

University of Computer Science & Skills PG Diploma in Mobile Application Design & Development

Duration: One Year Fee: Euro 3000.00

- . March intake
- . September intake

Program Information

Mobile application development is quickly evolving and growing to meet the demand of today's marketplace. The Mobile Application & Design Development UCSS PGD program will allow students the opportunity to develop

a wide variety of skills in applications for mobile and tablet devices. Curriculum focuses on mobile application development topics, and becomes increasingly in-depth to allow students to develop the skills employers demand.

Initial curriculum focuses on platform-based development including iOS and Android applications. Various client-side development tools are introduced such as HTML5, CSS3, and JavaScript, as well as server-side programming to complement mobile application development. The focus will be on open source development based on PHP and MySQL.

In the second term, curriculum is based on various applied courses and team projects to



ensure the continued development of critical skills in publishing their native, game and



cross-platform mobile applications on both the App Store and Android Market. The third term



curriculum focuses on user-experience design, web security, online mobile marketing, user interface design and native smartphone application development utilizing the latest standard web technologies. To synthesize all student learning outcomes, the co-op work term or the applied project provides the components necessary to improve graduate employability competencies.

In this program, graduates develop their problem solving skills to analyze business requirements and design, develop and implement real-life mobile applications. In

addition, students expand their business and communication skills through participating in collaborative team projects.

Winter 2022 Delivery Format

For full details about the winter delivery format of this program, please visit the Academic Delivery Approach page.

Admission Requirements

A university degree in the information technology field.

The admissions process is competitive and meeting the minimum academic requirements does not guarantee admission.

UCSS reserves the right to alter information including admission requirements and to cancel at any time a program or course; to change the location and/or term in which a

program or course is offered; to change the program curriculum as necessary to meet current competencies or changes in the job market; to change the pathways third-party certification bodies; or to withdraw an offer of admission both prior to and after its acceptance by an applicant or student because of insufficient applications or registrations or over-acceptance of offers of admission. In the event UCSS exercises such a right, UCSS's sole liability will be the return of monies paid by the applicant or student to UCSS.

English Language Requirements

Applicants must demonstrate language proficiency by submitting one of the following scores:

- IELTS of 5.5

- or -

IELTS of 5.0 + Completion of EAP-3106 (English for Academic Purposes) during first term of study.

. TOEFL iBT 79

-or-

TOEFL 70 + Completion of EAP-3106 (English for Academic Purposes) during first term of study.

. Passed Lambton Institute of English placement test

Please Note: IELTS is the only proficiency score accepted by the Study Direct Stream (SDS) program. Additional country-specific requirements may also be applicable.

Meeting the minimum English requirements does not guarantee admission. Students with higher English proficiency scores will receive priority in the admission assessment process.

Not all students will qualify for EAP-3106 in place of the required IELTS or TOEFL test scores.

Technology Requirements

In order to keep pace with the requirements of each and every course in your program, UCSS recommends that each student have access to a laptop while studying at our University.

Course List

Term 1

CBD-2303: Introduction to Database Design

The concepts and design methodologies for

modeling relational databases are introduced. Students analyze user requirements and construct conceptual, logical, and physical data models; employ Data Definition Language (DDL) to create, modify, and remove database objects; employ Data Manipulation Language (DML) to perform CRUD (Create, Read, Update, and Delete) operations on a database; and prepare technical documentation for a database project.

MAD-3463: Introduction to Programming Java

Various components of Java object-oriented programming language are introduced. Students (1) develop solutions using data types, I/O, control structures, methods, and objects; (2) work with arrays, reference types, inheritance, polymorphism, GUI applications and recursion; and (3) documents solutions

with javadoc comments.

MAD-3004: Introduction to Swift Programming

Swift is an exciting and dynamic approach to object-oriented programming. It is the latest approach adopted by Apple as the foundation for programming on Mac platform. In addition to covering the essentials of Swift syntax, this course introduces students to important facets of the language such as memory management, dynamic loading, distributed objects, and exception handling. During the course students will develop various small applications based on Swift

MAD-3115: Introduction to iOS Programming Fundamentals

This course guides students through the

essential concepts, tools, and techniques for developing iOS applications. Students start with the Model-View-Controller (MVC) development paradigm, and visually design and implement interfaces using Xcode Storyboards, Segues, and the iOS Object Library. Students also build advanced UIs with Tables, Split Views, Navigation Controllers, and other tools. During the course students will build basic applications using the latest iOS SDK for iPhone, iPod and iPad.

MAD-3125: Introduction to Android Development Fundamentals

This course covers a wide range of topics starting from building applications for embedded devices, phones, and tablets to more advanced concepts such as multi-tasking. In this course, students also explore and use the Android APIs, including APIs for

the improved UI across all Android platforms, packages, handlers, the AsyncTask, and integration with services. This will equip students with the skills to create cutting-edge applications, while also keeping them agile to respond to changes in the future. During the course students will build basic mobile applications using the latest Android SDK for Android phones and tablets.

Term 2

MAD-3144: Mobile Browser Application Development

This hands-on course provides the skills and knowledge necessary to create mobile web applications for today's most popular smart phone devices. This course focuses on working with HTML5, one of the best advancements to hit the web since its inception. CSS and JavaScript are also

covered in detail. The course will also focus on the mobile web by covering more complex features, including multimedia and interactive functionality. Students will also learn how to validate HTML form fields, create a JavaScript quiz, build a mobile search page, implement a mobile blogging interface, and create a shopping cart.

MAD-4114: Advanced iOS Application Development

This Advanced iOS course goes beyond programming fundamentals and delves into more advanced topics such as developing database applications using Core data, pulling data from web servers, and building advanced location-based feature sets. The course also focuses on mobile security, online payment, and explores the options available to incorporate in-app purchasing or drive users to a third party platform. The

process of deploying applications to physical devices and testers, and publishing them on the App Store is also covered.

MAD-4124: Advanced Android Application Development

This course goes beyond programming fundamentals and explores more advanced topics of the Android platform. Students will explore GPS functionality, accelerometers, communication abilities, user-hardware interaction, location-based services, and background services to help them construct increasingly complex and innovative mobile applications for Android phones and tablets. We will also discuss mobile security and online payment processing as it relates to the Android platform, including its limitations, and what security parameters are required. During this course, students will deploy their applications on a physical device and also go

through the process of application publishing to the Android Market by publishing their own application.

MAD-5254: The Business of Mobile Application Development

The design and development of mobile websites and applications eventually needs to move beyond the classroom. This course discusses the mobile landscape from a business point of view. Mobile application marketplaces, online marketing, locating funding and becoming an entrepreneur are just a few of the topics this course covers. Students work together to explore how all these topics impact mobile development projects.

MAD-5264: Mobile Development and Design Capstone Project I

This capstone course is for students completing the Mobile Application Design and Development program. It is an opportunity for participants to integrate concepts learned throughout the courses into a final capstone project. Small groups of students work as a team to design and document a complete mobile solution (back-end database coupled with mobile application, etc.). The design must be supported by documented market research, a marketing plan and a business plan. A faculty advisor will meet regularly with the group to ensure the process is properly managed and a plan is followed.

CPP-1001: Co-op Preparation

This course will provide students with employment preparatory skills specifically related to Co-operative Education. This will include understanding the Co-operative

Education & Internship Policy, understanding the support system available through the Co-op and Career Services department, utilizing social media, preparing effective cover letters & resume as well as the fundamentals of behavioural based interviewing.

Term 3

MAD-5234: Software Quality Assurance Testing

This course is an introduction to the principles of software quality assurance. The course addresses the concepts and practices of a software quality assurance function, as well as those aspects of project management, software design, and testing and configuration management, as applicable to the development of quality software products.

MAD-5274: Mobile Development and Design Capstone Project II

This course is the culmination of the all material learned in the program. In this project-based course, students design, develop, and publish an app that showcases the knowledge and skills gained throughout the program. All students must produce a ready-to-publish mobile application in a platform of their choice such as iOS, Android or cross platform.

MAD-6114: Mobile Frontend Development

This course exposes students to client-side mobile app development using JavaScript. Students learn the principles of WORE (write once, deploy everywhere), develop their skills

in modern frameworks, and contrast the differences between native and cross platform mobile application development.

MAD-6123: Mobile Backend Development

In this course, students explore how to architect the backend component of a mobile application using server-side JavaScript frameworks. Topics covered include Node.js, Express.js, No-SQL databases, and API integration.

MAD-6135: Javascript Fundamentals

In this course students gain fundamental skills necessary to develop mobile and web applications using JavaScript. This course exposes students to JavaScript programming language, from variables to data structures. Students develop their problem solving and

algorithm development abilities in an event-based environment. Course also covers aspects of object oriented programming, event handling, and debugging.

Term 4

CPL-1049: Work Term - Full-Time*

Co-operative education provides students with the opportunity to apply classroom learning to the workplace, undertake career sampling and gain valuable work experience that may assist students in leveraging employment after graduation. For further information regarding co-op, please refer to:

https://www.lambtoncollege.ca/co-op_and_career/

-or-

CPL-5559: WIL Project

Work Integrated Learning Project is aimed at enriching student success by connecting different program areas of study, cutting across subject -matter lines, and emphasizing unifying concepts. The focus is on making connections, allowing students to engage in relevant, meaningful activities that are connected and practiced in real life. This will attempt to enhance and strengthen the student's employability prospects post-graduation by exposing them to skills and knowledge in demand from today's employers. Students are required to attend the scheduled shifts in the WIL office, reporting to the WIL Supervisor. Weekly real-world challenges are presented in the WIL office, designed by industry professionals. In addition to the weekly assigned deliverables, students are also offered professional development sessions, and exposed to industry guest speakers, enhancing their

opportunity to develop their professional network.

*In order to be eligible to participate in a full-time Co-op Work Term (CPL-1049) students must have a GPA of 2.8 or greater.

Failing to do so will require the students to enroll in CPL-5559 WIL Project at an additional cost to the student.

See the Costs tab for current fees.

Program Maps

Students are required to follow their prescribed program map and are not allowed to take unscheduled breaks for any reason.

Current Students

Current students can view program

maps from previous years on the my UCSS website.

You will need to login with your C# and password in order to access your program map.

e. Courses

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Program Info: 000000000000

Main: 000000000000

Address: Lodz Poland

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PGD-in-ICT Program

Courses & Syllabus

Courses to be offered in

Postgraduate Diploma in Information and Communication Technology (PGD-in-ICT)

Summary Courses Credits Group

A (Compulsory Courses)	5 courses x 3 credits	15	Group B (Optional Courses)	7 courses x 3 credits	21	Group C (Project)	6	Total Credits	42
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(Compulsory courses)	Course No.	Course Name	Credits
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ICT6001	ICT Fundamentals	3
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ICT6002	Structured Programming	3
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ICT6003	Data Structure and Algorithm	3
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ICT6004	Database Management System	3
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ICT6005	Object-Oriented	3
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Programming3Group B (Optional Courses)

Any seven from the following

courses

Course No.	Course Name	Credits
ICT6006	Mobile Application Development	3
ICT6007	Computer Networks	3
ICT6008	Information System Analysis and Design	3
ICT6009	Computer Organization and Architecture	3
ICT6010	Software Engineering and Application Development	3
ICT6011	Data Science	3
ICT6012	Business System Engineering	3
ICT6013	Advanced Networking	3
ICT6014	Web and Internet Programming	3
ICT6015	Interactive Multi-Media Design and Development	3
ICT6016	Client Server Technologies and Distributed Database	3
ICT6017	Network Administration	3
ICT6018	Visual Programming and .net technology	3
ICT6019	Operating Systems	3
ICT6020	Computer Aided Design	3
ICT6021	Machine Learning	3
ICT6022	Advanced Database	3

Administration3ICT6023Digital Logic
Design3ICT6024Embedded
System3ICT6025Digital
Communication3ICT6026Digital Image
Processing3ICT6027Big Data
Analysis3ICT6028Mobile
Communications3ICT6029e-Commerce and
e-Governance3ICT6030Cyber Security and
the Internet of Things3ICT6031GIS and
Remote Sensing3**Group C (Project)Course
No.Course NameCredits**ICT6000Project
Work and Report6

Detail Syllabus for Postgraduate Diploma in Information and Communication Technology (PGD-in-ICT)

ICT6001ICT Fundamentals3 Credits

Fundamentals of ICT. Applications, impact and effects of ICT. Computer fundamentals: history, types, organization, storage & I/O

devices, software, operating system, programming language, memories, number systems, boolean algebra, computer network, data communication, video communication. Internet: browsers and search engines, email and digital communications, collaborative computing and social networking, IT security and other issues. Digital content development, multimedia design and development, drawing Animation MS-Office with MSWORD, MS-EXCEL, MS-POWER POINT and MS-ACCESS etc.

ICT6002 Structured Programming 3 Credits

Structured programming language: data types, operators, expressions, control structures; Functions and program structure: parameter passing conventions, scope rules and storage classes, recursion; Header files; Preprocessor; Pointers and arrays; Strings; Multidimensional array; User defined data

types: structures, unions, enumerations; Input and Output: standard input and output, formatted input and output, file access; Variable length argument list; Command line parameters; Error Handling; Graphics; Linking; Library functions. Reference language: C.

ICT6003 Data Structure and Algorithm3 Credits

Introduction to elementary data structures: arrays, records, linked lists, stacks, queues, trees; Complexity analysis of algorithms; Basic search and traversal techniques; Sorting algorithms; Methods for the design of efficient algorithms: recursion, divide and conquer, greedy method, dynamic programming; Graph algorithms; etc.

ICT6004 Database Management System3 Credits

Introduction to Database; Data Models and ER Models; Functional Dependencies, Normalization and Normal Forms, Relational Algebra and Calculus, Relational Model, Database Design and Implementation, Database Development using SQL Server, SQL: DDI, DML, DCL; Indexing, Query Development: Basic SELECT, Functions, Sub-Queries and Joins; Procedural Language Extensions of SQL; Data Integrity; Transaction Concurrency Control and Recovery Management.

ICT6005 Object-Oriented Programming3 Credits

Introduction: Object oriented programming overview. Object Oriented Concepts: Modeling problems using object oriented concepts. Introduction to UML. Encapsulation, Inheritance and Polymorphism. Object Oriented vs.

Procedural programming, Basics of Object Oriented Programming language. Objects and Classes: Attributes and functions, constructors and destructors, functions or methods, overloading methods, access control, special considerations in different Languages. I/O: Stream and files. Inheritance: Inheriting classes, subclass, superclass, access control, inheritance hierarchy, overriding, dynamic binding, abstract class, inner classes, special considerations in different languages, multiple inheritance, interface. Exception and exception handling: Exception handling fundamentals, exception types, chained exception, creating own exception subclasses. Generics or Templates: Special considerations in different languages. Package/Namespace: Understanding and implementing package/namespace. Object-oriented Design Principles and examples: Introduction to object-oriented design

principles and examples, introduction to object-oriented design. Case Study using Object Oriented Programming.

ICT6006 Mobile Application Development3 **Credits**

Basic application, UI controls design, Web communication, Application deployment, Publishing an application. Updating apps, Version control, Popular market OS app development, App commercialization.

Introduction to Mobile Computing. Introduction to Android Development Environment.

Factors in Developing Mobile Applications, Mobile Software Engineering, Frameworks and Tools. Generic UI Development: Android User. More on UIs: VUIs and Mobile Apps, Text-to-Speech Techniques, Designing the Right UI, Multichannel and Multimodal UIs. Intents and Services: Android Intents and Services,

Characteristics of Mobile Applications, Successful Mobile Development. Storing and Retrieving Data: Synchronization and Replication of Mobile Data, Getting the Model Right, Android Storing and Retrieving Data, Working with a Content Provider. Communications Via Network and the Web: State Machine, Correct Communications Model, Android Networking and Web. Telephony: Deciding Scope of an App, Wireless Connectivity and Mobile Apps, Android Telephony. Notifications and Alarms: Performance, Performance and Memory Management, Android Notifications and Alarms. Graphics: Performance and Multithreading, Graphics and UI Performance, Android Graphics. Multimedia: Mobile Agents and Peer-to-Peer Architecture, Android Multimedia. Location: Mobility and Location Based Services, Packaging and Deploying, Performance Best Practices, Android Field Service App. Security and Hacking: Active

Transactions, Hacking Android. Platforms and Additional Issues: Development Process, Architecture, Design, Technology Selection, Mobile App Development Hurdles, Testing.

ICT6007 Computer Networks 3 Credits

Overview of LAN concepts, media, collision and broadcast; MAC address; Token ring, Fiber Distributed Data Interface (FDDI), Ethernet and Carrier Sense Multiple Access Collision Detect (CSMA/CD), IEEE 802.3., LAN topology; Network layer: internet-working, routing, IPv4 and IPv6 addressing, subnetting, VLSM, NAT/PAT, ACL, ARP and RARP, DHCP, RIP, IGRP and EIGRP, OSPF; Upper layers of OSI model; Wireless LAN: Ad hoc, infrastructure networks; WAN services: analog dial-up, ISDN dial-up, dedicated leased line, X.25, frame relay, ATM; IEEE 802.11: physical layer, framing, multiple access techniques, bluetooth, IEEE 802.15;

Broadband wireless: Wireless ATM, 802.16; local multipoint distribution service (LMDS), Multichannel Multipoint Distribution System (MMDS); Network protocols: mobile IP, cellular IP, mobile Ad hoc networking.

ICT6008 Information System Analysis and Design 3 Credits

Different Types of Information; Attributes of Information; Roles, Tasks and Attributes of a system Analyst; Sources of Information; Information Gathering Techniques; Handling of Missing Information; Steps of System Analysis; Cost-Benefit Analysis; Design of an information System; Network Models for Project Time Estimation; Estimation of Confidence Levels; Simplex Method for Minimization of Project Time; Project Effort Analysis Methods; Designing of Inputs and Outputs; Project Team Organization; Database and Files Design; Project

Management and Documentation; Analysis of System Maintenance and Upgrading; Ethics and Privacy; Control and Security.

ICT6009 Computer Organization and Architecture 3 Credits

Introduction to Microprocessors: architecture, addressing modes, instruction set, interrupts, memory interface, bus interface; Peripheral chips and their application; Arithmetic Logic Unit design; Control Unit design: Hardwired and Micro-programmed; Memory organization; Direct Memory Access; Pipelined architecture and pipeline control; Multiprocessors and relevant issues.

ICT6010 Software Engineering and Application Development 3 Credits

Software Engineering Paradigms; Different

Software Design Methodologies Different Software Complexity Models; Graphical Analysis of Complexity Measures; Memory Requirement Analysis; Processing Time Analysis; Testing Philosophy and Methods; Software Reliability and Availability; Quality Measure and Assurance; Software Maintenance; Development of an Application Using Software Engineering Concepts.

ICT6011 Data Science 3 Credits

Introduction to Data Science: Big Data and Data Science hype, Datafication, Current landscape of perspectives. Statistical Inference: Populations and samples, Statistical modeling, probability distributions, fitting a model, Intro to R. Exploratory Data Analysis (EDA) and the Data Science Process: Basic tools (plots, graphs and summary statistics) of EDA, Philosophy of EDA, The Data Science Process, Basic

Machine Learning Algorithms and Usage in Applications: Linear Regression, k-Nearest Neighbors (k-NN), k-means, Naive Bayes. Feature Generation and Feature Selection, Feature Selection algorithms.

Recommendation Systems: Building a User-Facing Data Product, Algorithmic ingredients of a Recommendation Engine. Mining Social-Network Graphs: Social networks as graphs, Clustering of graphs, Direct discovery of communities in graphs, Partitioning of graphs, Neighborhood properties in graphs. Data Visualization: Basic principles, ideas and tools for data visualization. Data Science and Ethical Issues: privacy, security, ethics.

ICT6012 Business System Engineering 3 Credits

Systems concept: Definition, Systems Approach, General system model, Organizational and Natural Environments;

Elements of Business Systems Engineering; Business system Engineering model and a generic business enterprise model; Planning and Development: Management of business functions, Organizational structures, Financial Planning. Project Management: PERT and CPM. Information and communications: MIS, Information for Management and control, Uses of financial information.

Strategic systems: Strategic planning, strategic Information systems, business process re-engineering. Business system in society: Ecology, Environment and Business, Business and the consumer, Business and World market. Emergence of modern concept of quality, Total Quality Management (TQM), Quality standards and their compliance, ISO 9000 and ISO 14000. Applications of Business Systems Engineering: Importance of effective business communication, Case

Studies, Project conceptualization and modeling, Report Writing, Presentation.

ICT6013Advanced Networking3 Credits

WAN Technologies: X.25, ATM, Integrated Services Digital Network (ISDN), DSL, Frame Relay; End-to-End Protocols: User Data Protocol (UDP), Transmission Control Protocol (TCP), Remote Procedure Call (RPC); Routing Protocols; Routing Information Protocol (RIP), Interior Gateway routing Protocol (IGRP), Extended Interior Gateway Routing Protocol (EIGRP), Open Shortest Path First (OSPF); End-to-End Data: Presentation Formatting, Data Compression-JPEG, MPEG, MP3; Congestion control and resource allocation, Queuing discipline, congestion avoidance mechanism, Quality of Service.

ICT6014Web and Internet Programming3 Credits

Website Basics: HTML 5, CSS 3, WEB 2.0:
Web 2.0: Basics-RIA Rich Internet
Applications – Collaborations tools –
Understanding websites and web servers:
Understanding Internet – Difference between
websites and web server- Internet
technologies Overview –Understanding the
difference between internet and intranet;
HTML and CSS: HTML 5.0 , XHTML, CSS 3.
Client side and server side programming: Java
Script: An introduction to JavaScript-
JavaScript DOM Model-Date and Objects,-
Regular Expressions- Exception Handling-
Validation-Built-in objects-Event Handling-
DHTML with JavaScript. Servlets: Java
Servlet Architecture- Servlet Life Cycle- Form
GET and POST actions- Session Handling-
Understanding Cookies- Installing and
Configuring Apache Tomcat Web Server;-
database connectivity: JDBC perspectives,
JDBC program example – JSP:

Understanding Java Server Pages-JSP
Standard Tag Library(JSTL)-Creating HTML
forms by embedding JSP code. PHP and
XML: An introduction to PHP: PHP- Using
PHP- Variables- Program control- Built-in
functions-Connecting to Database – Using
Cookies-Regular Expressions; XML: Basic
XML- Document Type Definition- XML
Schema DOM and Presenting XML, XML
Parsers and Validation, XSL and XSLT
Transformation, News Feed (RSS and
ATOM). Introduction to AJAX and Web
Services: AJAX: Ajax Client Server
Architecture-XML Http, Request Object-Call
Back Methods; Web Services: Introduction-
Java web services Basics – Creating,
Publishing, Testing and Describing a Web
services (WSDL)-Consuming a web service,
Database Driven web service from an
application – SOAP.

ICT6015 Interactive Multi-Media Design and
Development 3 Credits

Introduction to multimedia — Image, Sound, Video formats and their different properties, compression, playing and recording techniques, conversions between different formats and their combinations, Multimedia authoring.

Drawing: Basic Image properties and how to set/change them in PhotoShop, Concept of layers, Color concepts, text, texture, brightness, contrast, filters and effects, PhotoShop Print Production, PhotoShop Web Production, Introduction to Macro-media Director, Illustrator and Premier. Animation creating software (Media studio/Video studio etc), its use, facts to concern while marketing.

ICT6016 Client Server Technologies and Distributed Database3 Credits

Fundamentals of Client Server Systems,

Components of Client Server Systems, Architecture; Server, Network and Client Operating System Interactions, Middleware: Components, DCE, RPC, and CORBA. Oracle Architecture; Storage Management; Security and User Management; Backup and Recovery; Performance Tuning and Net8 administration. Distributed System Architecture, Distributed Database: Concepts, Managements, and Application Development.

ICT6017 Network Administration 3 Credits

Network architectures, heterogeneous systems, authentication and security, network services including firewalls, storage services, performance analysis and tuning, management and configuration of services and system resources, system initialization, drivers, cross-platform services, policies and procedures. Installation of windows server, usage and administration windows server in

a domain environment, creation users and groups and management of each in a domain and local environment, setting up and maintenance of shared file system resources, implementation and administration network printing, administration of disk storage. Secure Windows Server. Store, retrieve, evaluate, and synthesize information using technology tools.

ICT6018 Visual Programming and .net technology 3 Credits

Concept of windows applications, Object Oriented and Event Driven programming; Objects, Controls, Events and Methods; Visual programming basics; Control array and menus; Procedures and Functions; working with ActiveX controls and Database fields; Dynamic link libraries, Object linking and embedding; Creating and updating database with SQL and MySQL.

ICT6019 Operating Systems 3 Credits

Operating System: Its Role in Computer Systems; Process: Model and Implementation, Inter process Communication; CPU Scheduling, Memory Management, Virtual Memory, File System, Protection and Security.

Introduction to UNIX, UNIX Kernel, UNIX Commands, Services, Device Structure, Memory Structure, Process and Jobs, File System and File Management, vi and emacs editor Shell Programming.

ICT6020 Computer Aided Design 3 Credits

Introduction to computer Graphics: Definitions, Classification, Architecture of interactive computer Graphics, Applications Display & Interactive devices; Basic concepts

of CAD; Graphics programming; mechanical drafting package; Advanced modeling techniques, Surface modeling, Solid modeling; CAD data base development and data base management systems; 2D: Representation and Transformation of Points, Transformation of Lines, Rotation, Reflection, Scaling and combined transformations; 3D: Scaling, Shearing, Rotation, Reflection, Translation, Projections parametric representation of Ellipse, Parabola, Hyperbola; Rendering, Animations, Multimedia, Picture, Sound, Video, Tools of Multimedia, CAM.

ICT6021 Machine Learning 3 Credits

Supervised and Unsupervised Learning, issues in machine learning: parametric and nonparametric models, curse of dimensionality, overfitting, and model selection. Linear Models for Regression:

Maximum Likelihood and least squares, regularized least squares, Bias variance decomposition, Bayesian linear regression. Linear Models for classification: Fisher's linear discriminant, probabilistic generative models - parametric (maximum likelihood and Bayesian) and nonparametric density estimation. Probabilistic discriminative models: logistic regression, log-linear models, Kernel methods and Sparse Kernel Machines. Clustering, mixture models and Expectation Maximization algorithm. Sequential data and Markov models.

ICT6022 Advanced Database Administration3
Credits

Database administration skills covering installation, configuration and tuning a database, administering servers and server groups, managing and optimizing schemas, tables, indexes, and views, creating logins,

configuring permissions, assigning roles and performing other essential security tasks, backup and recovery strategies, automation and maintenance.

ICT6023 Digital Logic Design 3 Credits

Digital logic: Boolean algebra, De Morgan's Theorems, logic gates and their truth tables, canonical forms, combinational logic circuits, minimization techniques; Arithmetic and data handling logic circuits, decoders and encoders, multiplexers and demultiplexers; Combinational Circuit design; Flip-flops; race around problems; Counters: asynchronous and synchronous counters and their applications; Asynchronous and synchronous logic design: State diagram, Mealy and Moore machines; State minimizations and assignments; Pulse mode logic; Fundamental mode design; PLA design; Design using MSI and LSI components.

ICT6024 Embedded System 3 Credits

Concepts, classifications; Characteristics; Requirements; Introduction to embedded system design process, Unified Modeling Language (UML); Embedded microcontroller cores; Embedded memories; Technological aspects; Interfacing between analog and digital blocks; Signal conditioning, digital signal processing, sub-system interfacing; Interfacing with external systems, user interfacing; Design trade-offs, thermal considerations; Networked embedded systems: the I2C bus, the CAN bus, the FlexRay; Example of applications.

ICT6025 Digital Communication 3 Credits

Overview of different types of communication networks and their architecture; A/D conversion; GIF, JPEG, PNG;

Audio coding for fixed telephone network and speech coding for mobile communications; Image and video coding: JPEG and MPEG; Channel coding: scrambling, convolution coding, cyclic redundancy checks, scrambling and interleaving; Modulation schemes: ASK, PSK, FSK, and GMSK. Modulation for local access: ADSL, DSL; Multiple access technologies, high speed PSTN access technology; Routing strategies, numbering schemes, Switching techniques: space switching, store and forward switching; Routing strategies; Numbering schemes; VSAT and satellite communication; Audio and video conferencing technique, Cable and satellite TV networks, HDTV transmission.

ICT6026 Digital Image Processing 3 Credits

Introduction and Fundamental to Digital Image Processing: What is Digital Image Processing, Origin of Digital Image

Processing, Examples that use Digital Image Processing, Fundamental steps in Digital Image Processing, Components of Digital Image Processing System, Image sensing and acquisition, Image sampling, quantization and representation, Basic relationship between pixels. Image Enhancement in the Spatial Domain & Frequency domain: Background, Basic gray level transformation, Histogram processing, Basics of spatial filtering, Smoothing and Sharpening Spatial filters, Introduction to Fourier Transform and the Frequency Domain, Discrete Fourier Transform. Smoothing and Sharpening Frequency-Domain filters. Image Restoration: Image Degradation/Restoration Process, Noise models, Restoration in presence of noise, Inverse Filtering, Minimum Mean Square Filtering, Geometric mean filter, Geometric transformations. Color Image Processing: Color Fundamentals, Color models, Basis of

full color image processing, Color transformations. Image Compression: Fundamentals, Image compression models, Error free compression, Lossy compression. Morphological image processing: Preliminaries, Dilations and Erosion, opening and closing, Some basic morphological algorithms. Image Segmentation: Detection of Discontinuities, Edge linking and boundary detection, Thresholding, Region oriented segmentation. Representation, Description and Recognition: Representation-chain codes, polygonal approximation and skeletons, Boundary descriptors-simple descriptors, shape numbers, Regional descriptors- simple, topological descriptors, Pattern and Pattern classes-Recognition based on matching techniques.

ICT6027Big Data Analysis3 Credits

Big Data introduction :- Big data: definition

and taxonomy – Big data value for the enterprise – Setting up the demo environment – First steps with the Hadoop “ecosystem”

The Hadoop ecosystem :- Introduction to Hadoop – Hadoop components: MapReduce/Pig/Hive/HBase – Loading data into Hadoop – Handling files in Hadoop – Getting data from Hadoop, Querying big data with Hive :- Introduction to the SQL Language – From SQL to HiveQL ,Querying big data with Hive :- Introduction to HIVE e HIVEQL – Using Hive to query Hadoop files, Big data & Machine learning – Quick intro to Machine learning – Big Data & Machine Learning :- Machine learning tools – Spark & SparkML ,H2O ,Azure ML, Next steps in the big data world

ICT6028 Mobile Communications 3 Credits

An introduction to ubiquitous communication;
Wireless transmission:

frequencies for transmission, International Regulations and Regulatory Authorities, signals, antennas, signal propagation, multiplexing, modulation, spread spectrum; Medium access control: SDMA, FDMA, TDMA, CDMA; Radio network planning; Fundamentals of cellular telephony: concept of cellular communications, frequency reuse, cell splitting, registration, terminal authentication, handoff; GSM and GPRS: services, system architecture, radio interface, protocols, handover, security; Next generation mobile telecommunications systems: 2.5G systems (EDGE, TETRA), 3G systems (UMTS, UTRAN), 4G and beyond; Wireless LANS and personal area networks: 802.11, IrDA, Bluetooth, data services: WAP, mobile IP.

ICT6029e-Commerce and e-Governance3
Credits

Introduction to e-commerce: Overview,

Candidate Models, web Resource; Security and encryption: Computer and Network Security Risks, Digital Certificates, Encryption and PGP, Firewalls, Transaction Security; Electronic Payment Systems: Web based payment system based on credit cards, checking accounts and cash; Business to consumer e-commerce: e-commerce business models, On-line retailing, On-line publishing, On-line customer Service and Support, On-line Banking; Legal Issue Intellectual Property, Copyright, Trademark and patents, Cyber Crime and Money Laundering.

Overview of e-Governance and role of ICT in Good Governance. e-Governance initiatives in Bangladesh and Overseas.

ICT6030 Cyber Security and the Internet of Things 3 Credits

Fundamentals of cryptography, security for communication protocols, security for operating systems and mobile programs, and security for electronic commerce, passwords and offline attacks, DES, RSA, DSA, SHA, SSL, CBC, IPSec, SET, DDOS attacks, biometric authentication, PKI smart cards, S/MIME, privacy on the Web, viruses, security models, wireless security, and sandboxing.

Internet in general and Internet of Things: layers, protocols, packets, services, performance parameters of a packet network as well as applications such as web, Peer-to-peer, sensor networks, and multimedia.

Transport services: TCP, UDP, socket programming. Network layer: forwarding & routing algorithms (Link, DV), IP-addresses, DNS, NAT, and routers. Local Area Networks, MAC level, link protocols such as: point-to-point protocols, Ethernet, WiFi 802.11, cellular Internet access, and Machine-to-machine.

Mobile Networking: roaming and handoffs, mobile IP, and ad hoc and infrastructure less networks. Real-time networking: soft and real time, quality of service/information, resource reservation and scheduling, and performance measurements. IoT definitions: overview, applications, potential & challenges, and architecture. IoT examples: Case studies, e.g. sensor body-area-network and control of a smart home.

ICT6031 GIS and Remote Sensing 3 Credits

Introduction: What is a GIS? Terminology; Computer Assisted Cartography, Remote Sensing, photogrammetry and Land Information Systems; What is Geographical data? GIS data Capture; GIS displays etc. Spatial Analysis and Cartographic Concepts: Point, lines, areas and surfaces; Nominal, ordinal, interval and ratio attributes; Socio-economic versus resource and physical data,

Geo-referencing; Geo-codes etc. Map projection and transformations, properties thereof; Coordinate transformation in 2D and 3D; Fundamentals spatial concepts: distance, orientation, pattern, proximity and connection; The quality of spatial surfaces: including generalization and enhancement, perimeter, area, polygon reclassification and overlaying techniques; The object/Layer debate.

Technical Aspect of GIS: Relationship between GIS and other Information Systems; Data models for spatial data: Arcs, polygons, topological data structures, polygon building; Data capture devices, digitizing and scanning techniques- state of the art; Special environment for GIS; Issues of display, hard v. Virtual, vector v. Raster, data resolution; Graphics output design issues: Modes of use GIS Interaction; Temporal and 3D representation; Line Generalization; Use and function of the Global Positioning System (GPS) in GIS. The Application of Geographical

Information Systems: Who uses them and what for public utilities, resources analysis, urban planning and decision support. Global scale application: international initiatives; global data capture and referencing. The actual use of GIS, map analysis, spatial data searches etc. Cost and benefit of GIS. GIS and Global science. GIS and Spatial Cognition. Knowledge based techniques in GIS.

ICT6000 Project Work and Report 6 Credits

Each student should work on a particular topic approved by the Director of the PGD-in-ICT and under the guidance of a teacher in the field of ICT or Computer Science. The project will be started at the beginning of Term 3 with a time-to-time presentation of its progress in a seminar to be arranged by the Director in consultation with the guiding teachers.

Course Schedule:

Each Term: Classes 14 Weeks, Examination and Results: 2 Weeks 1 Credit theory = 1 Lecture/week; 1 Credit lab = 2 Hours/ Week.

Grading Procedure:

Class attendance-10%, Continuous Assessment through class test-60%, Final Examination- 30% Grades will be calculated as follows:

Numerical Grade

Letter Grade

Grade Point

90% or above

A+

4.00

85% to less than 90%

A

3.75

80% to less than 85%

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Batch-17

Note: *Please upload your scanned documents after registration. Your application will not be reviewed if the documents are not uploaded.*

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Contact

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Department of Computer Science

University of Computer Science & Skills

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