sylabus

Semester I				
IS1101	Fundamentals of Information Systems	TH	-	-
Information concepts: Data, information, knowledge, and wisdom; cost/value and quality of information; system concepts; system performance and standards; system components and relationships; organizations and information systems; systems development; competitive advantage of information systems; global challenges in information systems; and IS career paths.				

IS1102	Structured Programming Techniques	TH	-	-
Introduction to Programming: Introduction to compilers & interpreters, Data types, Variables, Expressions & Assignment Statements, Console Input/Output, Libraries & Namespaces. Flow Control: Branching Mechanisms, Loops. Function Basics: Predefined Functions, User-Defined Functions, Scope Rules. Parameters: Parameters, Default Arguments. Arrays: Introduction to Arrays, Array manipulation, Multidimensional Arrays. Pointers: Introduction to pointers, Pointer arithmetic. Recursion: Recursive functions. Exception Handling: Testing & Debugging. File Reading & Writing.				

IS1103	Structured Programming Practicum	-	PRS	-
Identify & describe uses of Data types, Variables, Expressions & Assignment Statements, Console Input/ Output and Libraries. Modify & expand short programmes that use standard conditional & iterative control structures. Write programmes using functions, parameter passing, choose appropriate conditional & iteration constructs for a given programming task. Write programmes using arrays, standard conditional & iterative structures & pointers. Demonstrate the concept of recursion by examples, identify the base case & the general case of a recursively defined problem. Demonstrate file handling & exception handling.				

IS1104	Theories of Information Systems	TH	-	-
Set of theories centered around the IS lifecycle, including: DeLone and McLean's Success Model, Technology Acceptance Model, Unified Theory of Acceptance and Use of Technology, User Resistance Theories, Task-Technology Fit Theory, Process Virtualization Theory, Theory of Deferred Action. Strategic and economic theories, including: Resource-Based View, Theory of Slack Resources, Portfolio Theory, Theory of the Lemon Markets, Technology – Organization – Environment				

Framework, Contingency Theory, Porter's Competitive Forces Model, Business Value of IT, Diffusion of Innovations, Punctuated Equilibrium Theory, Discrepancy Theory Models, Institutional Theory, A Multi-level Social Network Perspective, Expectation Confirmation Theory, Stakeholder Theory. Socio-psychological theories including: Personal Construct Theory, Psychological Ownership and the Individual Appropriation of Technology, Transactive Memory, Language-Action Approach, Organizational Information Processing Theory, Organizational Learning, Absorptive Capacity, and the Power of Knowledge, Actor-Network Theory, Structuration Theory, Social Shaping of Technology Theory, An IT Innovation Framework, Yield Shift Theory of Satisfaction, Theory of Planned Behavior, An Interpretation of Key IS Theoretical Frameworks using Social Cognitive Theory. Methodological theories including: Critical Realism, Grounded Theory and Information Systems: Are We Missing the Point?, Developing Theories in Information Systems Research – The Grounded Theory Method Applied, Narrative Inquiry, Work System Method.

IS1105	Computer System Organization	TH	PRS	-

Basic Concept and Computer evolution: Organization and Architecture, the evolution of the Intel x86 Architecture, Embedded Systems, ARM architecture. Computer Performance Issues: Multicore, MIC and GPGPUs, Basic Measures of Computer Performance, benchmark and SPEC. Computer Function and interconnection: Computer Bus Interconnection, Point to Point Interconnection. Computer Memory System: Cache Memory Principles, Semiconductor main memory, External memory. Input/output: External Devices, I/O Modules, Interrupt Driven I/O, Programmed I/O, I/O channels and processors, External Interconnection Standards. Arithmetic and Logic: number system, Integer Representation, Floating Point representation, Digital logic, Combinational Circuits, Sequential Circuits, Programmable Logic Devices. The central Processing Unit: Machine Instruction Characteristics, Addressing Modes, Assembly language, Processor, Instruction Level Parallelism and superscalar Processor. Parallel Organization: Parallel processing, Multicore computers, General purpose Graphic processing Unit. Practical: Using a graphical simulation tool for designing and simulating logic circuits; digital logic design; implementation and simplification of Boolean functions; combinational logic modules—adders and subtractors; sequential logic, flip-flops, FSM analysis and design; and an introduction to assembly language programming.

IS1106	Foundations of Web Technologies	TH	PRS	-

Internet fundamentals. HTML. Cascading Style Sheets (CSS). Client-side Scripting: JavaScript, Typescript and pug, AJAX. Introduction to UI Frameworks with responsive front-end design. Introduction to Browser based developer tools. Hands on experience in web tools.

IS1107	Personal Productivity with Information Technology	TH	-	-
Knowledge work productivity concepts. Advanced functions and features of productivity tools to support personal and group productivity: DAX, Power BI				

(Pivot, Charts, Tables), What-if analysis. Professional document design (latex implementation). Conduct effective communication using digital tools (Emails, shared documents). Effective presentation design (Example: formatting tool like Latex, Power point). Presenting scientific materials to lay audience. Ethics and plagiarism.

IS1108	Fundamentals of Mathematics	TH	-	-
Linear Algebra. Matrices, Vector spaces & subspaces. Linearly independent & dependent vectors, Dimension rank & the basis of vector spaces. Linear transformations, Systems of linear equations, Determinants. Diagonalization of matrices, Functions & relations. Sets, cardinality Cartesian product. Ordered pairs, Bijective mappings, Equivalence relations. Logic Propositions, Truth tables, Symbolic statements, Disjunctive & conjunctive normal forms. Karnaugh maps				

IS1109	Statistics & Probability Theory	TH	-	-
Probability: Venn diagrams. Tree diagrams & Cartesian diagrams. Conditional Probability - The occurrence of an event given that another event has already occurred. Bayes' theorem & applications - An extension of conditional probabilities. Statistics: Population & Sample - Population: all the objects that a person is interested in. Sample: a subset of the population which is used to make inferences about the population. Types of random variables - Discrete & continuous random variables. Data Collecting - Experimental studies & observational studies. Data Summarizing Techniques - Descriptive statistics: mean, median, mode, inter quartile range, standard deviation etc. Data Visualizing Techniques - Techniques to visualize continuous & discrete variables. Measure of Central tendency - Mean, median, mode, Measure of Dispersion - Standard deviation, variance & inter quartile range. Mean & Variance of Random Variables - Relationship between the mean & the variance of random variables				

IS1110	Communication Skills I	TH	-	-

Introduction to Communication: Purpose of Communication, Process of Communication, Importance of Communication in Business, Differences between Technical and General Communication, Barriers to Communication, Measures to Overcome the Barriers to Communication. Types of Communication: Verbal Communication-Importance of verbal communication- Advantages of verbal communication- Advantages of written communication, Significance of Non-verbal Communication. Listening Skills: Listening Process, Classification of Listening, Purpose of Listening, Common Barriers to the Listening Process, Measures to Improve Listening, Listening as an Important Skill in Work Place. Language for Communication: Language and Communication, General Principles of Writing, Improving Writing Skills, Essentials of good style, Expressions and words to be avoided, Grammar and Usage. Communication in Organizations: Internal Communication, Stake Holders in Internal Communication, Channels of Internal Communication, External Communication, Stake Holders in External Communication, Channels of External Communication. Communication Network: Scope and Types of Communication Network, Formal and Informal

Communication Network, Upward Communication, Downward Communication, Horizontal Communication, Diagonal Communication. Writing Business Letter: Importance of Business Letters, Difference between Personal and Business Letters, Structure and Format of Business Letters, Types of Business Letters.

IS1111	Academic Integrity	TH	-	-
Introduction to academic integrity, Academic integrity policies, Plagiarism, collusion and contract cheating, Putting academic integrity into practice, Research ethics, Citing and referencing, Reading and Note-making, Critical Thinking.				

IS-EGP 1101	General English I	TH	-	-
Refer English Curriculum (Page 88 & 89)				

Semester II				
IS2101	Object Oriented Programming	TH	-	-

Fundamentals of Object-Oriented Programming; Classes & Objects. Data Abstraction. Information Hiding & Encapsulation. Methods: Void methods, return methods, argument passing. Inheritance. Polymorphism: Method overloading and method overriding. Abstract Classes. Exception Handling. Files & Database connections.

IS2102	Object Oriented Programming Practicum	-	PRS	-

Installation & configuring an IDE for OOP language: setting up path, environmental variable. Implement Class, Objects, Variables, Identifiers, Keywords, Data types, Arithmetic/logical Operators. Demonstrate Control statement (If-else, Switch), Loops (while, do-while, for). Implementation of Arrays. Implementation of Methods, Passing parameters, Arguments, Constructors. Implementation of OOP Concepts: Abstraction, Encapsulation, Inheritance (Specialization and Generalization) and Polymorphism. Applications of OOP concepts to solve real life problems.

IS2103	Emerging IS Technologies	TH	-	WS

Emerging technologies: Contrasts between traditional & emerging technologies. Driving forces behind emerging technologies and technology life cycles. Adoption rates & assessment process. Disruptive technologies: Communication Communities, Collaboration, Hosted services (e.g., social networks, web culture, virtual workforce). Blockchain. DevOps. Cloud edge computing. Computer Supported Cooperative Work and Tools. Tracking, Searching, Advertising & publishing on the web.

IS2104	Database Systems	TH	-	-

Introduction to Databases: Definition of the database, database system, data models, database applications. Database system architecture, characteristics of database approaches. Database development process. Data models. Relational model. ER model. Schema Mapping. Designing: Logical design: Relational database model,

Logical view of data, keys, integrity rules, Normalization. Relational algebra: Introduction, Selection & projection, set operations, renaming, Joins, Division, syntax, semantics, Operators, Grouping & ungrouping, relational, Triggers.

IS2105	Database Management Systems Practicum	-	PRS	-
Database Management tools: Installation and Setting up the environment. Create Databases & Tables, Modifying Databases & Tables. Inserting Table Data, Modifying Table Data. Querying Data. Functions (String Functions, Date & time functions, Numeric Functions, Aggregate Functions). Joining Tables (Querying Multiple Tables, Joining Tables with SELECT, Table Name Aliases, Inner Joins, and Outer Joins).				

IS2106	System Analysis & Design	TH	-	-
System Analysis Fundamentals: Fundamentals System Analysis and Design (SA&D) concepts, Roles of system analyst, System development life cycle, depicting system graphically, determining feasibility, activity planning and control. Evolution of software development models. Information requirements analysis. Process requirements analysis. The essentials of design. Deployment and maintenance				

IS2107	Social & Professional Issues	TH	-	-
History of computing, social context of computing. Methods & tools of analysis: consequence, duty and right based ethical theories. Professional & ethical responsibility. Risks & liability of computer-based systems. Intellectual property, privacy & civil liberties. Computer crime, customs & law. Economic issues in computing. Philosophical frameworks.				

IS2108	Human Computer Interaction	TH	-	-
HCI Principles. Usability principles. Building a simple GUI, Human abilities. Human-centered software development, cultural aspects, human-centered software evaluation. GUI design, GUI programming. HCI aspects of multimedia systems. HCI aspects of collaboration & communication. Validation of usability & user experience. Handling errors & help.				

IS2109	Information Assurance & Security	TH	-	-

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

IS2110	Software Project Initiation & Planning	TH	-	WS

Develop Project Charter (Inputs, Tools & Techniques, Outputs). Develop Project Management Plan (Inputs, Tools & Techniques, Outputs). Direct & Manage Project Work (Inputs, Tools & Techniques, Outputs). Manage Project Knowledge (Inputs, Tools & Techniques, Outputs). Monitor & Control Project Work (Inputs, Tools & Techniques, Outputs). Perform Integrated Change Control (Inputs, Tools & Techniques, Outputs), Close Project or Phase (Inputs, Tools & Techniques, Outputs).

IS2111	Advanced Mathematics	TH	-	-

Functions & relations - relations: an association between two or more sets. Functions: a binary relation. Sequences - An enumerated collection of objects in which repetitions are allowed & order does matter. Series - The addition or multiplication of multiple quantities. Errors Numerical Solution of Nonlinear Equations. Interpolation Theory - The theory of estimating data points within a known data set. Numerical solution of systems of Linear Equation. Numerical Differentiation & integration. Numerical methods for differential equations. Graph theory.

IS2112	Communication Skills II	TH	-	-

Writing Memos Circulars and Notices: What is a Memo?- Principles of précis writing- Approaches to memo writing- Characteristics of a memo- Guidelines for writing memos- Language and writing style of a memo- Format of a Memo, Circulars- Guidelines for writing a circular- Languages and writing style of a circular- Format of a circular, Notices- Purpose- Format- Important points to remember while writing a notice. Report Writing: Features of Writing a Good Report, Purpose of Report Writing, Difference between Business Report and Engineering Report-Characteristics of writing a good report-Importance of communication in report writing, Guidelines for Report Writing, Steps in Report Writing, Structure of Report, Types of Reports and Different Formats. Writing E mail: Principles of E-mail, E-mail Etiquette, Overcoming Problems in E-mail Communication. Oral Communication Skills: Oral Business Presentation- Purpose –Audience-Locale, Steps in Making a Presentation- Research and planning Structure and style-Preparation –Presentation, Delivering a Presentation. Meetings: Types of Meetings, Importance of Business Meetings, Different Types of Business Meetings, Conducting Meetings-Selecting Participants-Developing Agendas Opening Meetings-Establishing ground rules for meetings-Time Management

Evaluations of meeting process-Evaluating the overall meeting-Closing meetings, Common Mistakes Made at Meetings. Reading Skills: Reading Skill, Purpose of Reading, Types of Reading, Techniques for Effective Reading. Employment Communication – Resume: Contents of Good Resume, Guidelines for Writing Resume, Different Types of Resumes, Reason for a Cover Letter to Apply for a Job Format of Cover Letter, Different Types of Cover Letters. Employment Communication – Job Interview: Importance and Factors Involving Job Interview, Characteristics of Job Interview, Job Interview Process, Job Interview Techniques Manners and etiquettes to be maintained during an interview, Sample Questions Commonly asked During Interview.

IS-EGP 1201	General English II	TH	-	-
Refer English Curriculum (Page 88 & 89)				

Semester III				
IS3101	Object Oriented Analysis & Design	TH	PRS	-
Managing design complexity with OOAD. Evolution of the object-oriented paradigm. Classes & Objects: Associations, Aggregation, Inheritance; Polymorphism, Abstraction, Encapsulation. Unified process. Notation: Unified Modeling Language. Use Case Diagrams. Class Diagrams. Sequence Diagrams. Activity and component diagrams. Behavioral State Machine Diagrams. OOAD in Agile. Hands on experience using CASE tools.				

IS3102	Data Structures & Algorithms	TH	PRS	-

Primitive data types: arrays, structures, pointers, memory allocation, iteration & recursion. Singly & doubly linked lists. Stack and Queue. Trees, binary search trees & basic operations. Hash tables. Graphs & basic algorithms on graphs: depth first & breadth first search, Dijkstra's algorithm. Sorting algorithms: quick sort, bubble sort, selection sort, merge sort, tree sort. Complexity analysis of algorithms. Hands on experience on data structures & algorithms.

IS3103	IT Governance	TH	-	-

Introduction to Governance: Corporate Governance, Enterprise Governance, Business Governance. IT Governance: Business IT Alignment, Necessity for IT Governance. Drivers for IT Governance: Information Economy & Intellectual Capital, Governance Convergence. Strategic & Operational Risk management in IT Governance: Compliance Risk, Information Risk. Strategic & Operational Risk management in IT Governance: Issues of Inadequate IT Governance. Achieving IT Governance: Objectives of IT Governance, Structural Issues in IT Governance, Maturity in IT Governance. IT Governance Frameworks: Constructing IT Governance Frameworks, Third Party governance frameworks, proprietary Governance Frameworks, Benefits of IT Governance Frameworks. Effective implementation of IT Governance. Future of IT Governance.

IS3104	Software Engineering	TH	-	-

Software Engineering concepts. Introduction to Software engineering frameworks. Requirements & Specification. Software Design. Software implementation. Software Testing & Quality Assurance. COTS & Reuse. CASE Tools. Software metrics & Reliability Assessment. CMMI. Team Organization & people management. Software Estimation. Software Maintenance. Software evolution

IS3105	IS Risk Management	TH	-	-

Background of Risk Management; Risk Management Processes: Risk Identification, developing a Risk Management Plan; Analyse & Prioritize Risks: Qualitative Risk

Analysis, Quantitative Risk Analysis, Develop Risk Responses, Risk Monitoring & Control; Risk Assessment Frameworks (OCTAVE, FAIR, NIST SP800-30, and ISO 27005); Application of Risk Assessment Frameworks; Authentication & Authorization; Intrusion Detection.

IS3106	IS Sustainability	TH	-	-
Introduction to Sustainability. Adaptability of systems. Legal issues surround reusing data collected for another purpose. Processes to support ethical behavior to the society /to an individual/ in organizations. Activities to support ethical behavior in organizations/ for an individual/ to the society. Performance criteria to support ethical behavior by a person / in organizations/ to the society.				

IS3107	Management Information Systems	TH	-	-
Management within the organization: Management activities, Roles and Levels; Management Planning, Controlling and Strategic planning. Decision making and using MIS: Measurement of MIS performance and capabilities. MIS applications and relationships: Introduction to different types of Information Systems. Databases and data warehouses and their relevance to MIS; Networks, Internet and MIS. Development of MIS: Managing MIS Project, Techniques and methodologies for supporting MIS development. Customer Relationship Management (CRM) and Supply Chain Management (SCM). Financial Systems and E-Commerce, Business Process Redesigning using new trends in MIS (ERP, Mobile and Cloud enabled MIS etc.).				

IS3108	E-Business	TH	-	-
E-business and e-commerce. E-business Infrastructure: Internet technology, Web Technology, Internet-access software applications, Managing e-business infrastructure. E-business Strategy: What is e-business strategy? Strategic analysis, Strategic objectives, Strategy definition, Strategy implementation. Analysis and Design: User-centered site design, Security design for e-business. Social commerce. Analytics and reporting. Search engine optimization. Orders management. Customer Relationship Management. Product management. E-marketing.				

IS3109	Digital Innovation	TH	PRS	PR
Internet Impact on Business: New business forms and models—brokerage, advertising, merchant, on-demand, and utility. Digital Innovation: Digital innovation vs. IT innovation; strategy and digital innovation; digital innovation and business models; digital platform exploitation for business; building digital capabilities; organizational engagement; leveraging crowds for innovation; digital business transformation; characteristics of digital disruptors; validating the value proposition; and conducting competitive research and analysis for innovation. Information Systems Design for the Web: Enterprise Resource Planning, Customer Relationship Management, and Document Management Systems. Networked Applications and Their Impact on Business Processes: E-mail, file sharing, and				

collaboration tools; driving digital innovation using networked applications. User Experience Strategy: Definition of UX strategy—UX design vs. UX strategy, UX strategy vs. business strategy; conducting competitive research and analysis; conducting user research; creating prototypes; and storyboarding. Collecting requirements from any business organization and developing an e-commerce web solution as a group activity.

IS-EAP-2101	Academic English I	TH	-	-
Refer English Curriculum (Page 88 & 89)				

Semester IV				
IS4101	IT Auditing	TH	-	-
IT Audit Overview: Roles of the IS auditor and IS audit functions; auditing and internal control; auditing IT governance controls; auditing operating systems and networks; auditing database systems; computer-assisted audit tools and techniques; business ethics, fraud, and fraud detection; and IT auditing frameworks.				

IS4102	Web Application Development	TH	PRS	-
Server-Side Scripting and Technologies. Client server communication with Scripting Language. Integrated scripting with Data. Sessions and Cookies in PHP. Web development frameworks. Web security. Implementation of Server-Side Scripting Languages.				

IS4103	Operating Systems	TH	PRS	-

Operating Systems Overview (Historical development, Operating system objectives and functionalities, Major achievements). Process & Thread Management (Process concepts, Thread concepts, Descriptions, structures, and controls, Multiprocessors and Multi Thread programming). CPU Scheduling. Concurrency Control (Mutual exclusion, Synchronization, Deadlock, Starvation). Memory Management (Multiprogramming and partitions, Paging and segmentation, Virtual memory, Demand paging, Page replacement algorithms). I/O & File Management (I/O devices, Disk scheduling, File organization, Directory structures). Case Studies. Shell Programming: a) Unix Commands b) Editor Commands c) Unix Shell programming commands a) Concatenation of two strings b) Comparison of two strings c) Maximum of three numbers d) Fibonacci series e) Arithmetic operation using case. System Calls: a) Process Creation b) Executing a command c) Sleep command d) Sleep command using getpid e) Signal handling using kill k) Wait command. Introduction to MIPS Programming with Mars simulation tools- (Exception and interrupt handling).

IS4104	System Administration and Maintenance	TH	PRS	-

Shell Programming: Unix commands; editor commands; Unix shell programming commands: concatenation of two strings, comparison of two strings, maximum of three numbers, Fibonacci series, and arithmetic operations using the case statement. System Calls: Process creation; executing a command; sleep command; sleep

command using getpid; signal handling using kill; and the wait command. Introduction to MIPS Programming: Using Mars simulation tools—exception and interrupt handling. Foundation Elements of System Administration: a) Operating Systems: Installation, configuration, maintenance, server services, client services, and support. b) Administrative Activities: Content management and deployment; server administration and management; user and group management; backup management; security management; disaster recovery; automation management; and user support and education. c) Administrative Domains: Web, network, database, OS, and support domains. d) Additional Topics: Introducing system administration on cloud computing and hybrid usage; help desk concepts; system monitoring; and hands-on experience with related latest tools.

IS4105	IT Procurement Management	TH	-	WS

Procurement processes. Procurement documents. Different types of contacts. Procurement negotiation. Procurement performance review. Contract change control systems. National procurement guideline.

IS4106	Software Architecture	TH	-	-
Basic concepts & principles about software architecture. Introduction to Software Architectural pattern. ADL. 4+1 Architecture. Practical approaches & methods for Create & Analyse software architecture. Quality attributes of software architectures. Examples in architectural design applications & case studies in software architecture (N tier architecture, SOA, Cloud, etc.).				

IS4107	Professionalism & Ethics in Computing	TH	-	-
Role & functions of professional bodies. Professional bodies for computing practitioners. Impact of computing professional bodies on vocational areas of work. Codes of conduct relevant to computing practitioners, Professional integrity and ethics. Duty of computing practitioners in social, political & environmental areas. Computing legislation in the context of job roles for computing practitioners, Other relevant legislation that impacts on computing practitioners. Sources of ethical advice out with professional bodies for computing practitioners. Social, political & environmental computing principles, Ethical conflict resolution.				

IS4108	IS Strategies	TH	-	-
Role of Information Systems in Organizations. An Overview of Strategic Management. Process for Developing Information Systems Strategies. IS Strategic Analysis. Innovating with Technology, Systems & Information. Exploiting Information Systems for Strategic Advantage. Determining the Business Information Systems Strategy. Managing the Portfolio of Business Applications. Justifying & Managing Information Systems Investments. An Organizing Framework for the Strategic Management of IS.				

IS4109	Agile Software Development	TH	-	WS
Plan Driven Development Methodologies Vs Agile Software Development. Agile Manifesto: Values & Principles. Agile Software Development Frameworks. Scrum:				

Roles, Artifacts, Events, Values & Rules. Extreme Programming (XP); Practices, Values & Principles. Lean Software Development: Kanban & Kaizen. Agile Project Management: Planning, Estimation, Communication, Scrum. Agile Testing. Scale up and out in Agile. Agile Tools. Naked objects.

IS4110	Capstone Project	-	-	PR
Study the basic concepts of programming concepts & application to design & implement the mini project intended solution for project-based learning.				

IS-EAP 2201	Academic English II	TH	-	-
Refer English Curriculum (Page 88 & 89)				

Semester V				
IS5101	Entrepreneurship & Innovation	TH	-	WS
Role of entrepreneurs in national development. Training of entrepreneurs. Essential characteristics of techno-entrepreneurs. Business proposal & assessing criteria. Making business proposals. Technology & innovation: Invention, Commercialization & Diffusion, Technology push & market pull. Business models for innovation.				

IS5102	Enterprise Architecture	TH	-	-
An Introduction to Enterprise Architecture (EA). EA Frameworks, Component Architectures. Enterprise Application Service Delivery. Systems Integration. Content Management. Inter-Organizational Architectures. Processes for Developing EA. Architecture Change Management. Implementing EA. EA & Management Controls.				

IS5103	High Performance Computing	TH	PRS	-

Introduction to Parallel & Distributed Programming (definitions, taxonomies, trends). Parallel Computing Architectures, Paradigms, Issues, & Technologies (architectures, topologies, organizations). Parallel Programming (performance, programming paradigms, applications). Parallel Programming Using Shared Memory I (basics of shared memory programming, memory coherence, race conditions & deadlock detection, synchronization). Parallel Programming Using Shared Memory II (multithreaded programming, OpenMP, pthreads, Java threads). Parallel Programming using Message Passing - I (basics of message passing techniques, synchronous/asynchronous messaging, partitioning & load-balancing). Parallel Programming using Message Passing - II (MPI), Advanced Topics (accelerators, CUDA, OpenCL, PGAS). Introduction to Distributed Programming (architectures, programming models). Distributed Programming Issues/Algorithms (fundamental issues & concepts - synchronization, mutual exclusion, termination detection, clocks, event ordering, locking). Distributed Computing Tools & Technologies I (CORBA, JavaRMI). Distributed Computing Tools & Technologies II (Web Services, shared spaces), Distributed Computing Tools & Technologies III (Map-Reduce, Hadoop). Parallel & Distributed Computing

– Trends & Visions (Cloud & Grid Computing, P2P Computing, Autonomic Computing). Cloud based tool will be used to conduct the practical.

IS5104	Software Process Management	TH	-	-

Project Quality Management - Plan Quality Management, Manage Quality, Control Quality. Project Resource Management - Plan Resource Management, Estimate Activity Resources, Acquire Resources, Develop Team, Manage Team, Control Resources. Project Communications Management - Plan Communications Management, Manage Communications, Monitor Communications. Project Stakeholder Management - Identify Stakeholders, Plan Stakeholder Engagement, Manage Stakeholder Engagement, Monitor Stakeholder Engagement.

IS5105	Business Process Management	TH	-	-

Business Processes (basic concepts, modeling). Design, analysis, verification & refinement methods. Workflow Systems (organization & architecture). Synchronization, control, communication & monitoring of process enactment. Workflow Analysis. Workflow Patterns. Workflow development tools & software.

IS5106	UI/UX Practicum	PRS	WS	PR

Identify User Experience Design as a field & how it relates to Computer Science. Distinguish between Human-Centered Computing and Human-Computer Interaction. Design Graphics for computer interfaces. Explore User Experience Design Techniques: scenarios, personas, storyboards, wireframing, information architecture. Explore User Experience Design methods: focus groups, design probes, affinity diagramming, speed dating for UI concepts. Use Prototyping tools (both low-fidelity & high-fidelity). Develop designs for small screens: responsive design, Non-GUI design (e.g., auditory interfaces, gesture interfaces).

IS5107	Project Management Practicum	-	PRS	PR

Master WBS Creation and Resource Planning: Work Breakdown Structure, Identify Stakeholders, Analyzing Stakeholders. Resource Utilization Planning and Master Schedule Development: Dedicated and Shared Resources, Shared Resource Management, Resource Utilization Planning, Master Schedule.

IS5108	Business Intelligence	TH	-	-

Decision Support Systems and Business Intelligence: Business Environment Factors (markets, consumer demands, technology, and societal, etc.), Decision Support Frameworks (Degree of Structuredness vs. Types of Control), Automated Decision Making, Evolution of BI Capabilities, DSS & BI Architectures, Styles and Benefits of BI, Elements of a Work Systems, Major Tool Categories for Management Support Systems. Decision Making, Systems, Modeling, and Support: Introduction to Decision-Making Disciplines, Characteristics of Decision Making and Decision Styles, Types and Benefits of Decision-Making Models, Decision-Making Process, New Technologies to Support Decision Making, Key Data Issues and Key Ingredients of Data (Information) Quality Management. Decision Support Systems Concepts, Methodologies, and Technologies: DSS Characteristics and Capabilities,

DSS Classifications, Major DSS Components and Web Impacts, Future/current DSS Developments. Emerging Trends and Impacts: RFID and BI (RFID for BI in Supply Chain, RFID + Sensors for Better BI, etc.), Reality Mining and Virtual Worlds in BI applications, Web X.0 Revolutions, Virtual (Internet) Communities and Types, Online Social Networking and Social Network Analysis, Implications of Business and Enterprise Social Networks, Cloud Computing and BI, Issues of Legality, Privacy and Ethics. Collaborative Computer-Supported Technologies and Group Support Systems: Why (business) collaboration is difficult? Time/Place Communication Framework, Groupware for (business) collaboration, Group Support Systems and Important Features, GSS Enabling Technologies, Collaborative Planning, Forecasting, and Replenishment (CPFR) and Collective Intelligence, Introduction to Taxonomy of Collective Intelligence.

IS5109	IS Project for Community	-	-	PR
Independent Topics related to Software development will be conducted.				

IS5110	Advanced Database Systems	TH	PRS	-
Database Design & Implementation - Relational Database Design, Database Implementation & Tools, Advanced SQL, Database System Catalog. DBMS Advance Features - Query Processing & Evaluation, Transaction Management & Recovery, Database Security & Authorization. Distributed Databases - Enhanced Database Models, Object Oriented Databases, Database & XML. Emerging Trends & Example of DBMS Architecture - Emerging Database Models, Technologies & Applications, Big data. Advanced SQL - Temporary table, Views, Stored procedures, Stored function & Triggers.				

IS5111	Data Communication & Networks	TH	PRS	-
Fundamental concepts of data communications: Application, Physical, Data Link and Network/Transport layer, Principles of communication and connecting to the network, Network Services. Network Technologies: Local Area Network (LAN) and Wireless LAN. Wireless technologies: Wide Area Network (WAN) and Metropolitan Area Networks (MAN), Internet standards and services. Network Management: Security, Design and Management of the network. Research on data communications and networking. Understand the networking concepts using simulation tools. Hands on experience in the laboratory.				

IS5112	Design Patterns & Anti-patterns	TH	PRS	-
Introduction to Design Patterns: A Brief History, How Design Patterns Solve Design Problems, How to Select & Use a Design Pattern. The Catalog of GoF (Gang-of-Four) Design Patterns. Creational Patterns: Abstract Factory, Factory Method, Singleton. Structural Patterns: Adapter, Composite, Decorator. Behavioral Patterns: Observer, Strategy, Template Method Pattern. Model-View-Controller (MVC) Pattern. Design Principles for creating software that is flexible, reusable, and maintainable. Symptoms of bad design (anti-patterns). Hands on experience in modelling using a UML professional design software and OOP programming.				

IS5113	Software Quality Assurance	TH	PRS	WS

Introduction to Software Quality and Software Quality Assurance (SQA). The components of the software quality assurance system, Software project life cycle components, Infrastructure components for error prevention and improvement, Management SQA components, SQA standards, system certification, and assessment components. Testing Concepts Definition, Types and Levels of testing, Black vs. White Box testing. Test Techniques, White Box techniques, Black Box techniques, Test Planning. Test Design Specifications, Test Cases, Test Metrics, Pre process metrics: Estimation, In-process metrics: Process Management, End-process metrics: Process Improvement. Test Management, Test planning, resource management, test reporting, tools. Test Automation: Web test automation, Mobile test automation, Test script writing. SQA Standards, certification and assessment. Organizing for quality assurance, Management and its role in software quality assurance. Hands on experience with a SQA Tool for authoring functional tests.

IS5114	Data Mining & Analytics	TH	PRS	-

Clustering Algorithms: K-mean, Agglomerative algorithm. Classification Algorithms: Decision Tree, Support Vector Machine. Association rule mining. Topic extraction. Implementation of datamining algorithms using python and Weka tools.

IS-EBP 3101	Business English	TH	-	-

Refer English Curriculum (Page 88 & 89)

Semester VI				
IS6101	Industrial Training	-	-	PR

Students will be required to complete industrial training related to Information Systems at a relevant industry or research institution. The duration of the project period should be a minimum of 15 weeks. A project report (thesis if it is a research) should be submitted at the end of the semester & should be presented & defended by the respective student in front of an evaluation panel appointed by the department.

Semester VII				
IS7101	Research Methodologies	TH	-	-

Introduction to the notion of research. Literature review. Research designs. Identifying data requirements, sources, & instruments for data gathering. Undertaking 'experiments'. Validation: Types of validation. Analysing research data. Writing Strategies. Ethical Consideration

IS7102	Information System Law	TH	-	-

Introduction to Information System Law. Communications Law: Policy and regulation of electronic communications, focusing particularly on the Internet and its most current challenges. Electronic Commerce Law: Legal issues surrounding electronic commerce - including business-to-consumer (B2C), business-to-business (B2B), and consumer to consumer (C2C) forms - and digital applications to support

the sharing economy, creative processes and the public sector. Information Technology Law: Impact information technology and the Internet have had, and are having, on substantive law. Legal Aspects of Managing Intellectual Property: Intellectual Property Law: Copyright and Related Rights & Industrial Property. Information technology law and Sri Lanka's response-computer and information technology council of Sri Lanka act No. 10 of 1984, computer crime act no 24 of 2007, Electronic transaction act no 19 of 2006 information and communication technology act no. 27 of 2003.

IS7103	Business Process Simulation	TH	PRS	-

Simulation in management decision making. Queuing theory. Concepts of discrete event simulation. Construction of models: Modeling issues, Verification & Validation of models. Use of computer simulation tools.

IS7104	Enterprise Modelling Ontologies	TH	PRS	-

Introduction to the Semantic Web. Introduction to Ontologies. Ontology Languages for the Semantic Web. Resource Description Framework (RDF). Lightweight ontologies: RDF Schema. Web Ontology Language (OWL). A query language for RDF: SPARQL. Ontology Engineering. Semantic web & Web 2.0. Applications of Semantic Web. Hands-on experience with Protégé tool.

IS7105	Organizational Behavior & Management	TH	-	-

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

IS7106	Cloud Computing	TH	PRS	-

Cloud Computing Concepts: Introduction to cloud computing, Properties, characteristics & disadvantages, Gossip, Membership & Grids, P2P Systems, Key Value Stores, Time & Ordering Classical Distributed Algorithms. Cloud Systems & Infrastructure: Cloud computing stack, Service model, Deployment models, Containers, virtual machines, MAAS, PAAS, Web Services. Storage: Ceph, SWIFT, HDFS, NAAS, SAN, Zookeeper. Big Data & Applications in the Cloud: Spark, Hortonworks, HDFS, CAP, Streaming Systems, Graph Processing & Machine Learning. Cloud Resource management & Service management in cloud computing. Cloud Networking: Introduction to cloud networking SDN with cloud, Data center networking. Cloud security: Identity & Access management, Access control, Authentication in cloud computing. Developing application in cloud platform, Introduction to Cloud Computing with AWS, Azure Google's cloud platform.

Research trends in cloud: Edge & Fog computing, cloud & IoT. Hands on experience using a cloud-based tool.

IS7107	Mobile Application Development	-	PRS	WS

Native & Cross-platform Development. Mobile Application Development Languages & Frameworks. Development Tools & Version controlling. Mobile Application Architectures and Design Patterns. Graphics & User Interface Design. Data Persistence, APIs & Libraries, Files & Media. Camera & Motions sensors. GPS/ location sensing & Maps. Network programming. Future Trends (Augmented Reality, M-Commerce, Low Code Development). Security, & Marketplace deployment.

IS7108	Web Service Technologies	TH	PRS	-

Introduction to SOA. Communication Protocols: RESTFul services, SOAP services (WS-* protocols). Serialization Formats: XML (XML Schema, XPath & XSLT), JSON, Text Encoding Formats, Binary Formats (Protobuf). Web services with tools (Postman). Security: OAuth, JWT, SWT, Distributed Web applications development using a Java Web Framework. Implementation of web services.

IS7109	Geographical Information Systems	TH	PRS	-

Introduction to GIS - What is Geographic Information Systems, Different components of GIS, Different types of vector data, Raster data models & their types, TIN data model. Data Representations - Advantages & disadvantages associated with vector, raster & TIN, Non-spatial data (attributes) & their type, Raster data compression techniques, Different raster data file formats, Spatial database systems & their types. Map Projections - Pre-processing of spatial datasets, Different map projections, Spatial interpolation techniques, Different types of resolutions, Digital Elevation Model (DEM). Geographic Phenomena. Hands on experience with GIS. Hands on experience with different spatial related APIs (Geo Coding API, LocationIQ API, Google Maps API etc.).

IS7110	Statistical Distribution & Inferences	-	PRS	-

Probability distributions - Normal distribution, Poisson distribution, exponential, distribution, binomial distribution etc. An overview of statistical inference. An introduction to statistical inference. Sampling Distributions - Statistical inference: Estimation of population parameters based on the data obtained through a suitable sample. Sampling distribution: The probability distribution of a particular statistic of an obtained sample. Estimation - Approximation of values for a particular parameter. Hypothesis testing - Evaluation of a particular assumption made. Correlation & simple linear regression analysis - Correlation: Measuring the strength of the association between the independent & the dependent variables. Simple linear regression: measuring the relationship between the independent & the dependent variable.

IS7111	Advanced Programming Practicum	-	PRS	-

Advanced programming features available in OOP languages: Model-View Controller & design patterns, multithreading, exception handling, file handling & file I/O, abstract classes & interfaces, collections framework, event driven programming model & Java layout managers for GUI design, various categories of design patterns including but not limited to Behavioral Patterns, Creational Patterns & Structural Patterns. The emphasis will be on design, implementation & testing of object-oriented solutions to a specified problem using above techniques. Choosing an appropriate design pattern for a particular situation.

IS7112	Machine Learning	TH	PRS	-

Introduction to machine learning & neural networks: supervised learning, linear models for regression, basic neural network structure. Deep learning. Neural networks: Forward Propagation, Cost Functions, Error Backpropagation, training by gradient descent, bias/variance & under/ overfitting, regularization, Exercises on NNs, solving a problem with NNs on TensorFlow. Exercises on CNN, solving a problem with CNN on TensorFlow. Exercises on RNNs, solving a problem with RNNs on TensorFlow.

Semester VIII				
IS8101	Research Project in IS	-	-	THS

The course starts with a reflection and discussion about interdisciplinary research, where students define their research topics. Throughout the course, the students work in developing their research questions and choose the appropriate methodological approaches for their research and analyze the results. Students should be able to provide valid findings in selected research domains and report in a format of thesis and submit it to the department. They are encouraged to present their findings in local and international research forums.

IS8102	Business/IT Alignment	TH	-	-

IT Solutions in Organizations. Frameworks for the Analysis of IT Solutions in Organizations. Business-IT Alignment - Theoretical Background and Hypotheses Formulation. Business-IT Alignment - Empirical Research. Roadmaps for Business IT Alignment (Models).

IS8103	Human Resource Management	TH	-	-

Uniqueness of Human Resource, Human Resource Management, Purpose of HRM, Importance & Responsibility for functions of HRM, Jobs, job designing & Job analysis. The necessity for Job re-designing, Job redesigning methods, Alternative work schedules. Value of Job Analysis, Job Description & Job Specification, HR Planning, HR Planning Process Recruitment & process of recruitment, Employer branding, New trends in recruitment – Active Sourcing/SNS recruitment. Significance of employee selections, Selection methods & selection process, Errors in employee selection Process of hiring, Probationary period, Employee orientation. Definition of Employee Performance Evaluation (EPE), Significance of EPE, EPE methods, Developing PE system. Definition–Learning, Education, training,

development, Learning Principles, Training needs analysis. Training programme designing, Effective implementation of training Programmes, Evaluation of training programmes. Reward & total reward, Basic Salary determination - Job evaluation, Pay survey, Performance based pay, Employee benefits, Legal provisions for reward management in Sri Lanka. Grievance Handling (GH), Importance of GH, Methods of GH, Practical tips in HG. Discipline management, Hot Stove Model, Misconducts, Domestic Inquiry. The concepts of occupational health & safety, Hazards & factors affecting health & safety, Interventions for improving health & safety. Human Resource Information Systems. Green HRM, HR Analytics, HR Scorecards.

IS8104	Scientific Communication	TH	-	-

The nature of scientific writing: the scientific paper as an argument. Writing proposals: kinds of proposals, standard formats for proposals, and strategies for making the proposal persuasive. Writing lab reports, project reports, and journal articles; standard formats for research reports; and principles of structuring the report. Strategies for presenting data logically and persuasively. Writing abstracts: kinds of abstracts, structuring the abstract, and strategies for making the abstract concise, specific, and detailed. Academic writing: research significance, flow, making claims, and the argumentation model. Maintaining objectivity; using jargon; and presenting equations. Rhetorical principles and conventions of presenting data graphically. Documenting the scientific paper. Presenting scientific material to a lay audience. Ethics and plagiarism.

IS8105	IS Economics	TH	-	-

Economic Aspect of Information & Information Systems. Problem of Asymmetric Information: Adverse Selection & Moral Hazard. Macroeconomic & Microeconomic Aspects of Information Systems. Basic Economic Principles on Firms, Markets, Industries & Organization; Demand & Supply Analysis. Economic Impacts of Telecommunication & Digital Media. Sustainable Development & Information Technology. Intellectual Property Rights & Knowledge Based Economy. The Impact of Information Systems on Employment /Unemployment. Pricing & Marketing of Information Goods.

IS8106	Computer System Security	TH	PRS	-

Threats and attacks on security; crypto basics; symmetric key cryptography; public key cryptography; key distribution and hash functions. Authentication: biometric methods. Authorization: access control. Simple authentication protocols and real world security protocols; wireless network security; operating system security; software security; and network management security. Hands-on experience with related latest tools.

IS8107	Supply Chain Management	TH	-	-
Overview of Supply Chain Management. Integrated Supply Chain Management. Procurement Management, Inventory Management & Manufacturing. Packaging & Handling, Distribution & Warehouse Management. Transportation. Supply Chain Logistics Planning & Design. Global Supply Chains & Network Design. Performance Measurement, Risk & Security Management.				

IS8108	Advanced Computer Networks	TH	PRS	-
Device to Device Communication Architectures - Algorithm & protocols designed for MANET, mesh, cellular & opportunistic networks. Students will read several classic research papers to understand the design choices & vision. Content based Network Architectures - Principles of data dissemination, aggregation & caching that are applied to sensor networks, Internet of Things & other content-based paradigms. Students will survey recent research publications on opportunistic networks & next generation content-based networking ideas. Applications - P2P, Social Networks, Cloud computing applications will be discussed for the IP network & similar applications for next generation networks. These discussions will be mainly led by students & moderated by the instructor. Simulation & Experimentation - Introduction to performance analysis of new networking ideas using the Network Simulator -v3 (ns3), Click Modular Router & the GENI testbed. Students will complete lab exercises that demonstrate various capabilities of the aforementioned tools. Hands on experience with related latest tools.				

IS8109	Process Mining	TH	PRS	-
Introduction to Process Mining. Process Modeling & Analysis. Getting the Data. Process Discovery: Advanced Process Discovery Techniques Conformance Checking. Mining Additional Perspectives. Operational Support. Tool Support. Hands on experience with related latest tools.				

IS8110	Digital Business Model	TH	-	-
Introduction to Digital Business Models. How Internet companies use digital business models. Key actors and stakeholders in the digital economy. The emergence of new digital spaces and business models. Adopting digital business models and disrupting established market sectors. Developing digital business models that capture value and sustain their competitive advantage. Build your own Digital Business Model.				

IS8111	Game Development	TH	PRS	-
A brief history of video games; games and society; game design (with 3D characters: animation and control); teams and processes in games; programming fundamentals for game development; debugging games; game architecture; memory and I/O systems in game development environments; mathematical concepts for games; collision detection and resolution; graphics for games; artificial intelligence in games; networks and multiplayer mode for games; UI development; connecting games to services and databases; and global illumination and code libraries. This module's laboratory sessions are covered by using a suitable gaming library to develop simple gaming applications based on a given scenario.				

Rules and Regulations

1. Students should complete (obtain at least D+ grade) for the Compulsory, Credited, Non-GPA courses: Academic Integrity, Communication Skills I, Communication Skills II, General English I, General English II, Academic English I, Academic English II, and Business English to be eligible for the award of the BScHons (Inf Sys) Degree.
2. Students should follow at least courses which are not less than total credits of six (06) out of ten (10) credits elective courses in the Semester V.
3. Students should follow at least courses which are not less than total credits of four (04) out of nine (09) credits elective courses in the Semester VII.
4. Students should follow at least courses which are not less than total credits of four (04) out of nine (09) credits elective courses in the Semester VIII.
5. Elective courses will be conducted in the Semester V, VII and VIII, depending on the availability of the resources.
6. Compulsory, Non-Credited Industrial Visit will be organized during the Semester V.
7. Students should go for the Industrial Training in the Semester VI, which is compulsory for all. Also, students should submit Internship Placement Offer Letter to the Department prior to the commencement of Semester VI.
8. Students must complete both the Capstone Project and the Information Systems Project for Community, in accordance with the established guidelines. Final reports must be submitted by the specified deadlines.
9. Students should submit the Research Proposal for the Final Year Research Project in Information Systems during the first part of the semester VII through the course IS7101 Research Methodologies. Upon approval, the Research will commence and continue with regular progress presentations from Semester VII until the end of the Semester VIII. This project is completely a research project and is not an industry internship.

semester 1

Semester I				
IS1101	Fundamentals of Information Systems	TH	-	-
Information concepts: Data, information, knowledge, and wisdom; cost/value and quality of information; system concepts; system performance and standards; system components and relationships; organizations and information systems; systems development; competitive advantage of information systems; global challenges in information systems; and IS career paths.				

IS1102	Structured Programming Techniques	TH	-	-
Introduction to Programming: Introduction to compilers & interpreters, Data types, Variables, Expressions & Assignment Statements, Console Input/Output, Libraries & Namespaces. Flow Control: Branching Mechanisms, Loops. Function Basics: Predefined Functions, User-Defined Functions, Scope Rules. Parameters: Parameters, Default Arguments. Arrays: Introduction to Arrays, Array manipulation, Multidimensional Arrays. Pointers: Introduction to pointers, Pointer arithmetic. Recursion: Recursive functions. Exception Handling: Testing & Debugging. File Reading & Writing.				

IS1103	Structured Programming Practicum	-	PRS	-
Identify & describe uses of Data types, Variables, Expressions & Assignment Statements, Console Input/ Output and Libraries. Modify & expand short programmes that use standard conditional & iterative control structures. Write programmes using functions, parameter passing, choose appropriate conditional & iteration constructs for a given programming task. Write programmes using arrays, standard conditional & iterative structures & pointers. Demonstrate the concept of recursion by examples, identify the base case & the general case of a recursively defined problem. Demonstrate file handling & exception handling.				

IS1104	Theories of Information Systems	TH	-	-
Set of theories centered around the IS lifecycle, including: DeLone and McLean's Success Model, Technology Acceptance Model, Unified Theory of Acceptance and Use of Technology, User Resistance Theories, Task-Technology Fit Theory, Process Virtualization Theory, Theory of Deferred Action. Strategic and economic theories, including: Resource-Based View, Theory of Slack Resources, Portfolio Theory, Theory of the Lemon Markets, Technology – Organization – Environment				

Framework, Contingency Theory, Porter's Competitive Forces Model, Business Value of IT, Diffusion of Innovations, Punctuated Equilibrium Theory, Discrepancy Theory Models, Institutional Theory, A Multi-level Social Network Perspective, Expectation Confirmation Theory, Stakeholder Theory. Socio-psychological theories including: Personal Construct Theory, Psychological Ownership and the Individual Appropriation of Technology, Transactive Memory, Language-Action Approach, Organizational Information Processing Theory, Organizational Learning, Absorptive Capacity, and the Power of Knowledge, Actor-Network Theory, Structuration Theory, Social Shaping of Technology Theory, An IT Innovation Framework, Yield Shift Theory of Satisfaction, Theory of Planned Behavior, An Interpretation of Key IS Theoretical Frameworks using Social Cognitive Theory. Methodological theories including: Critical Realism, Grounded Theory and Information Systems: Are We Missing the Point?, Developing Theories in Information Systems Research – The Grounded Theory Method Applied, Narrative Inquiry, Work System Method.

IS1105	Computer System Organization	TH	PRS	-

Basic Concept and Computer evolution: Organization and Architecture, the evolution of the Intel x86 Architecture, Embedded Systems, ARM architecture. Computer Performance Issues: Multicore, MIC and GPGPUs, Basic Measures of Computer Performance, benchmark and SPEC. Computer Function and interconnection: Computer Bus Interconnection, Point to Point Interconnection. Computer Memory System: Cache Memory Principles, Semiconductor main memory, External memory. Input/output: External Devices, I/O Modules, Interrupt Driven I/O, Programmed I/O, I/O channels and processors, External Interconnection Standards. Arithmetic and Logic: number system, Integer Representation, Floating Point representation, Digital logic, Combinational Circuits, Sequential Circuits, Programmable Logic Devices. The central Processing Unit: Machine Instruction Characteristics, Addressing Modes, Assembly language, Processor, Instruction Level Parallelism and superscalar Processor. Parallel Organization: Parallel processing, Multicore computers, General purpose Graphic processing Unit. Practical: Using a graphical simulation tool for designing and simulating logic circuits; digital logic design; implementation and simplification of Boolean functions; combinational logic modules—adders and subtractors; sequential logic, flip-flops, FSM analysis and design; and an introduction to assembly language programming.

IS1106	Foundations of Web Technologies	TH	PRS	-

Internet fundamentals. HTML. Cascading Style Sheets (CSS). Client-side Scripting: JavaScript, Typescript and pug, AJAX. Introduction to UI Frameworks with responsive front-end design. Introduction to Browser based developer tools. Hands on experience in web tools.

IS1107	Personal Productivity with Information Technology	TH	-	-
Knowledge work productivity concepts. Advanced functions and features of productivity tools to support personal and group productivity: DAX, Power BI				

(Pivot, Charts, Tables), What-if analysis. Professional document design (latex implementation). Conduct effective communication using digital tools (Emails, shared documents). Effective presentation design (Example: formatting tool like Latex, Power point). Presenting scientific materials to lay audience. Ethics and plagiarism.

IS1108	Fundamentals of Mathematics	TH	-	-
Linear Algebra. Matrices, Vector spaces & subspaces. Linearly independent & dependent vectors, Dimension rank & the basis of vector spaces. Linear transformations, Systems of linear equations, Determinants. Diagonalization of matrices, Functions & relations. Sets, cardinality Cartesian product. Ordered pairs, Bijective mappings, Equivalence relations. Logic Propositions, Truth tables, Symbolic statements, Disjunctive & conjunctive normal forms. Karnaugh maps				

IS1109	Statistics & Probability Theory	TH	-	-
Probability: Venn diagrams. Tree diagrams & Cartesian diagrams. Conditional Probability - The occurrence of an event given that another event has already occurred. Bayes' theorem & applications - An extension of conditional probabilities. Statistics: Population & Sample - Population: all the objects that a person is interested in. Sample: a subset of the population which is used to make inferences about the population. Types of random variables - Discrete & continuous random variables. Data Collecting - Experimental studies & observational studies. Data Summarizing Techniques - Descriptive statistics: mean, median, mode, inter quartile range, standard deviation etc. Data Visualizing Techniques - Techniques to visualize continuous & discrete variables. Measure of Central tendency - Mean, median, mode, Measure of Dispersion - Standard deviation, variance & inter quartile range. Mean & Variance of Random Variables - Relationship between the mean & the variance of random variables				

IS1110	Communication Skills I	TH	-	-

Introduction to Communication: Purpose of Communication, Process of Communication, Importance of Communication in Business, Differences between Technical and General Communication, Barriers to Communication, Measures to Overcome the Barriers to Communication. Types of Communication: Verbal Communication-Importance of verbal communication- Advantages of verbal communication- Advantages of written communication, Significance of Non-verbal Communication. Listening Skills: Listening Process, Classification of Listening, Purpose of Listening, Common Barriers to the Listening Process, Measures to Improve Listening, Listening as an Important Skill in Work Place. Language for Communication: Language and Communication, General Principles of Writing, Improving Writing Skills, Essentials of good style, Expressions and words to be avoided, Grammar and Usage. Communication in Organizations: Internal Communication, Stake Holders in Internal Communication, Channels of Internal Communication, External Communication, Stake Holders in External Communication, Channels of External Communication. Communication Network: Scope and Types of Communication Network, Formal and Informal

Communication Network, Upward Communication, Downward Communication, Horizontal Communication, Diagonal Communication. Writing Business Letter: Importance of Business Letters, Difference between Personal and Business Letters, Structure and Format of Business Letters, Types of Business Letters.

IS1111	Academic Integrity	TH	-	-
Introduction to academic integrity, Academic integrity policies, Plagiarism, collusion and contract cheating, Putting academic integrity into practice, Research ethics, Citing and referencing, Reading and Note-making, Critical Thinking.				

IS-EGP 1101	General English I	TH	-	-
Refer English Curriculum (Page 88 & 89)				

semester 2

Semester II				
IS2101	Object Oriented Programming	TH	-	-
Fundamentals of Object-Oriented Programming; Classes & Objects. Data Abstraction. Information Hiding & Encapsulation. Methods: Void methods, return methods, argument passing. Inheritance. Polymorphism: Method overloading and method overriding. Abstract Classes. Exception Handling. Files & Database connections.				

IS2102	Object Oriented Programming Practicum	-	PRS	-
Installation & configuring an IDE for OOP language: setting up path, environmental variable. Implement Class, Objects, Variables, Identifiers, Keywords, Data types, Arithmetic/logical Operators. Demonstrate Control statement (If-else, Switch), Loops (while, do-while, for). Implementation of Arrays. Implementation of Methods, Passing parameters, Arguments, Constructors. Implementation of OOP Concepts: Abstraction, Encapsulation, Inheritance (Specialization and Generalization) and Polymorphism. Applications of OOP concepts to solve real life problems.				

IS2103	Emerging IS Technologies	TH	-	WS
Emerging technologies: Contrasts between traditional & emerging technologies. Driving forces behind emerging technologies and technology life cycles. Adoption rates & assessment process. Disruptive technologies: Communication Communities, Collaboration, Hosted services (e.g., social networks, web culture, virtual workforce). Blockchain. DevOps. Cloud edge computing. Computer Supported Cooperative Work and Tools. Tracking, Searching, Advertising & publishing on the web.				

IS2104	Database Systems	TH	-	-
Introduction to Databases: Definition of the database, database system, data models, database applications. Database system architecture, characteristics of database approaches. Database development process. Data models. Relational model. ER model. Schema Mapping. Designing: Logical design: Relational database model,				

Logical view of data, keys, integrity rules, Normalization. Relational algebra: Introduction, Selection & projection, set operations, renaming, Joins, Division, syntax, semantics, Operators, Grouping & ungrouping, relational, Triggers.

IS2105	Database Management Systems Practicum	-	PRS	-
Database Management tools: Installation and Setting up the environment. Create Databases & Tables, Modifying Databases & Tables. Inserting Table Data, Modifying Table Data. Querying Data. Functions (String Functions, Date & time functions, Numeric Functions, Aggregate Functions). Joining Tables (Querying Multiple Tables, Joining Tables with SELECT, Table Name Aliases, Inner Joins, and Outer Joins).				

IS2106	System Analysis & Design	TH	-	-
System Analysis Fundamentals: Fundamentals System Analysis and Design (SA&D) concepts, Roles of system analyst, System development life cycle, depicting system graphically, determining feasibility, activity planning and control. Evolution of software development models. Information requirements analysis. Process requirements analysis. The essentials of design. Deployment and maintenance				

IS2107	Social & Professional Issues	TH	-	-
History of computing, social context of computing. Methods & tools of analysis: consequence, duty and right based ethical theories. Professional & ethical responsibility. Risks & liability of computer-based systems. Intellectual property, privacy & civil liberties. Computer crime, customs & law. Economic issues in computing. Philosophical frameworks.				

IS2108	Human Computer Interaction	TH	-	-
HCI Principles. Usability principles. Building a simple GUI, Human abilities. Human-centered software development, cultural aspects, human-centered software evaluation. GUI design, GUI programming. HCI aspects of multimedia systems. HCI aspects of collaboration & communication. Validation of usability & user experience. Handling errors & help.				

IS2109	Information Assurance & Security	TH	-	-

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

IS2110	Software Project Initiation & Planning	TH	-	WS

Develop Project Charter (Inputs, Tools & Techniques, Outputs). Develop Project Management Plan (Inputs, Tools & Techniques, Outputs). Direct & Manage Project Work (Inputs, Tools & Techniques, Outputs). Manage Project Knowledge (Inputs, Tools & Techniques, Outputs). Monitor & Control Project Work (Inputs, Tools & Techniques, Outputs). Perform Integrated Change Control (Inputs, Tools & Techniques, Outputs), Close Project or Phase (Inputs, Tools & Techniques, Outputs).

IS2111	Advanced Mathematics	TH	-	-

Functions & relations - relations: an association between two or more sets. Functions: a binary relation. Sequences - An enumerated collection of objects in which repetitions are allowed & order does matter. Series - The addition or multiplication of multiple quantities. Errors Numerical Solution of Nonlinear Equations. Interpolation Theory - The theory of estimating data points within a known data set. Numerical solution of systems of Linear Equation. Numerical Differentiation & integration. Numerical methods for differential equations. Graph theory.

IS2112	Communication Skills II	TH	-	-

Writing Memos Circulars and Notices: What is a Memo?- Principles of précis writing- Approaches to memo writing- Characteristics of a memo- Guidelines for writing memos- Language and writing style of a memo- Format of a Memo, Circulars- Guidelines for writing a circular- Languages and writing style of a circular- Format of a circular, Notices- Purpose- Format- Important points to remember while writing a notice. Report Writing: Features of Writing a Good Report, Purpose of Report Writing, Difference between Business Report and Engineering Report-Characteristics of writing a good report-Importance of communication in report writing, Guidelines for Report Writing, Steps in Report Writing, Structure of Report, Types of Reports and Different Formats. Writing E mail: Principles of E-mail, E-mail Etiquette, Overcoming Problems in E-mail Communication. Oral Communication Skills: Oral Business Presentation- Purpose –Audience-Locale, Steps in Making a Presentation- Research and planning Structure and style-Preparation –Presentation, Delivering a Presentation. Meetings: Types of Meetings, Importance of Business Meetings, Different Types of Business Meetings, Conducting Meetings-Selecting Participants-Developing Agendas Opening Meetings-Establishing ground rules for meetings-Time Management

Evaluations of meeting process-Evaluating the overall meeting-Closing meetings, Common Mistakes Made at Meetings. Reading Skills: Reading Skill, Purpose of Reading, Types of Reading, Techniques for Effective Reading. Employment Communication – Resume: Contents of Good Resume, Guidelines for Writing Resume, Different Types of Resumes, Reason for a Cover Letter to Apply for a Job Format of Cover Letter, Different Types of Cover Letters. Employment Communication – Job Interview: Importance and Factors Involving Job Interview, Characteristics of Job Interview, Job Interview Process, Job Interview Techniques Manners and etiquettes to be maintained during an interview, Sample Questions Commonly asked During Interview.

IS-EGP 1201	General English II	TH	-	-
Refer English Curriculum (Page 88 & 89)				