery server configurations, Switching and routing, Wireshark, packet tracer, Transport layer, Connection oriented, Connectionless protocols, UDP, TCP, Packet forwarding routing, Routing algorithm, Network devices in layer 2, 3.4. | | |
| Recommended Texts: | 1. Tanenbaum, A.S and Wetherall, D.J, 2010, Computer Networks, 5 th | | |
| | edn,Prentice Hall,Sydney | | |
| | 2. Odom, W, 2013, Cisco CCENT/CCNA ICND1 100-101 Official Cert | | |
| | Guide,Cisco Press,USA | | |
| | 3. Stallings, W 2007, Data And Computer Communications, 8 th Edition, | | |
| | Prentice Hall, Sydney | | |
| | 4. Douglas, E, 2008, Computer Networks and Internet with Internet Applications, 4 th edition, Prentice Hall, Sydney | | |
| Cohomo of Fuchantions | | | |
| Scheme of Evaluation: | Continuous Assessment | End Semester Examination | |
| | 60% | 40% | |
| Methodology: | 30 hours of theory | | |
| Type of Credits: | Optional | | |
| Prerequisites: | None | | |

CST 433-2 Advance Networking and Applications

Second Semester

CST 494-6 Industrial Training

| Course Code | CST 494-6 | |
|----------------------|---|--|
| Course Title | Industrial Training | |
| Objective | to expose students to real work of environment experience and at the same time, to gain the knowledge through hands on observation and | |
| | Job execution. | |
| | to build a good communication skill learn proper behavior of corporate lit | with group of workers and learn to fe in industrial sector. |
| Learning outcomes | At the successful completion of the course, the student will be able to integrate academic theory with practical experience in a professional field of interest clarify career goals develop content specific and transferable skills establish mentoring relationships with professionals in a career field of interest build a professional network inculcate good moral values such as responsibility , commitment and trustworthy | |
| Content | At the end of the 4 th year 1 st semester, the students will be assigned to selected industries in Sri Lanka. Students are required to physically present in the selected industry for work, ensure that the student has a supervisor who can provide information about company policies, expectations, key contacts, and consistent feedback, Schedule a possible site visit from the intern Coordinator during the semester, Students must keep touch with the intern Coordinator through Virtual Learning Environment | |
| Recommended Texts | 1. Industrial Diary | |
| Scheme of Evaluation | Continuous Evaluation | End Semester Evaluation |
| | 60% | 40% |
| Methodology | Oral Presentation, Onsite Evaluation | , Supervisor Feedback , activity Dairy |
| Type of credits | Compulsory and Non GPA | |
| Prerequisites | None | |

CST 495-8 Research Project

| Course Code | CST 495-8 | | |
|----------------------|---|---|--|
| Course Title | Research Project | | |
| Objective | To provide insight into understanding and | applying the scientific method, including | |
| | forming hypotheses, designing experime | ents to test hypotheses, and collecting, | |
| | analyzing, interpreting, and reporting data | l. | |
| | To improve the ability to think critically, a | nalyze, synthesize, and use information to | |
| | solve problems. | | |
| Learning outcomes | At the successful completion of the course | e, the student will be able to | |
| | demonstrate understanding of the | e importance and process of research in | |
| | computer sciences | | |
| | identify a problem where a compute | iter-based solution can be provided and | |
| | formulating a research question | | |
| | perform literature search, critique | and review; and write a detailed and | |
| | critical account of current knowled | dge of a selected topic | |
| | perform acknowledgment , citatio | ns, referencing in an acceptable manner | |
| | - define plagiarism and importance | of avoiding it | |
| | demonstrate understanding of eth | nical issues and principles | |
| | plan and manage an innovative co | mputer science and business research | |
| | project, within given constraints, u | using knowledge and skills developed | |
| | during the course | | |
| | apply problem-solving methodologies to generate, evaluate and justify | | |
| | INNOVATIVE SOlUTIONS | | |
| | - clearly communicate information, | ideas, issues, problems and solutions to | |
| | specialist as well as non-specialist | audiences | |
| Content | This research project will involve the in | vestigation of a computer science or any | |
| | other problem or phenomenon using c | omputer-based, experimental procedures | |
| | or literature-based computational or s | statistical methods, under the theme of | |
| | value addition to national resources | analyzed evaluated and presented both orally and in the form of a written | |
| | project report. An academic staff is assigned as a supervisor with the mutual | | |
| | project report. An academic staff is assigned as a supervisor with the mutual | | |
| | their work, with advice from their supe | esponsible for organizing themselves and | |
| | regular basis as agreed with the supervisor with whom they should meet on a | | |
| Pacammandad Taxts | 1 Pooth WC Colomb C C and Williams LM 2002 The Creft of Personal | | |
| Recommended Texts | 1. BOUCH, W.C. COLOMD, G.G. and WIIIIAMS, J.M., 2003, The Craft of Research. | | |
| | 2 Williams I M 2007 The Elements | of Style Covote Canyon Press ISBN- | |
| | 0.0979660742 | | |
| | 3 Zobel 1 (2007) writing for comput | ter science Springer ISBN 978-1-4471- | |
| | 6639-9 | | |
| Scheme of Evaluation | Continuous Evaluation | End Semester Evaluation | |
| | 60% | 40% | |
| Methodology | Project Proposal, Progress Report, Oral Presentation, Thesis Evaluation | | |
| Type of credits | Compulsory | | |
| Prerequisites | | | |

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