



UNIVERSITY OF SARGODHA

Office of the Registrar (Acad Branch)

Ref: SU/Acad/23/1053

Dated: 15.11.2023

Assistant Controller of Examinations
(Secrecy P.S Branch)
Office of Controller of Examinations
University of Sargodha

Subject: **PROVISION OF SYLLABUS OF ASSOCIATE DEGREE PROGRAM OF INFORMATION TECHNOLOGY (ADP-IT) W.E.F. FALL 2023**

Kindly refer to your letter No. SU/CE/ACE (Secrecy PS)/582 dated 02.11.2023 on the subject cited above.

2. It is to update you that no revision in Syllabus of Associate Degree in Information Technology has been made yet, therefore, previously notified Syllabus of aforementioned program vide No. UOS/Acad/564 dated 29.04.2019 will remain valid.

Syed Abid Hussain
Assistant Registrar (Acad)
for Registrar



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No. UOS/CE

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UNIVERSITY OF SARGODHA, SARGODHA

Dated:

13/05/19


NOTIFICATION


No. UOS/Acad/564

Dated: 29.04.2019

On the recommendations of Academic Council dated 08.01.2019, the Syndicate in its meeting held on 16.02.2019 has approved the following recommendations of the Board of Faculty of Science, duly vetted by the Department concerned and Director Academics:

1. Associate Degree Program of Information Technology regarding Multimedia Systems and Application and web-engineering (Annexure-'A').
2. Revision in curricula of BS(CS), BS(IT), BS(SE), MS(SE), MS(IT), MS(CS), PhD computer Science (annexure-'B, C, D, E, F, G & H') from session 2019.


Muhammad Farooq
Deputy Registrar (Acad)


29/04/19

Distribution:

- Incharge, Department of Computer Science & IT
- Controller of Examinations
- Director Sub-Campuses (Mianwali & Bhakkar)
- All Principals of affiliated college (concerned)
- Web-Developer (for uploading on university web-site)

C.C:

- Director Academics
- Director Quality Enhancement Cell
- Director Implementation
- Secretary to the Vice-Chancellor
- P.A to Registrar

latest
July
18/1/22

Curriculum for
Associate Degree Program of Information Technology
(Web Engineering)
for
Affiliated Colleges



Department of Computer Science & Information Technology

University of Sargodha

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Curriculum for Associate Degree Program of Information Technology (Web Engineering)

Details of Associate Degree Program

Program's Aims & Objectives

The Associate degree program is designed to help prepare professionals in disciplines of immediate application and relevance to the market. It is equivalent to a Bachelor (Pass) degree. This new and exciting degree program is offered to equip students with skills that enable them to develop websites/portals using cutting edge technology. During this study program students will learn to develop websites using PHP, PERL, CGI, MYSQL java, Dot Net Technologies, as well as advanced Web Services Development and Web Development.

Program's Outcome

The program will enable the students

1. To design, develop and maintain web applications..
2. To work on upcoming tools and trends in web development.
3. To learn latest tools to deal with web based applications for smart devices.

Duration

The program shall comprise Four (4) Semesters/Terms spread over Two (2) calendar years with two Semesters/Terms a year as per rules of the University.

Eligibility Criteria

At least 45% marks in Intermediate or equivalent qualification.

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Distribution of Courses

Followings are the distribution of total credit hours:

Distribution of Courses		
Major Areas	No of courses	Credit Hours
Compulsory Courses	7	18
Foundation Courses	4	12
Major Courses + Internship	9	31
Elective Courses	2	6
Total		67

Compulsory Courses (18 Credit Hrs)			
#	Code	Course Title	Cr. Hrs.
1	ENGL-101	Functional English	3 (3+0)
2	ENGL-102	Communication Skills	3 (3+0)
3	ENGL-201	Technical and Report Writing	3 (3+0)
4	ISLS-101	Islamic Studies/ Ethics(Non Muslims)	1 (1+0)
5	PKST-101	Pakistan Studies	2 (2+0)
6	ICTC-101	Introduction to Information & Communication Technologies	3 (2+1)
7	MATH-101	Calculus and Analytical Geometry	3 (3+0)

Foundation Courses (12 Credit Hrs)			
#	Code	Course Title	Cr. Hrs.
1	PHYS-101	Basic Electronics	3 (3+0)
2	CMPC-104	Discrete Mathematics	3 (3+0)
3	MATH-102	Probability and Statistics	3 (3+0)
4	MATH-201	Linear Algebra	3 (3+0)

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Major Courses			
#	Code	Course Title	Cr. Hrs.
1	CMPC-102	Programming Fundamentals	4 (3+1)
2	CMPC-106	Digital Logic Design	3 (3+0)
3	CMPC-201	Object Oriented Programming	4 (3+1)
4	CMPC-203	Data Communication & Networking	3 (3+0)
5	CMPC-205	Database systems	4 (3+1)
6	CMPC-202	Data Structure & Algorithms	4 (3+1)
7	CMPC-202	Operating Systems	3 (3+0)
8	CMPC-204	Software Engineering	3 (3+0)
9	CMPC-108	Internship	3 (0+3)

Electives (6 credit Hrs)			
#	Code	Course Title	Cr. Hrs.
1	ITEC-202	Web Systems and Technologies	3 (3+0)
2	ITEC-204	Multimedia Systems and Design	3 (3+0)


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Scheme of Studies for Associate Degree Program of BS Information Technology (Web Engineering)

Semester 1 (15 Cr. Hrs.)	Semester 2 (17 Cr. Hrs.)	Semester 3 (17 Cr. Hrs.)	Semester 4 (15 Cr. Hrs.)
Semester 1	Semester 2	Semester 3	Semester 4
ICTC-101 3(3+0) Introduction to ICT	CMPC-102 4 (3+1) Programming Fundamentals	CMPC-201 4(3+1) Object Oriented Programming	CMPC-202 4 (3+1) Data Structure & Algorithms
MATH-101 3 (3+0) Calculus and Analytical Geometry	CMPC-104 3 (3+0) Discrete Mathematics	MATH-201 3 (3+0) Linear Algebra	ITEC-202 3 (3+0) Web Systems and Technologies
PHYS-101 3(3+0) Basic Electronics	MATH-102 3 (3+0) Probability & Statistics	ENGL-201 3 (3+0) Technical and Report Writing	ITEC-204 3 (3+0) Multimedia Systems and Design
ENGL-101 3(3+0) Functional English	ENGL-102 3(3+0) Communication Skills	CMPC-203 3 (3+0) Data Communication & Networking	CMPC-202 3 (3+0) Operating Systems
ISLS-101 1(1+0) Islamic Studies /Ethics	CMPC-106 4 (3+1) Digital Logic Design	CMPC-205 4 (3+1) Database Systems	CMPC-204 3 (3+0) Software Engineering
PKST-101 2 (2+0) Pakistan Studies			

* Internship(3 credit hours) will be offered in summer semester


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Course Outlines

Semester 1

Course Title: Introduction to Computing

Course Code: ICTC-101

Course Structure: Lectures: 3, Lab: 1

Credit Hours: 3

Prerequisites: None

Course Objective:

In today's information age, computers are used in almost each and every field of human life: from disease diagnose to design of space ships etc. Objective of this course is to get a breadth first overview of computing and information technology, and to make students productive with widely used software applications and the world wide web.

Course Syllabus:

Software, Hardware, Central Processing Unit, Introduction to Microsoft Office, Input & Output, Storage & Multimedia, Microsoft Word, The Internet, Introduction to internet Explorer, Computer Networks, Spreadsheets & Business Graphics, Programming Languages, Software Engineering, Management Information Systems, Artificial Intelligence, Microsoft Excel, Database Management Systems, Microsoft Access, Microsoft Power Point, Introduction to Web Development, Introduction to HTML, Images & Links, Lists & Tables, Forms, Maps & Frames, Introduction to Microsoft FrontPage, Introduction to JavaScript, E-commerce, Security, Privacy & Cyber-Ethics, Introduction to Programming, Algorithms & Flowcharts, Variables & Data Types, Operators & Precedence, Conditional Statements, Loops, Functions, Arrays, HTML, Tabular Data Control, New hardware/software technologies.

Lab Syllabus:

Microsoft Office

HTML

JavaScript

Textbook(s):

1. Capron, *Computers- Tools for an Information age, Sixth Edition, Prentice Hall*, ISBN 10.0131405640
2. Dietel, *Internet and World Wide Web-How to Program* Prentice Hall, ISBN 10 0131405640

Reference Material

Sanders; *Computers Today*, McGraw Hill, ISBN 9780070547018

Course Title: Calculus and Analytical Geometry

Course Code: MATH-101

Course Structure: Lectures: 3, Labs: 0

Credit Hours: 3

Prerequisites: None

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Course Objectives:

To provide foundation and basic ground for calculus and analytical geometry background.

Course Syllabus:

Real Numbers and the Real Line. Functions. Shifting Graphs, Trigonometric Functions. Limits and Continuity. Tangent Lines. Derivatives. Differentiation Rules. Derivatives of Trigonometric Functions. The Chain Rule. Implicit Differentiation and Rational Exponents. Applications of Derivatives. Integration. Numerical Integration. Applications of Integrals. Transcendental Functions. Inverse Trigonometric Functions. Derivatives of Inverse Trigonometric Functions. Integrals. Hyperbolic Functions. Conic Sections, Parametrized Curves, and Polar Coordinates. Vectors and Analytic Geometry in Space.

Textbook(s):

Calculus and Analytic Geometry by George B. Thomas and Ross L. Finney, Addison Wesley; 10th Edition (1995) ISBN-10: 0201531747

Reference Material:

- Calculus and Analytical Geometry by Swokowski, Olinick and Pence, 6th Edition, (1994), Brooks/Cole Publishers.
 - Calculus by Howard Anton, Irl C. Bivens, Stephen Davis, Wiley; 10th Edition (2012), ISBN-10: 0470647728
 - Calculus with Analytic Geometry: Student Solution Manual by Howard Anton, Wiley; 5th Edition (1995). ISBN-10: 0471105899
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Course Title: Basic Electronics

Course Code: PHYS-101

Course Structure: Lectures: 3 / Labs: 0

Credit Hours: 3

Prerequisites: None

Course Syllabus:

Zero Reference Level, Chassis Ground, Ohm's Law, Linear Resistor, Non-Linear Resistor, Cells in Series and Parallel. Resistive Circuits. Resistors, Inductors, Capacitors, Energy Sources. Magnetism and Electromagnetism. Theory of Solid State. P-N Junction. Forward Biased P-N Junction, Forward V/I Characteristics, Reverse Biased P-N Junction, Reverse Saturation Current, Reverse V/I Characteristics, Junction Breakdown, Junction Capacitance. Optoelectronics— Devices. Spectral Response of Human Eye, Light Emitting Diode (LED), Photoemissive Devices, Photomultiplier Tube, Photovoltaic Devices, Bulk Type Photoconductive Cells, Photodiodes, P-N Junction Photodiode, PIN Photodiode, and Avalanche Photodiode. DC Power Supplies. Rectifiers. Filters, Voltage Multipliers, Silicon Controlled Rectifier SCR. The Basic Transistor. Transistor Biasing, Transistor Circuit Configuration. Modulation and Demodulation. Carrier Waves, Modulation, Demodulation Or Detection, Integrated Circuits. Operational Amplifier. Fiber Optics.

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Textbook(s):

- Basic Electronics Solid State by B. L. Theraja, S Chand & Co Ltd, 5th Edition, 2007, ISBN-13: 978-8121925563

Reference Material:

- Electronic Principles by Albert Paul Malvino, Sixth Edition, 1999, ISBN 0-07-115604-6

Course Title: Functional English**Course Code: ENGL-101****Course Structure: Lectures: 3/ Labs: 0****Credit Hours: 3****Prerequisites: None****Course Objectives:**

In today's employment market employers are looking for people who can articulate clearly, take and pass on messages, deal with customers effectively, read, understand and follow a wide range of documents and write fluently and accurately, using accepted business conventions of format, spelling, grammar and punctuation. Functional English course is developed to strengthen students' these skills which enable them to deal with the practical problems and challenges of life – at home, in education and at work.

Course Syllabus:

Punctuation. Writing Mechanics. Vocabulary: Frequently Confused Words, Frequently Misused Words, Phrases, Synonyms, Antonyms, Idioms, General Vocabulary. Use Of Articles and One, A Little/ A Few, This, That, Care, Like, Love, Hate, Prefer, Wish, All, Each, Every, Both, Neither, Either, Some, Any, No, None. Interrogatives. Kinds of Nouns. Prepositions. Possessive, Personal, Reflexive, and Relative Pronouns and Clauses. Classes of Verbs. Usage of May, Can, Ought, Should, Must, Have To, Need for Obligation; Must, Have, Will and Should. The Auxiliaries Dare and Used. Present, Past, Future and Perfect Tenses. The Gerund & The Participles. Commands, Requests, Invitations, Advice, Suggestions. The Subjunctive. The Passive Voice; Indirect Speech, Conjunctions, Purpose. Clauses: Noun Clauses; Clauses of Reason, Result, Concession, Comparison, Time. Numerals, Dates, and Weights and Measures. Spelling Rules. Phrasal Verbs.

Textbook(s):

1. A Practical English Grammar by A. J. Thomson and A. V. Martinet, 4th Edition Oxford University Press (1986).
2. Basic English Usage by Michael Swan, Oxford UnivPr (Sd) (January 1986). ISBN-10: 0194311872

Reference Material:

- Functional English In Aglobal Society: Vocabulary Building and Communicative Grammar by Nicanor L. Guintomary Ann R. Sibal Brian D. Villaverde Dept. of Lan-guages, Literature and Humanities College of Arts and Sciences Southern Luzon State University (2012).

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- AQA Functional English Student Book: Pass Level 2 by Mr David Stone, Heinemann; 1st Edition (28 Jun 2010). ISBN-10: 0435151401
- English Composition and Grammar: Complete Course by John E. Warriner, Harcourt Brace Jovanovich; Complete Course Benchmark Edition (January 1988). ISBN-10: 0153117362
- Companion to English: Vocabulary (Learners Companion) by George Davidson, Prim-Ed Publishing (March 1, 2003). ISBN-10: 9814070904
- Word Power Made Easy by Norman and Lewis, Goyal Publishers (September 1, 2009). ISBN-10: 8183071007
- 1000 Most Important Words by Norman W. Schur, Ballantine Books (July 12, 1982). ISBN-10: 0345298632
- High School English Grammar and Composition by P.C Wren, Chand & Co (July 13, 2008). ISBN-10: 812192197X Irregular Verbs.

Course Title: Islamic Studies

Course Code: ISLS-101

Course Structure: Lectures: 1 / Labs: 0

Credit Hours: 1

Prerequisites: None

Course Objectives:

This course provides a comprehensive knowledge of Islam. It covers the basic beliefs and practice of Islam. This course is intended to familiarize students with a range of most important Islamic beliefs, practices and issues. It should equip them to recognize, understand and appreciate the different dimensions of Islam that they will encounter in their practical life.

Course Syllabus:

In this course : Aqeedah , Tawheed , Risalah and Al-Akhirak , Tahara , Salah , Qadda , Qasar (shortening) and Jama (joining) , Sawam (Fasting), Salah at-Taraweeh (The night Prayer) , Zakaah , Hajj , Jihd , Birth , Tehneek , Aqeeqah , and Circumcision (Khittaam) , Death , The Funeral Nemaz , Burial , Food and Dress / adornment , Male / Female Relationship , Social Interaction , Between Men and Women , Marriage (Nikah) , Rights and Obligations of the spouses , The Law of Divorce , Inheritance , Crime and Punishment , Islamic Economics and Finance , Contemporary issues , Moral / Manners , Concepts of Taqwa , Tazkiyah , Ihsan , Huqooq Ullah , Huqooq ul-Ibad,

Text Book:

Dr.Muhammad Hamidullah , *Introduction to Islam*

Reference Materials:

- Marwan Ibrahim al-qasy *Morals and manners in Islam, The Islamic Foundation , United Kingdom 1991.*
 - Muhammad Yousuf Islahi , *etiquettes of life in Islam* , markari Maktabah Islami Publishers , New delhi , 2003.
 - Dr. Abu Ameenah Bilal Philips , (The foundation of Islamic studies)
 - John Esposito , *Islam : The straight Path*
 - Abul A'la Mawdudi , *Al-Jihad fil Islam*
 - Dr. Abu Ameenah Bilal Philips , (*The Funeral rights in Islam*)
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- Abul A'la Mawdudi , *Human Rights in Islam*
 - Abul A'la Mawdudi , *Ethical Viewpoint of Islam*
 - Muhammad Akram Khan , *An Introduction In Islamic Ecenomics.*
 - Khursheed Ahmad, *Studies in Islamic Economics.*
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Course Title: Pakistan Studies

Course Code: PKST-101

Course Structure: Lectures: 2/ Labs:0

Credit Hours: 2

Prerequisites:None

Course Objectives:

Develop vision of historical perspective, government, politics, contemporary Pakistan, ideological background of Pakistan. Study the process of governance, national development, issues arising in the modern age and posing challenges to Pakistan.

Course Syllabus:

Students will learn the reason behind the achievement of Pakistan following topics will be covered in the course: Historical background of Pakistan, Muslim Society in Indo-Pakistan, Ideology of Pakistan, Two nation theory, The movement led by the society, The downfall of Islamic society, Establishment of British Raj-Causes consequences, Political evolution of Muslims in the twentieth Century, Sir Syed Ahmed Khan, Muslim league, Nehru, Allama Iqbal, Independence movement, Lahore Resolution, Pakistan Culture and Society Constitutional and Administrative issues, Pakistan and its Geo-political dimensions, Pakistan and international affairs, Pakistan and the challenges ahead.

Text Book:

Dr.Muhammad Sarwar, *A text book of Pakistan Studies, Ilmi Kitab Khana, Urdu Bazar, Lahore,2003.*

Reference materials:

Ikram-ul-Haq Raja *Pakistan studies, Azeem Academy, Urdu Bazar , Lahore , 2001.*

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Semester 2

Course Title: Programming Fundamentals

Course Code: CMPC-102

Course Structure: Lectures: 3, Lab 1

Credit Hours: 4

Prerequisites: None

Course Objectives:

The course is designed to familiarize students with the basic structured programming skills. It emphasizes upon problem analysis, algorithm designing, and program development and testing.

Course Syllabus:

Overview of Computer Programming. Principles of Structured and Modular Programming. Overview of Structured Programming Languages. Algorithms and Problem Solving. Program Development: Analyzing Problem, Designing Algorithm/Solution, Testing Designed Solution. Translating Algorithms into Programs. Fundamental Programming Constructs. Data Types. Basics of Input and Output. Selection and Decision (If, If-Else, Nested If-Else, Switch Statement and Condition Operator). Repetition (While and For Loop, Do-While Loops), Break Statement, Continues Statement. Control Structures. Functions. Arrays. Pointers. Records. Files. Testing & Debugging.

Textbook(s):

C How to Program by Paul Deitel and Harvey Deitel, Prentice Hall; 7th Edition (March 4, 2012)

Reference Material:

Programming in C by Stephen G. Kochan, Addison-Wesley Professional; 4 edition (September 25, 2013). ISBN-10: 0321776410

Course Title: Discrete Structures

Course Code: CMPC-104

Course Structure: Lectures: 3 / Labs: 0

Credit Hours: 3

Prerequisites: None

Course Objectives:

The course provides a solid theoretical foundation of discrete structures as they apply to Computer Science problems and structures. The students will learn how to use mathematical notation and solve problems using mathematical tools.

Course Syllabus:

Logic: Propositional Equivalences, Predicates and Quantifiers, Nested Quantifiers, Methods of Proof. Sets & Functions. Algorithms: the Growth of Functions, Complexity of Algorithms, the Integers and Division, Matrices. Number Theory and Cryptography. Mathematical Reasoning:

Proof Strategy, Sequences and Summations, Mathematical Induction, Recursive Definitions and Structural Induction, Recursive Algorithms, Program Correctness. The Basics of Counting: The Pigeonhole Principle, Permutations and Combinations, Binomial Coefficients, Generalized Permutations and Combinations, Generating Permutations and Combinations. Advanced Counting Techniques: Recurrence Relations, Solving Recurrence Relations, Divide-and-Conquer Algorithms and Recurrence Relations, Generating Functions, Inclusion-Exclusion & its Application. Relations and Their Properties, n-ary Relations and Their Applications, Representing Relations, Closures of Relations, Equivalence Relations, Partial Orderings. Graph: Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest-Path Problems, Planar Graphs, Graph Coloring. Trees: Applications of Trees, Tree Traversal, Spanning Trees, Minimum Spanning Trees.

Textbook(s):

Discrete Mathematics and Its Applications by Kenneth H. Rosen, McGraw-Hill Science/Engineering/Math; 7th Edition (2011). ISBN-10: 0073383090

Reference Material:

- Discrete Mathematics by Richard Johnsonbaugh, Pearson; 7th Edition (January 8, 2008). ISBN-10: 0131593188
- Discrete Algorithmic Mathematics by Stephen B. Maurer and Anthony Ralston, A K Peters/CRC Press; 3rd Edition (August 2004). ISBN-10: 1568811667
- Discrete Mathematical Structures by Bernard Kolman, Robert Busby and Sharon C. Ross, Pearson; 6th Edition (2008). ISBN-10: 0132297515
- Discrete Mathematics with Ducks by sarah-marieBelcastro, A K Peters/CRC Press; 1st Edition (June 21, 2012). ISBN-10: 1466504994.

Course Title: Probability and Statistics

Course Code: MATH-102

Course Structure: Lectures: 3/ Labs: 0

Credit Hours: 3

Prerequisites: None

Course Objectives:

To introduce the concepts of data analysis, presentation, counting techniques, probability and decision making

Course Syllabus:

Statistics and Data Analysis. Collection of Data. Measures of Location. Measures of Variability. Discrete and Continuous Data. Statistical Modeling. Scientific Inspection, and Graphical, General Types of Statistical Studies. Probability. Random Variables and Probability Distributions. Mathematical Expectation. Discrete Probability Distributions. Continuous Probability Distributions. Fundamental Sampling Distributions and Data Descriptions. One and Two-Sample Estimation Problems. Single Sample Estimating. One- and Two-Sample Tests of

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Hypotheses. Sample Tests. Simple Linear Regression and Correlation. Multiple Linear Regression and Certain

Textbook(s):

Probability and Statistics for Engineers and Scientists by Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers and Keying E. Ye, Pearson; 9th Edition (January 6, 2011). ISBN-10: 0321629116

Reference Material:

- Probability and Statistics for Engineers and Scientists by Anthony J. Hayter, Duxbury Press; 3rd Edition (February 3, 2006), ISBN-10: 0495107573
 - Schaum's Outline of Probability and Statistics, by John Schiller, R. AluSrinivasan and Murray Spiegel, McGraw-Hill; 3rd Edition (2008). ISBN-10: 0071544259
 - Probability: A Very Short Introduction by John Haigh, Oxford University Press (2012). ISBN-10: 0199588481
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Course Title: Communication Skills

Course Code: ENGL-102

Course Structure: Lectures: 3/ Labs: 0

Credit Hours: 3

Prerequisites: None

Course Objectives:

- To sensitize students to their communicative behavior
- To enable them to reflect and improve on their communicative behavior/performance
- To build capacities for self-criticism and facilitate growth
- To lead students to effective performances in communication

Course Syllabus:

Communication. The Communication Process. Perspectives in Communication. Internal Representation. Elements of Communication. Listening.Expressing.Clarifying Language. Making Contact. Prejudgment. Influencing Others. Public Speaking. Preparing a Formal Oral Presentation. Delivering Presentation .Interviewing .Effective written Communication. Building Rapport

Textbook(s):

1. Effective Communication Skills, MTD Training & Ventus Publishing ApS.(2010) ISBN 978-87-7681-598-1 (TB1)
2. Messages: The Communication Skills Book by Matthew McKay PhD , Martha Davis PhD, and Patrick Fanning, New Harbinger Publications; Third Edition (March 3, 2009). ISBN-10: 1572245921
3. Secrets of Successful Presenters: A Guide for Successful Presenters by Dr. M. A. Pasha & Dr. S. Pasha, Lambert Academic Publishing (2012). ISBN-10:3659217557

Reference Material:

- Communication Skills in English by Prof P N Kharu, Dr. Varinder Gandhi Publisher: Laxmi. EAN: 9788131806920
- Essential Communication Skills: Teacher Edition with Talking Points by Patty Ann, Patty Ann; 1st Edition (July 5, 2012). ASIN: B008HYUDWQ
- Communication Skills Magic: Improve Your Relationships & Productivity through Better Understanding Your Personality Style and the Personality Styles of Those Around You by E.G. Sebastian, CreateSpace Independent Publishing Platform (January 5, 2010). ISBN-10: 1450513344
- People Skills: How to Assert Yourself, Listen to Others, and Resolve Conflicts by Robert Bolton, Touchstone (June 6, 1986). ISBN-10: 067162248X
- The Handbook of Communication Skills by Owen Hargie, Routledge; 4th Edition, Taylor & Francis, (12-Oct-2012).

Course Title: Digital Logic and Design**Course Code: CMPC-106****Course Structure: Lectures: 3/Labs: 0****Credit Hours: 3****Prerequisites: None****Course Objectives:**

The course introduces students with digital circuit of large complexity and how such circuits could be built in a methodological way, starting from Boolean logic and applying a set of rigorous techniques.

Course Syllabus:

Number Systems: Digital Systems, Number Systems and Codes. Unweighted Codes, Binary Storage and Registers, Binary Logic. Boolean Algebra and Logic Gates, Boolean Functions, Canonical and Standard Forms. Digital Logic Gates. Integrated Circuits. Gate-Level Minimization: The Map Method, Product of Sums Simplification, Don't-Care Conditions, NAND and NOR Implementation, Exclusive-OR Function, Karnaugh Maps, Quine Mc-Cluskey Method. Combinational Logic: Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier. Magnitude Comparator. Decoders. Encoders. Multiplexers. Synchronous Sequential Logic: Sequential Circuits, Latches, Flip-Flops, Registers and Counters. Memory and Programmable Logic: Random-Access Memory. Memory Decoding. Error Detection and Correction. Read-Only Memory. Programmable Logic Array.

Textbook(s):

Digital Fundamentals by Thomas L. Floyd, Prentice Hall; 9th edition (2007)

Reference Material:

- Digital Fundamentals: A Systems Approach by Thomas L. Floyd, Prentice Hall; 1 edition (July 13, 2012)
- Digital Design, by M. Morris Mano, Michael D. Ciletti, 4th Edition, Prentice Hall (2007). ISBN-10: 0131989243
- Digital Design by Franc Vahid, Wiley; 1st Edition (July 28, 2006). ISBN-10: 0470044373

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- Fundamentals of Logic Design by Jr. Charles H. Roth and Larry L Kinney, CL Engineering; 6th Edition (March 13, 2009). ISBN-10: 0495471690

Semester 3

Course Title: Object Oriented Programming

Course Code: CMPC-201

Course Structure: Lectures: 3 / Labs: 1

Credit Hours: 4

Prerequisites: CMPC-201(Programming Fundamentals)

Course Objectives:

The course aims to develop students 'Object Oriented Programming skills.

Course Syllabus:

Objects and Classes, Abstraction, Encapsulation, Final Classes, Nested and Inner Classes, Inheritance, Abstract Classes, Concrete Classes, Inheritance and Encapsulation.is-a Relationship, Inheritance via Abstract Classes, Extending the Hierarchy, Upcasting and Downcasting, Interfaces. Composition, has-a Relationship. Polymorphism. Polymorphism, Dynamic (or Late) Binding. Interfaces and Polymorphism. The Wrapper Classes, Boxing and Un-Boxing, Packages. Exceptions and Exception Handling File Systems and Paths, File and Directory Handling and Manipulation, Input/output Streams, Reading Binary Data, Writing binary Data, Writing Text(Character), Reading Text(Character), Logging with Print Stream, Random Access Files, Object Serialization. Collections, for-each Loop. GUI Concepts, Components and Containers, Abstract Windows Toolkit and Swing, Windows and Frames, Layout Managers, Panels. Event-Driven Programming, The delegation Event Model. Event Classes, Mouse Events, Keyboard Events, Using Actions. Component and JComponent, Buttons, Labels, Text Fields, Text Areas, Dialog Boxes, Checkboxes and Radio Buttons, Menus, JSlider, JTabbedPane.

Textbook(s):

1. Java Programming: From the Ground Up by Ralph Bravaco and Shai Simonson, McGraw-Hill Higher Education New York, 2010, ISBN 978-0-07-352335-4
2. Ivor Horton's Beginning Java by Ivor Horton, John Wiley & Sons, Inc, 7th Edition, 2011, ISBN: 978-0-470-40414-0

Reference Material:

- JavaTM Programming by Joyce Farrell, 6th Edition, Cengage Learning, 2012, ISBN13:978-1-111-52944-4
- JavaTM How to Program by Paul Deitel and Harvey Deitel, Pearson, 9th Edition, 2012, ISBN-13:978-0-13-257566-9

Course Title: Linear Algebra**Course Code: MATH-201****Course Structure: Lectures: 3/ Labs: 0****Credit Hours: 3****Prerequisites: None****Course Objectives:**

To provide fundamentals of solution for system of linear equations, operations on system of equations, matrix properties, solutions and study of their properties.

Course Syllabus:

Introduction to Vectors. Solving Linear Equations. Elimination = Factorization. Vector Spaces and Subspaces. Orthogonally. Determinants. Eigen values and Eigenvectors. Graphs and Networks, Markov Matrices, Population, and Economics. Linear Programming. Fourier series. Linear Algebra for Functions, Linear Algebra for Statistics and Probability, Computer Graphics. Numerical Linear Algebra. Complex Vectors and Matrices. Discrete Transforms and Simple Applications.

Textbook(s):

- Introduction to Linear Algebra by Gilbert Strang, Wellesley Cambridge Press; 4th Edition (February 10, 2009). ISBN-10: 0980232716

Reference Material:

- Elementary Linear Algebra with Applications by Bernard Kolman, David Hill, 9th Edition, Prentice Hall PTR, 2007. ISBN-10: 0132296543
- Strang's Linear Algebra And Its Applications by Gilbert Strang, Strang, Brett Coonley, Andy Bulman-Fleming, Andrew Bulman-Fleming, 4th Edition, Brooks/Cole, 2005
- Elementary Linear Algebra: Applications Version by Howard Anton, Chris Rorres, 9th Edition, Wiley, 2005.
- Linear Algebra and Its Applications by David C. Lay, 2nd Edition, Addison-Wesley, 2000.
- Linear Algebra by Harold M. Edwards, Birkhäuser; 1st Edition (2004). ISBN-10: 0817643702
- Linear Algebra: A Modern Introduction by David Poole by Brooks Cole; 3rd Edition (May 25, 2010). ISBN-10: 0538735457

Course Title: Technical and Report Writing**Course Code: ENGL-201****Course Structure: Lectures: 3/ Labs: 0****Credit Hours: 3****Prerequisites: None****Course Objectives:**

To effectively plan and structure technical reports and to recognize the various stages in writing a technical report.

Course Syllabus:

WJ

Writing for Readers Academic, Public, and Work Communities Analyzing Electronic Communities Discovering and Planning. Purpose, Thesis, and Audience Drafting. Revising, Editing, and Proofreading. Paragraphs, Clear and Emphatic Sentences, Reasoning Critically Reading Critically Arguing Persuasively Designing Documents Writing in Online Communities Speaking Effectively. Academic Writing for Social and Natural Sciences. Public Writing. Researching and Writing.

Textbook(s):

Writer's Companion – The Longman by Chris M. Anson, Robert A. Schwegler and Marcia F. Muth, Pearson Longman, 4th Edition (2007) . ISBN10: 0-20556-252-3

Reference Material:

- Technical English: Writing, Reading, and Speaking by Pickett and Laster. 8th Edition
 - The Technical Writer's Companion by Alfred, Gerald, Charles T. Brusaw and Walter E. Oliu, 3rd Edition. ISBN 0-312-25978-6.
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Course Title: Data Communication and Networks

Course Code: CMPC-203

Course Structure: Lectures: 3/ Labs: 0

Credit Hours: 3

Prerequisites: None

Course Objectives:

To introduce students with concepts related to computer communication, analogue & digital Transmission, network layers, network models (OSI, TCP/IP) and protocol standards. Emphasis is given on the understanding of modern network concepts.

Course Syllabus:

Introduction to Data Communications, Communications Models, Data Networking, and the Internet. Protocol & Architecture. Data Transmission. Signal Encoding Techniques. Digital Data Communication Techniques. Data Link Control Protocols. Multiplexing. Circuit Switching and Packet Switching. Cellular Wireless Networks Technology & Protocols. Local Area Network Technology & Protocols. Ethernet Technology & Protocols. Wireless LANs: Wireless LAN Technology and Protocols.

Textbook(s):

Data and Computer Communications by William Stallings, Prentice Hall; 9th Edition (August 13, 2010). ISBN-10: 0131392050

Reference Material:

- Data Communications and Networking by Behrouz Forouzan, 4th Edition (2007). ISBN 978-007-125442-7
- Computer Networks by Andrew S. Tanenbaum and David J. Wetherall, Prentice Hall; 5 th Edition (October 7, 2010). ISBN-10: 0132126958

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- Computer Networks and Internets by Douglas E. Comer, Prentice Hall; 5th Edition (April 28, 2008). ISBN-10: 0136066984

Course Title: Database Systems

Course Code: CMPC-205

Course Structure: Lectures: 3/ Labs: 1

Credit Hours: 4

Prerequisites: None

Course Objectives:

The course aims to introduce basic database concepts, different data models, data storage and retrieval techniques and database design techniques. The course primarily focuses on relational data model and DBMS concepts.

Course Syllabus:

Basic Concept: File Processing & Database Approach, Database Applications, Advantages of the DB, Components of the DB Environment, and Evolution of DBs. Database Architecture: DB Development Process, Three Schema Architecture, Data Modeling. Logical Design: E-R Modeling (Entities, Attributes, Relationships; Cardinality Constraints). RDBMS: Logical View of Data, Relational Data Model, Constraints, Transforming ERD/EERD into Relations. The Relational Model: Types, Relations, Relational Algebra, Relational Calculus, Integrity. Normalization. EE-R Diagrams: Development & Constraints, DB Design Life Cycle. DB Development & Management: Introduction to SQL and Basic Commands, SQL Integrity Constraints. Physical DB Design, DB architecture, Query Optimization. SQL Commands: Saving, Listing, Editing, Restoring Table Contents; Logical Operators, Management Commands, Arithmetic Operators, Complex Queries and SQL Functions, Aggregate Function, Grouping Functions, Virtual Tables, Views, Indexes, Joins. Client-Server & Distributed Environment, ODBC, Bridges, and Connectivity Issues. Concurrency Control with Locking, Serializability, Deadlocks, Database Recovery Management. Distributed Processing and Distributed Databases, DDBMS: Evolution, Architecture, Components, Advantages, Security and Authorization. Physical Design: Storage and File Structure, Efficiency and Tuning.

Textbook(s):

1. Modern Database Management by Fred McFadden, Jeffrey Hooper, Mary Prescott, Prentice Hall; 11th Edition (July 26, 2012). ISBN-10: 0132662256
2. Database Systems: A Practical Approach to Design, Implementation, and Management, 4th Edition, Thomas Connolly, Carolyn Begg, Addison Wesley, 2005.
3. Introduction to Oracle: SQL and PL/SQL ISBN-10: 0131453203

Reference Material:

- Database Design and Relational Theory: Normal Forms and All That Jazz by C. J. Date, O'Reilly Media; 1st Edition (April 24, 2012). ISBN-10: 1449328016
- Fundamentals of Database Systems by R. Elmasri and S. Navathe. 6th Edition, Addison-Wesley (2010). ISBN-10: 0136086209

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- Database System Concepts by Abraham Silberschatz, Henry F. Korth and S. Sudarshan. McGraw-Hill; 6th Edition (2010). ASIN: B004Y3YXK2
 - Database Systems: a Practical Approach to Design, Implementation and Management by T.Connolly and C.Begg, Addison-Wesley; 5th Edition (2009). ISBN-10: 0321523067
 - Modern Database Management System by Fred, Jeffery A. Hoffer
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Semester 4

Course Title: Data Structures and Algorithms

Course Code: CMPC-202

Course Structure: Lectures: 3 / Labs: 1

Credit Hours: 4

Prerequisites: CMP-1123 (Object Oriented Programming)

Course Objectives:

This course provides an introduction to the theory, practice and methods of data structures and algorithm design. Students will learn elementary data structures such as stacks, queues, linked lists, sequences, trees and graphs in Java language, and the algorithms designed for manipulating these data structures

Course Syllabus:

Introduction to Data Structure, primitive Java, Reference Types, Algorithm Analysis. Java collections API (The Java Collections Framework). Recursion, Sorting Algorithms: Bubble Sort, Selection Sort, Insertion Sort, Shell Sort, Merge Sort, Quick Sort, Heap Sort, Speed Limit for comparison Sorts, Radix Sort, Bucket Sort. Randomization. Stack and Queue. Linked Lists. Hash Table. Trees. Binary Search Trees. Priority Queue. Binary Heap. Splay Trees. Merging Priority Queues. Graphs: Simple Graphs, Graph Terminology, Paths and Cycles, Isomorphic Graphs, the Adjacency Matrix for a Graph, the Incidence Matrix for a Graph, the Adjacency List for a Graph, Digraphs, Paths in a Digraph, Weighted Digraphs and Graphs, Euler Paths and Hamiltonian Cycles, Dijkstra's Algorithm, Graph Traversal Algorithms. Data Structure Applications: Balanced-Symbol Checker, A simple Calculator, File Compression, A cross-reference generator, The Josephus problem. Event-Driven Simulation.

Textbook(s):

- Data Structures & Problem Solving Using Java by Mark Allen Weiss, Addison-Wesley, 4th Edition (October 7, 2009). ISBN-10: 0321541405
- Schaum's Outline of Data Structures with Java by John Hubbard, McGraw-Hill; 2nd Edition (May 26, 2009). ASIN: B0035X1BQ6

Reference Book(s):

- Data Structures: Abstraction and Design Using Java by Koffman and Wolfgang, Wiley; 2nd Edition (January 26, 2010). ISBN-10: 0470128704
 - Data Structures and Algorithm Analysis in Java by Mark Allen Weiss, Prentice Hall; 3rd Edition (November 28, 2011). ISBN-10: 0132576279
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Course Title: Web Systems and Technologies

Course Code: ITEC-202

Course Structure: Lectures: 3 / Labs: 0

Credit Hours: 3

Prerequisites: CMP-2122 (Programming Fundamentals)

Course Objectives: To introduce students with Web Systems and Technologies.

Course Syllabus:

Overview of WWW, Web Pages, Web Sites, Web Applications, TCP/IP, TCP/IP Application, Services, Web Servers, WAMP Configuration. Introduction to HTTP, HTML & HTML5 Tags, and Dynamic Web Content. CSS and CSS3. Client Side Programming: JavaScript: Basics, Expressions and Control Flow, Functions, Objects, and Arrays, Accessing CSS from JavaScript. Form Handling. Server Side Programming: Programming in PHP. Introduction MySQL, MySQL Functions, Accessing MySQL via php MyAdmin. Cookies, Sessions, and Authentication. Introduction to XML, Ajax, JQuery, Browsers and the DOM. Designing a Social Networking Site.

Textbook(s):

Learning PHP, MySQL, JavaScript, and CSS, A Step-by-Step Guide to Creating Dynamic Websites By Robin Nixon, O'Reilly Media; Second Edition edition (September 3, 2012). ISBN-10: 1449319262

Reference Material:

- Web Technologies: A Computer Science Perspective by Jeffrey C. Jackson, Prentice Hall; 1st Edition (August 27, 2006). ISBN-10: 0131856030
- Web Technologies by Uttam Kumar Roy, Oxford University Press, USA (June 13, 2011). ISBN-10: 0198066228
- Web Application Architecture: Principles, protocols and practices by Leon Shklar and Richard Rosen, Wiley; 2nd Edition (May 5, 2009). ISBN-10: 047051860X

Course Title: Multimedia Systems and Design

Course Code: ITEC-204

Course Structure: Lectures: 3/ Lab: 0

Credit Hours: 3

Prerequisites: None

Course Objectives: The course introduces students with the complete process of multimedia system specifications, formats, design, testing, and prototyping, including the tools and techniques for integrating multimedia content into a product.

Course Syllabus: What is Multimedia? Text, Multimedia Authoring and Tools, Multimedia Authoring, Multimedia Production, Multimedia Presentation, Automatic Authoring; Editing and Authoring Tools- (Adobe Premiere, Macromedia Director, Macromedia Flash, Dreamweaver), VRML, Handling Images, Sound, Making Animation and Video, Making Multimedia, Multimedia Skills, Planning and Costing, Designing and Producing, Content and Talent, The Internet and Multimedia, Designing for the World Wide Web, Delivering Multimedia Product.

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Text book(s):

1. Multimedia Making It Work Eighth Edition by Tay Vaughan, McGraw-Hill Osborne Media; 8 Edition (October 29, 2010). ISBN-10: 0071748466
2. Fundamentals of Multimedia by Z. M. Li and M. S. Drew, Prentice Hall (2004), ISBN: 0-13-127256-X

Reference Material:

- Digital Multimedia by N. Chapman and J. Chapman. 2nd Edition, Wiley 2004, ISBN: 0-470-85890-7
- The Technology of Video and Audio Streaming by David Austerberry, Focal Press; 2nd Edition (2004). ISBN-10: 0240805801
- Multimedia Security: Watermarking, Steganography, and Forensics by Frank Y. Shih, CRC Press; 1st Edition (2012), ISBN-10: 1439873313
- Multimedia Computing by Daniel Cunliffe and Geoff Elliott, Lexden Publishing Ltd. (2005). ISBN-10: 1904995055
- Multimedia Foundations: Core Concepts for Digital Design by Vic Costello, Ed Youngblood and Susan Youngblood, Focal Press; 1st Edition (2012). ISBN-10: 0240813944

Course Title: Operating Systems**Course Code: CMPC-202****Course Structure: Lectures: 3/ Labs: 0****Credit Hours: 3****Pre-requisites: None****Course Objectives:**

To help students gain a general understanding of the principles and concepts governing the functions of operating systems and acquaint students with the layered approach that makes design, implementation and operation of the complex OS possible.

Course Syllabus:

Computing Environments. Types and Generation of Operating-System. Key Components. Virtual Machines, System Calls, System Boot, System Programs. Processes, Process Scheduling, Operations on Processes, Inter-process Communication, Communication in Client-Server Systems. Threads: Multithreading Models, Thread Libraries, Threading Issues. CPU Scheduling, Scheduling Criteria, Scheduling Algorithms. Thread Scheduling, Algorithm Evaluation. Process Synchronization, The Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization. Deadlocks Conditions & Handling. Main Memory Management. Virtual Memory Management. File System and Implementation. I/O Systems: STREAMS, Hardware, Performance, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O Requests to Bibliographical Notes, Hardware Operations. Case studies: Linux, Windows Operating Systems.

Textbook(s):

Operating System Concepts -Essentials by Abraham Silberschatz, Peter B. Galvin and Greg Agne, Wiley; 8th Edition (July 5, 2008). ISBN-10: 0470128720

Reference Material:

- Applied Operating Systems Concepts by Silberschatz A., Peterson, J.L., & Galvin P.C. Wiley; 8th Edition (2011). ISBN-10: 1118112733
 - Modern Operating Systems by Tanenmaum A.S., Prentice Hall; 3rd Edition (2007). ISBN-13: 978-0136006633
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Course Title: Software Engineering

Course Code: CMPC-204

Course Structure: Lectures: 3/ Labs: 0

Credit Hours: 3

Prerequisites: None

Course Objectives:

To study various software development models and software development life cycles. The concepts of project management, change control, process management, software development and testing are introduced through hands-on team Projects.

Course Syllabus:

The Nature of Software, Nature of WebApps, The Software Process, Software Engineering Practice. Generic Process Models. Specialized Process Models. Systems Analysis and Design. Business Information Systems. Introduction to SDLC, SDLC Phases, System Planning, Preliminary Investigation, SWOT Analysis. Strategic Planning. Information Systems Projects. Requirements Engineering. Data & Process Modeling. Design within the Context of Software Engineering. Design Models. System Architecture. Architectural Styles. User Interface Design. Software Quality Assurance. Validation Testing, System Testing, Internal and External View of Testing. Project Management Concepts. Project Scheduling. Risk Management. Maintenance and Reengineering.

Textbook(s):

1. Software Engineering: A Practitioner's Approach by Roger S. Pressman, McGraw-Hill Science/Engineering/Math; 7th Edition (2009). ISBN-10: 0073375977
2. Systems Analysis and Design by Gary B. Shelly, Thomas J. Cashman and Harry J. Rosenblatt, Course Technology; 7th Edition (2007). ISBN-10: 1423912225

Reference Material:

- Software Engineering 8E by Ian Sommerville, Addison Wesley; 8th Edition (2006). ISBN-10: 0321313798
- Systems Analysis and Design by Gary B. Shelly, Thomas J. Cashman and Harry J. Rosenblatt, Course Technology; 7th Edition (2007). ISBN-10: 1423912225

MM

Curriculum for
Associate Degree Program of Information Technology
(Multimedia Systems and Applications)
for
Community Colleges



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Curriculum for Associate Degree Program of Information Technology (Multimedia systems and Applications)

Details of Associate Degree Program

Program's Aims & Objectives

The Associate degree program is designed to help prepare professionals in disciplines of immediate application and relevance to the market. It is equivalent to a Bachelor (Pass) degree. This new and exciting degree program is offered to equip students with skills that enable them to develop enterprise applications using J2EE and android application development. During this study program students will learn installing, Configuring the Android SDK Manager and J2EE Scenarios, J2EE Platform Technologies for enterprise application development.

Program's Outcome

The program will enable the students

1. To design, develop enterprise applications.
2. To develop Android application development.
3. J2EE Scenarios, J2EE Platform Technologies for enterprise application development

Duration

The program shall comprise Four (4) Semesters/Terms spread over Two (2) calendar years with two Semesters/Terms a year as per rules of the University.

Eligibility Criteria

At least 45% marks in Intermediate or equivalent qualification.

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Distribution of Courses

Followings are the distribution of total credit hours:

Distribution of Courses		
Major Areas	No of courses	Credit Hours
Compulsory Courses	7	18
Foundation Courses	4	12
Major Courses + Internship	9	31
Elective Courses	2	6
Total		67

Compulsory Courses (18 Credit Hrs)			
#	Code	Course Title	Cr. Hrs.
1	ENGL-101	Functional English	3 (3+0)
2	ENGL-102	Communication Skills	3 (3+0)
3	ENGL-201	Technical and Report Writing	3 (3+0)
4	ISLS-101	Islamic Studies/ Ethics(Non Muslims)	1 (1+0)
5	PKST-101	Pakistan Studies	2 (2+0)
6	ICTC-101	Introduction to Information & Communication Technologies	3 (3+0)
7	MATH-101	Calculus and Analytical Geometry	3 (3+0)

Foundation Courses (12 Credit Hrs)			
#	Code	Course Title	Cr. Hrs.
1	PHYS-101	Basic Electronics	3 (3+0)
2	CMPC-104	Discrete Mathematics	3 (3+0)
3	MATH-102	Probability and Statistics	3 (3+0)
4	MATH-201	Linear Algebra	3 (3+0)

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Major Courses			
#	Code	Course Title	Cr. Hrs.
1	CMPC-102	Programming Fundamentals	4 (3+1)
2	CMPC-106	Digital Logic Design	3 (3+0)
3	CMPC-201	Object Oriented Programming	4 (3+1)
4	CMPC-203	Data Communication & Networking	3 (3+0)
5	CMPC-205	Database systems	4 (3+1)
6	CMPC-202	Data Structure & Algorithms	4 (3+1)
7	CMPC-204	Operating Systems	3 (3+0)
8	CMPC-206	Software Engineering	3 (3+0)
9	CMPC-108	Internship	3 (0+3)

Electives (6 credit Hrs)			
#	Code	Course Title	Cr. Hrs.
1	ITEC-202	Mobile Application Development	3 (3+0)
2	ITEC-204	Enterprise Application Development	3 (3+0)

LL

Scheme of Studies for Associate Degree Program of BS Information Technology (Multimedia Systems and Applications)

Semester 1 (15 Cr. Hrs.)	Semester 2 (17 Cr. Hrs.)	Semester 3 (17 Cr. Hrs.)	Semester 4 (15 Cr. Hrs.)
Semester 1	Semester 2	Semester 3	Semester 4
ICTC-101 3(3+0) Introduction to ICT	CMPC-102 4 (3+1) Programming Fundamentals	CMPC-201 4(3+1) Object Oriented Programming	CMPC-202 3 (2+1) Data Structure & Algorithms
MATH-101 3 (3+0) Calculus and Analytical Geometry	CMPC-104 3 (3+0) Discrete Mathematics	MATH-201 3 (3+0) Linear Algebra	ITEC-202 3 (3+0) Mobile Application Development
PHYS-101 3(3+0) Basic Electronics	MATH-102 3 (3+0) Probability & Statistics	ENGL-201 3 (3+0) Technical and Report Writing	ITEC-204 3 (3+0) Enterprise Application Development
ENGL-101 3(3+0) Functional English	ENGL-102 3(3+0) Communication Skills	CMPC-203 3 (3+0) Data Communication & Networking	CMPC-204 3 (3+0) Operating Systems
ISLS-101 1(1+0) Islamic Studies /Ethics	CMPC-106 4 (3+1) Digital Logic Design	CMPC-205 4 (3+1) Database Systems	CMPC-206 3 (3+0) Software Engineering
PKST-101 2 (2+0) Pakistan Studies			

*** Internship will be offered in summer semester**


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Course Outlines

Semester 1

Course Title: Introduction to Computing

Course Code: ICTC-101

Course Structure: Lectures: 3, Lab: 0

Credit Hours: 3

Prerequisites: None

Course Objective:

In today's information age, computers are used in almost each and every field of human life: from disease diagnose to design of space ships etc. Objective of this course is to get a breadth first overview of computing and information technology, and to make students productive with widely used software applications and the world wide web.

Course Syllabus:

Software, Hardware, Central Processing Unit, Introduction to Microsoft Office, Input & Output, Storage & Multimedia, Microsoft Word, The Internet, Introduction to internet Explorer, Computer Networks, Spreadsheets & Business Graphics, Programming Languages, Software Engineering, Management Information Systems, Artificial Intelligence, Microsoft Excel, Database Management Systems, Microsoft Access, Microsoft Power Point, Introduction to Web Development, Introduction to HTML, Images & Links, Lists & Tables, Forms, Maps & Frames, Introduction to Microsoft FrontPage, Introduction to JavaScript, E-commerce, Security, Privacy & Cyber-Ethics, Introduction to Programming, Algorithms & Flowcharts, Variables & Data Types, Operators & Precedence, Conditional Statements, Loops, Functions, Arrays, HTML, Tabular Data Control, New hardware/software technologies.

Lab Syllabus:

Microsoft Office

HTML

JavaScript

Textbook(s):

1. Capron, *Computers- Tools for an Information age, Sixth Edition, Prentice Hall*, ISBN 10.0131405640
2. Dietel, *Internet and World Wide Web-How to Program* Prentice Hall, ISBN 10.0131405640

Reference Material

Sanders; *Computers Today*, McGraw Hill, ISBN 9780070547018

Course Title: Calculus and Analytical Geometry

Course Code: MATH-101

Course Structure: Lectures: 3, Labs: 0

Credit Hours: 3

Prerequisites: None

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Course Objectives:

To provide foundation and basic ground for calculus and analytical geometry background.

Course Syllabus:

Real Numbers and the Real Line. Functions. Shifting Graphs, Trigonometric Functions. Limits and Continuity. Tangent Lines. Derivatives. Differentiation Rules. Derivatives of Trigonometric Functions. The Chain Rule. Implicit Differentiation and Rational Exponents. Applications of Derivatives. Integration. Numerical Integration. Applications of Integrals. Transcendental Functions. Inverse Trigonometric Functions. Derivatives of Inverse Trigonometric Functions. Integrals. Hyperbolic Functions. Conic Sections, Parametrized Curves, and Polar Coordinates. Vectors and Analytic Geometry in Space.

Textbook(s):

Calculus and Analytic Geometry by George B. Thomas and Ross L. Finney, Addison Wesley; 10th Edition (1995) ISBN-10: 0201531747

Reference Material:

- Calculus and Analytical Geometry by Swokowski, Olinick and Pence, 6th Edition, (1994), Brooks/Cole Publishers.
 - Calculus by Howard Anton, Irl C. Bivens, Stephen Davis, Wiley; 10th Edition (2012), ISBN-10: 0470647728
 - Calculus with Analytic Geometry: Student Solution Manual by Howard Anton, Wiley; 5th Edition (1995). ISBN-10: 0471105899
-

Course Title: Basic Electronics

Course Code: PHYS-101

Course Structure: Lectures: 3 / Labs: 0

Credit Hours: 3

Prerequisites: None

Course Syllabus:

Zero Reference Level, Chassis Ground, Ohm's Law, Linear Resistor, Non Linear Resistor, Cells in Series and Parallel. Resistive Circuits. Resistors, Inductors, Capacitors, Energy Sources. Magnetism and Electromagnetism. Theory of Solid State. P-N Junction. Forward Biased P-N Junction, Forward V/I Characteristics, Reverse Biased P-N Junction, Reverse Saturation Current, Reverse V/I Characteristics, Junction Breakdown, Junction Capacitance. Optoelectronics Devices. Spectral Response of Human Eye, Light Emitting Diode (LED), Photoemissive Devices, Photomultiplier Tube, Photovoltaic Devices, Bulk Type Photoconductive Cells, Photodiodes, P-N Junction Photodiode, PIN Photodiode, and Avalanche Photodiode. DC Power Supplies. Rectifiers. Filters, Voltage Multipliers, Silicon Controlled Rectifier SCR. The Basic Transistor. Transistor Biasing, Transistor Circuit Configuration. Modulation and Demodulation. Carrier Waves, Modulation, Demodulation Or Detection, Integrated Circuits. Operational Amplifier. Fiber Optics.

Textbook(s):

- Basic Electronics Solid State by B. L. Theraja, S Chand & Co Ltd, 5th Edition, 2007, ISBN-13: 978-8121925563

Reference Material:

- Electronic Principles by Albert Paul Malvino, Sixth Edition, 1999, ISBN 0-07-115604-6

Course Title: Functional English**Course Code: ENGL-101****Course Structure: Lectures: 3/ Labs: 0****Credit Hours: 3****Prerequisites: None****Course Objectives:**

In today's employment market employers are looking for people who can articulate clearly, take and pass on messages, deal with customers effectively, read, understand and follow a wide range of documents and write fluently and accurately, using accepted business conventions of format, spelling, grammar and punctuation. Functional English course is developed to strengthen students' these skills which enable them to deal with the practical problems and challenges of life – at home, in education and at work.

Course Syllabus:

Punctuation. Writing Mechanics. Vocabulary: Frequently Confused Words, Frequently Misused Words, Phrases; Synonyms, Antonyms, Idioms, General Vocabulary. Use Of Articles and One, A Little/ A Few, This, That, Care, Like, Love, Hate, Prefer, Wish, All, Each, Every, Both, Neither, Either, Some, Any, No, None. Interrogatives. Kinds of Nouns. Prepositions. Possessive, Personal, Reflexive, and Relative Pronouns and Clauses: Classes of Verbs. Usage of May, Can, Ought, Should, Must, Have To, Need for Obligation; Must, Have, Will and Should. The Auxiliaries Dare and Used. Present, Past, Future and Perfect Tenses. The Gerund & The Participles. Commands, Requests, Invitations, Advice, Suggestions. The Subjunctive. The Passive Voice; Indirect Speech, Conjunctions, Purpose. Clauses: Noun Clauses; Clauses of Reason, Result, Concession, Comparison, Time. Numerals, Dates, and Weights and Measures. Spelling Rules. Phrasal Verbs.

Textbook(s):

1. A Practical English Grammar by A. J. Thomson and A. V. Martinet, 4th Edition Oxford University Press (1986).
2. Basic English Usage by Michael Swan, Oxford UnivPr (Sd) (January 1986). ISBN-10: 0194311872

Reference Material:

- Functional English In Aglobal Society: Vocabulary Building and Communicative Grammar by Nicanor L. Guintomary Ann R. Sibal Brian D. Villaverde Dept. of Lan-guages, Literature and Humanities College of Arts and Sciences Southern Luzon State University (2012).

HPX

- AQA Functional English Student Book: Pass Level 2 by Mr David Stone, Heinemann; 1st Edition (28 Jun 2010). ISBN-10: 0435151401
- English Composition and Grammar: Complete Course by John E. Warriner, Harcourt Brace Jovanovich; Complete Course Benchmark Edition (January 1988). ISBN-10: 0153117362
- Companion to English: Vocabulary (Learners Companion) by George Davidson, Prim-Ed Publishing (March 1, 2003). ISBN-10: 9814070904
- Word Power Made Easy by Norman and Lewis, Goyal Publishers (September 1, 2009). ISBN-10: 8183071007
- 1000 Most Important Words by Norman W. Schur, Ballantine Books (July 12, 1982). ISBN-10: 0345298632
- High School English Grammar and Composition by P.C Wren, Chand & Co (July 13, 2008). ISBN-10: 812192197X Irregular Verbs.

Course Title: Islamic Studies

Course Code: ISLS-101

Course Structure: Lectures: 1 / Labs: 0

Credit Hours: 1

Prerequisites: None

Course Objectives:

This course provides a comprehensive knowledge of Islam. It covers the basic beliefs and practice of Islam. This course is intended to familiarize students with a range of most important Islamic beliefs, practices and issues. It should equip them to recognize, understand and appreciate the different dimensions of Islam that they will encounter in their practical life.

Course Syllabus:

In this course : Aqeedah , Tawheed , Risalah and Al-Akhirak , Tahara , Salah , Qadda , Qasar (shortening) and Jama (joining) , Sawam (Fasting), Salah at-Taraweeh (The night Prayer) , Zakaah , Hajj , Jihd , Birth , Tehneek , Aqeeqah , and Circumcision (Khittaam) , Death , The Funeral Nemaz , Burial , Food and Dress / adornment , Male / Female Relationship , Social Interaction , Between Men and Women , Marriage (Nikah) , Rights and Obligations of the spouses , The Law of Divorce , Inheritance , Crime and Punishment , Islamic Economics and Finance , Contemporary issues , Moral / Manners , Concepts of Taqwa , Tazkiyah , Ihsan , Huqooq Ullah , Huqooq ul-Ibad,

Text Book:

Dr. Muhammad Hamidullah , *Introduction to Islam*

Reference Materials:

- Marwan Ibrahim al-qasy *Morals and manners in Islam*, The Islamic Foundation , United Kingdom 1991.
- Muhammad Yousuf Islahi , *etiquettes of life in Islam* , markari Maktabah Islami Publishers , New delhi , 2003.
- Dr. Abu Ameenah Bilal Philips , (The foundation of Islamic studies)
- John Esposito , *Islam : The straight Path*
- Abul A'la Mawdudi , *Al-Jihad fil Islam*
- Dr. Abu Ameenah Bilal Philips , (*The Funeral rights in Islam*)

- Abul A'la Mawdudi , *Human Rights in Islam*
- Abul A'la Mawdudi , *Ethical Viewpoint of Islam*
- Muhammad Akram Khan , *An Introduction In Islamic Ecnomics.*
- Khursheed Ahmad, *Studies in Islamic Economics.*

Course Title: Pakistan Studies

Course Code: PKST-101

Course Structure: Lectures: 2/ Labs:0

Credit Hours: 2

Prerequisites:None

Course Objectives:

Develop vision of historical perspective, government, politics, contemporary Pakistan, ideological background of Pakistan. Study the process of governance, national development, issues arising in the modern age and posing challenges to Pakistan.

Course Syllabus:

Students will learn the reason behind the achievement of Pakistan following topics will be covered in the course: Historical background of Pakistan, Muslim Society in Indo-Pakistan, Ideology of Pakistan, Two nation theory, The movement led by the society, The downfall of Islamic society, Establishment of British Raj-Causes consequences, Political evolution of Muslims in the twentieth Century, Sir Syed Ahmed Khan, Muslim league, Nehru, Allama Iqbal, Independence movement, Lahore Resolution, Pakistan Culture and Society Constitutional and Administrative issues, Pakistan and its Geo-political dimensions, Pakistan and international affairs, Pakistan and the challenges ahead.

Text Book:

Dr.Muhammad Sarwar, *A text book of Pakistan Studies, Ilmi Kitab Khana, Urdu Bazar, Lahore, 2003.*

Reference materials:

Ikram-ul-Haq Raja *Pakistan studies, Azeem Academy, Urdu Bazar , Lahore , 2001.*

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Semester 2

Course Title: Programming Fundamentals

Course Code: CMPC-102

Course Structure: Lectures: 3, Lab 1

Credit Hours: 4

Prerequisites: None

Course Objectives:

The course is designed to familiarize students with the basic structured programming skills. It emphasizes upon problem analysis, algorithm designing, and program development and testing.

Course Syllabus:

Overview of Computer Programming. Principles of Structured and Modular Programming. Overview of Structured Programming Languages. Algorithms and Problem Solving. Program Development: Analyzing Problem, Designing Algorithm/Solution, Testing Designed Solution. Translating Algorithms into Programs. Fundamental Programming Constructs. Data Types. Basics of Input and Output. Selection and Decision (If, If-Else, Nested If-Else, Switch Statement and Condition Operator). Repetition (While and For Loop, Do-While Loops), Break Statement, Continues Statement. Control Structures. Functions. Arrays. Pointers. Records. Files. Testing & Debugging.

Textbook(s):

C How to Program by Paul Deitel and Harvey Deitel, Prentice Hall; 7th Edition (March 4, 2012)

Reference Material:

Programming in C by Stephen G. Kochan, Addison-Wesley Professional; 4 edition (September 25, 2013). ISBN-10: 0321776410

Course Title: Discrete Structures

Course Code: CMPC-104

Course Structure: Lectures: 3 / Labs: 0

Credit Hours: 3

Prerequisites: None

Course Objectives:

The course provides a solid theoretical foundation of discrete structures as they apply to Computer Science problems and structures. The students will learn how to use mathematical notation and solve problems using mathematical tools.

Course Syllabus:

Logic: Propositional Equivalences, Predicates and Quantifiers, Nested Quantifiers, Methods of Proof. Sets & Functions. Algorithms: the Growth of Functions, Complexity of Algorithms, the Integers and Division, Matrices. Number Theory and Cryptography. Mathematical Reasoning:

Proof Strategy, Sequences and Summations, Mathematical Induction, Recursive Definitions and Structural Induction, Recursive Algorithms, Program Correctness. The Basics of Counting: The Pigeonhole Principle, Permutations and Combinations, Binomial Coefficients, Generalized Permutations and Combinations, Generating Permutations and Combinations. Advanced Counting Techniques: Recurrence Relations, Solving Recurrence Relations, Divide-and-Conquer Algorithms and Recurrence Relations, Generating Functions, Inclusion-Exclusion & its Application. Relations and Their Properties, n-ary Relations and Their Applications, Representing Relations, Closures of Relations, Equivalence Relations, Partial Orderings. Graph: Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest-Path Problems, Planar Graphs, Graph Coloring. Trees: Applications of Trees, Tree Traversal, Spanning Trees, Minimum Spanning Trees.

Textbook(s):

Discrete Mathematics and Its Applications by Kenneth H. Rosen, McGraw-Hill Science/Engineering/Math; 7th Edition (2011). ISBN-10: 0073383090

Reference Material:

- Discrete Mathematics by Richard Johnsonbaugh, Pearson; 7th Edition (January 8, 2008). ISBN-10: 0131593188
- Discrete Algorithmic Mathematics by Stephen B. Maurer and Anthony Ralston, A K Peters/CRC Press; 3rd Edition (August 2004). ISBN-10: 1568811667
- Discrete Mathematical Structures by Bernard Kolman, Robert Busby and Sharon C. Ross, Pearson; 6th Edition (2008). ISBN-10: 0132297515
- Discrete Mathematics with Ducks by sarah-marieBelcastro, A K Peters/CRC Press; 1st Edition (June 21, 2012). ISBN-10: 1466504994.

Course Title: Probability and Statistics

Course Code: MATH-102

Course Structure: Lectures: 3/ Labs: 0

Credit Hours: 3

Prerequisites: None

Course Objectives:

To introduce the concepts of data analysis, presentation, counting techniques, probability and decision making

Course Syllabus:

Statistics and Data Analysis. Collection of Data. Measures of Location. Measures of Variability. Discrete and Continuous Data. Statistical Modeling. Scientific Inspection, and Graphical, General Types of Statistical Studies. Probability. Random Variables and Probability Distributions. Mathematical Expectation. Discrete Probability Distributions. Continuous Probability Distributions. Fundamental Sampling Distributions and Data Descriptions. One and Two-Sample Estimation Problems. Single Sample Estimating. One- and Two-Sample Tests of

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Hypotheses. Sample Tests. Simple Linear Regression and Correlation. Multiple Linear Regression and Certain

Textbook(s):

Probability and Statistics for Engineers and Scientists by Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers and Keying E. Ye, Pearson; 9th Edition (January 6, 2011). ISBN-10: 0321629116

Reference Material:

- Probability and Statistics for Engineers and Scientists by Anthony J. Hayter, Duxbury Press; 3rd Edition (February 3, 2006), ISBN-10: 0495107573
 - Schaum's Outline of Probability and Statistics, by John Schiller, R. AluSrinivasan and Murray Spiegel, McGraw-Hill; 3rd Edition (2008). ISBN-10: 0071544259
 - Probability: A Very Short Introduction by John Haigh, Oxford University Press (2012). ISBN-10: 0199588481
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Course Title: Communication Skills

Course Code: ENGL-102

Course Structure: Lectures: 3/ Labs: 0

Credit Hours: 3

Prerequisites: None

Course Objectives:

- To sensitize students to their communicative behavior
- To enable them to reflect and improve on their communicative behavior/performance
- To build capacities for self-criticism and facilitate growth
- To lead students to effective performances in communication

Course Syllabus:

Communication. The Communication Process. Perspectives in Communication. Internal Representation. Elements of Communication. Listening. Expressing. Clarifying Language. Making Contact. Prejudgment. Influencing Others. Public Speaking. Preparing a Formal Oral Presentation. Delivering Presentation. Interviewing. Effective written Communication. Building Rapport

Textbook(s):

1. Effective Communication Skills, MTD Training & Ventus Publishing ApS. (2010) ISBN 978-87-7681-598-1 (TB1)
2. Messages: The Communication Skills Book by Matthew McKay PhD, Martha Davis PhD, and Patrick Fanning, New Harbinger Publications; Third Edition (March 3, 2009). ISBN-10: 1572245921
3. Secrets of Successful Presenters: A Guide for Successful Presenters by Dr. M. A. Pasha & Dr. S. Pasha, Lambert Academic Publishing (2012). ISBN-10: 3659217557

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Reference Material:

- Communication Skills in English by Prof P N Kharu, Dr. Varinder Gandhi Publisher: Laxmi. EAN: 9788131806920
- Essential Communication Skills: Teacher Edition with Talking Points by Patty Ann, Patty Ann; 1st Edition (July 5, 2012). ASIN: B008HYUDWQ
- Communication Skills Magic: Improve Your Relationships & Productivity through Better Understanding Your Personality Style and the Personality Styles of Those Around You by E.G. Sebastian, CreateSpace Independent Publishing Platform (January 5, 2010). ISBN-10: 1450513344
- People Skills: How to Assert Yourself, Listen to Others, and Resolve Conflicts by Robert Bolton, Touchstone (June 6, 1986). ISBN-10: 067162248X
- The Handbook of Communication Skills by Owen Hargie; Routledge; 4th Edition, Taylor & Francis, (12-Oct-2012).

Course Title: Digital Logic and Design**Course Code: CMPC-106****Course Structure: Lectures: 3/Labs: 0****Credit Hours: 3****Prerequisites: None****Course Objectives:**

The course introduces students with digital circuit of large complexity and how such circuits could be built in a methodological way, starting from Boolean logic and applying a set of rigorous techniques.

Course Syllabus:

Number Systems: Digital Systems, Number Systems and Codes, Unweighted Codes, Binary Storage and Registers, Binary Logic. Boolean Algebra and Logic Gates, Boolean Functions, Canonical and Standard Forms. Digital Logic Gates. Integrated Circuits. Gate-Level Minimization: The Map Method, Product of Sums Simplification, Don't-Care Conditions, NAND and NOR Implementation, Exclusive-OR Function, Karnaugh Maps, Quine Mc-Cluskey Method. Combinational Logic: Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier. Magnitude Comparator. Decoders. Encoders. Multiplexers. Synchronous Sequential Logic: Sequential Circuits, Latches, Flip-Flops, Registers and Counters. Memory and Programmable Logic: Random-Access Memory. Memory Decoding. Error Detection and Correction. Read-Only Memory. Programmable Logic Array.

Textbook(s):

Digital Fundamentals by Thomas L. Floyd, Prentice Hall; 9th edition (2007)

Reference Material:

- Digital Fundamentals: A Systems Approach by Thomas L. Floyd, Prentice Hall; 1 edition (July 13, 2012)
- Digital Design, by M. Morris Mano, Michael D. Ciletti, 4th Edition, Prentice Hall (2007). ISBN-10: 0131989243
- Digital Design by Franc Vahid, Wiley; 1st Edition (July 28, 2006). ISBN-10: 0470044373

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- Fundamentals of Logic Design by Jr. Charles H. Roth and Larry L Kinney, CL Engi-neering; 6th Edition (March 13, 2009). ISBN-10: 0495471690

Semester 3

Course Title: Object Oriented Programming

Course Code: CMPC-201

Course Structure: Lectures: 3 / Labs: 1

Credit Hours: 4

Prerequisites: CMPC-201(Programming Fundamentals)

Course Objectives:

The course aims to develop students 'Object Oriented Programming skills.

Course Syllabus:

Objects and Classes, Abstraction, Encapsulation, Final Classes, Nested and Inner Classes, Inheritance, Abstract Classes, Concrete Classes, Inheritance and Encapsulation.is-a Relationship, Inheritance via Abstract Classes, Extending the Hierarchy, Upcastingand Downcasting, Interfaces. Composition, has-a Relationship. Polymorphism. Polymorphism, Dynamic (or Late) Binding. Interfaces and Polymorphism. The Wrapper Classes, Boxing and Un-Boxing, Packages. Exceptions and Exception Handling File Systems and Paths, File and Directory Handling and Manipulation, Input/output Streams, Reading Binary Data, Writing binary Data, Writing Text(Character), Reading Text(Character), Logging with Print Stream, Random Access Files, Object Serialization. Collections, for-each Loop. GUI Concepts, Components and Containers, Abstract Windows Toolkit and Swing, Windows and Frames, Layout Managers, Panels. Event-Driven Programming, The delegation Event Model. Event Classes, Mouse Events, Keyboard Events, Using Actions. Component and JComponent, Buttons, Labels, Text Fields, Text Areas, Dialog Boxes, Checkboxes and Radio Buttons, Menus, JSlider, JTabbedPane.

Textbook(s):

1. Java Programming: From the Ground Up by Ralph Bravaco and Shai Simonson, McGraw-Hill Higher Education New York, 2010, ISBN 978-0-07-352335-4
2. Ivor Horton's Beginning Java by Ivor Horton, John Wiley & Sons, Inc, 7th Edition, 2011, ISBN: 978-0-470-40414-0

Reference Material:

- Java™ Programming by Joyce Farrell, 6th Edition, Cengage Learning, 2012, ISBN13:978-1-111-52944-4
- Java™ How to Program by Paul Deitel and Harvey Deitel, Pearson, 9th Edition, 2012, ISBN-13:978-0-13-257566-9

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Course Title: Linear Algebra

Course Code: MATH-201

Course Structure: Lectures: 3/ Labs: 0

Credit Hours: 3

Prerequisites: None

Course Objectives:

To provide fundamentals of solution for system of linear equations, operations on system of equations, matrix properties, solutions and study of their properties.

Course Syllabus:

Introduction to Vectors. Solving Linear Equations. Elimination = Factorization. Vector Spaces and Subspaces. Orthogonally. Determinants. Eigen values and Eigenvectors. Graphs and Networks, Markov Matrices, Population, and Economics. Linear Programming. Fourier series. Linear Algebra for Functions, Linear Algebra for Statistics and Probability, Computer Graphics. Numerical Linear Algebra. Complex Vectors and Matrices. Discrete Transforms and Simple Applications.

Textbook(s):

- Introduction to Linear Algebra by Gilbert Strang, Wellesley Cambridge Press; 4th Edition (February 10, 2009). ISBN-10: 0980232716

Reference Material:

- Elementary Linear Algebra with Applications by Bernard Kolman, David Hill, 9th Edition, Prentice Hall PTR, 2007. ISBN-10: 0132296543
- Strang's Linear Algebra And Its Applications by Gilbert Strang, Strang, Brett Coonley, Andy Bulman-Fleming, Andrew Bulman-Fleming, 4th Edition, Brooks/Cole, 2005
- Elementary Linear Algebra: Applications Version by Howard Anton, Chris Rorres, 9th Edition, Wiley, 2005.
- Linear Algebra and Its Applications by David C. Lay, 2nd Edition, Addison-Wesley, 2000.
- Linear Algebra by Harold M. Edwards, Birkhäuser; 1st Edition (2004). ISBN-10: 0817643702
- Linear Algebra: A Modern Introduction by David Poole by Brooks Cole; 3rd Edition (May 25, 2010). ISBN-10: 0538735457

Course Title: Technical and Report Writing

Course Code: ENGL-201

Course Structure: Lectures: 3/ Labs: 0

Credit Hours: 3

Prerequisites: None

Course Objectives:

To effectively plan and structure technical reports and to recognize the various stages in writing a technical report.

Course Syllabus:

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Writing for Readers Academic, Public, and Work Communities Analyzing Electronic Communities Discovering and Planning. Purpose, Thesis, and Audience Drafting. Revising, Editing, and Proofreading. Paragraphs, Clear and Emphatic Sentences, Reasoning Critically Reading Critically Arguing Persuasively Designing Documents Writing in Online Communities Speaking Effectively. Academic Writing for Social and Natural Sciences. Public Writing. Researching and Writing.

Textbook(s):

Writer's Companion – The Longman by Chris M. Anson, Robert A. Schwegler and Marcia F. Muth, Pearson Longman, 4th Edition (2007) . ISBN10: 0-20556-252-3

Reference Material:

- Technical English: Writing, Reading, and Speaking by Pickett and Laster. 8th Edition
 - The Technical Writer's Companion by Alred, Gerald, Charles T. Brusaw and Walter E. Oliu, 3rd Edition. ISBN 0-312-25978-6.
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Course Title: Data Communication and Networks

Course Code: CMPC-203

Course Structure: Lectures: 3/ Labs: 0

Credit Hours: 3

Prerequisites: None

Course Objectives:

To introduce students with concepts related to computer communication, analogue & digital transmission, network layers, network models (OSI, TCP/IP) and protocol standards. Emphasis is given on the understanding of modern network concepts.

Course Syllabus:

Introduction to Data Communications, Communications Models, Data Networking, and the Internet. Protocol & Architecture. Data Transmission. Signal Encoding Techniques. Digital Data Communication Techniques. Data Link Control Protocols. Multiplexing. Circuit Switching and Packet Switching. Cellular Wireless Networks Technology & Protocols. Local Area Network Technology & Protocols. Ethernet Technology & Protocols. Wireless LANs: Wireless LAN Technology and Protocols.

Textbook(s):

Data and Computer Communications by William Stallings, Prentice Hall; 9th Edition (August 13, 2010). ISBN-10: 0131392050

Reference Material:

- Data Communications and Networking by Behrouz Forouzan, 4th Edition (2007). ISBN 978-007-125442-7
- Computer Networks by Andrew S. Tanenbaum and David J. Wetherall, Prentice Hall; 5th Edition (October 7, 2010). ISBN-10: 0132126958

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- Computer Networks and Internets by Douglas E. Comer, Prentice Hall; 5th Edition (April 28, 2008). ISBN-10: 0136066984

Course Title: Database Systems

Course Code: CMPC-205

Course Structure: Lectures: 3/ Labs: 1

Credit Hours: 4

Prerequisites: None

Course Objectives:

The course aims to introduce basic database concepts, different data models, data storage and retrieval techniques and database design techniques. The course primarily focuses on relational data model and DBMS concepts.

Course Syllabus:

Basic Concept: File Processing & Database Approach, Database Applications, Advantages of the DB, Components of the DB Environment, and Evolution of DBs. Database Architecture: DB Development Process, Three Schema Architecture, Data Modeling. Logical Design: E-R Modeling (Entities, Attributes, Relationships; Cardinality Constraints). RDBMS: Logical View of Data, Relational Data Model, Constraints, Transforming ERD/EERD into Relations. The Relational Model: Types, Relations, Relational Algebra, Relational Calculus, Integrity. Normalization. EE-R Diagrams: Development & Constraints, DB Design Life Cycle. DB Development & Management: Introduction to SQL and Basic Commands, SQL Integrity Constraints. Physical DB Design, DB architecture, Query Optimization. SQL Commands: Saving, Listing, Editing, Restoring Table Contents; Logical Operators, Management Commands, Arithmetic Operators, Complex Queries and SQL Functions, Aggregate Function, Grouping Functions, Virtual Tables, Views, Indexes, Joins. Client-Server & Distributed Environment, ODBC, Bridges, and Connectivity Issues. Concurrency Control with Locking, Serializability, Deadlocks, Database Recovery Management. Distributed Processing and Distributed Databases, DDBMS: Evolution, Architecture, Components, Advantages, Security and Authorization. Physical Design: Storage and File Structure, Efficiency and Tuning.

Textbook(s):

1. Modern Database Management by Fred McFadden, Jeffrey Hooper, Mary Prescott, Prentice Hall; 11th Edition (July 26, 2012). ISBN-10: 0132662256
2. Database Systems A Practical Approach to Design, Implementation, and Management, 4th Edition, Thomas Connolly, Carolyn Begg, Addison Wesley, 2005.
3. Introduction to Oracle: SQL and PL/SQL ISBN-10: 0131453203

Reference Material:

- Database Design and Relational Theory: Normal Forms and All That Jazz by C. J. Date, O'Reilly Media; 1st Edition (April 24, 2012). ISBN-10: 1449328016
- Fundamentals of Database Systems by R. Elmasri and S. Navathe. 6th Edition, Addison-Wesley (2010). ISBN-10: 0136086209

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- Database System Concepts by Abraham Silberschatz, Henry F. Korth and S. Sudarshan. McGraw-Hill; 6th Edition (2010). ASIN: B004Y3YXK2
 - Database Systems: a Practical Approach to Design, Implementation and Management by T. Connolly and C. Begg, Addison-Wesley; 5th Edition (2009). ISBN-10: 0321523067
 - Modern Database Management System by Fred, Jeffery A. Hoffer
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Semester 4

Course Title: Data Structures and Algorithms

Course Code: CMPC-202

Course Structure: Lectures: 3 / Labs: 1

Credit Hours: 4

Prerequisites: CMP-1123 (Object Oriented Programming)

Course Objectives:

This course provides an introduction to the theory, practice and methods of data structures and algorithm design. Students will learn elementary data structures such as stacks, queues, linked lists, sequences, trees and graphs in Java language, and the algorithms designed for manipulating these data structures

Course Syllabus:

Introduction to Data Structure, primitive Java, Reference Types, Algorithm Analysis. Java collections API (The Java Collections Framework). Recursion, Sorting Algorithms: Bubble Sort, Selection Sort, Insertion Sort, Shell Sort, Merge Sort, Quick Sort, Heap Sort, Speed Limit for comparison Sorts, Radix Sort, Bucket Sort. Randomization. Stack and Queue. Linked Lists. Hash Table. Trees. Binary Search Trees. Priority Queue. Binary Heap. Splay Trees. Merging Priority Queues. Graphs: Simple Graphs, Graph Terminology, Paths and Cycles, Isomorphic Graphs, the Adjacency Matrix for a Graph, the Incidence Matrix for a Graph, the Adjacency List for a Graph, Digraphs, Paths in a Digraph, Weighted Digraphs and Graphs, Euler Paths and Hamiltonian Cycles, Dijkstra's Algorithm, Graph Traversal Algorithms. Data Structure Applications: Balanced-Symbol Checker, A simple Calculator, File Compression, A cross-reference generator, The Josephus problem. Event-Driven Simulation.

Textbook(s):

- Data Structures & Problem Solving Using Java by Mark Allen Weiss, Addison-Wesley, 4th Edition (October 7, 2009). ISBN-10: 0321541405
- Schaum's Outline of Data Structures with Java by John Hubbard, McGraw-Hill; 2nd Edition (May 26, 2009). ASIN: B0035X1BQ6

Reference Book(s):

- Data Structures: Abstraction and Design Using Java by Koffman and Wolfgang, Wiley; 2nd Edition (January 26, 2010). ISBN-10: 0470128704
 - Data Structures and Algorithm Analysis in Java by Mark Allen Weiss, Prentice Hall; 3rd Edition (November 28, 2011). ISBN-10: 0132576279
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Course Title: Enterprise Application Development**Course Code: ITEC-204****Course Structure: Lectures: 3 / Labs: 0****Credit Hours: 3****Prerequisites: None****Course Objectives:**

The course is aimed at creating robust enterprise applications using J2EE technologies that allow for rapid change and growth. Course Syllabus: Object-Oriented Programming Review, Software Architectures Overview, Challenges and Platform of Enterprise Application Development, J2EE Scenarios, J2EE Platform Technologies, The Client Tier, The Web Tier, The Enterprise JavaBeans Tier, Integrating with the Enterprise Information System Tier, Packaging and Deployment, Transaction Management, Security, J2EE Internationalization and Localization, Architecture of the Sample Application.

Textbook(s):

Designing Enterprise Applications with the J2EE™ Platform by Inderjeet Singh; Beth Stearns; Mark Johnson; 2nd Edition, Prentice Hall (March 25, 2002). Print ISBN-10: 0-201-78790-3

Reference Material:

- Mastering Enterprise JavaBeans 3.0 by Sriganesh, R.P., Brose, G., And Silverman, M. Wiley Publishing, Indianapolis, (2006). ISBN 0-471-78541-5.
- Core J2EE Patterns: Best Practices and Design Strategies by Deepak Alur, Dan Malksand John Crupi, Prentice Hall; 2nd Edition (May 10, 2003). ISBN-10: 0131422464
- Sun Certified Enterprise Architect for Java EE Study Guide by Mark Cade and Humphrey Sheil, Prentice Hall; 2nd Edition (February 8, 2010). ISBN-10: 0131482033

Course Title: Mobile Application Development**Course Code: ITEC-202****Course Structure: Lectures: 3 / Labs: 0****Credit Hours: 3****Prerequisites:****Course Syllabus:**

What is Android? Installing and Configuring the Android SDK Manager, Creating Android Application, Anatomy of an Android Application. Eclipse. Fragments, Calling Built-In Applications Using Intents, Displaying Notifications. Components of a Screen, Adapting to Display Orientation, Managing Changes to Screen Orientation, Utilizing the Action Bar, Creating the User Interface. Listening for UI Notifications. Views, User Preferences. Persisting Data. Sharing Data. Sending SMS Messages. Getting Feedback. Sending E-mail. Displaying Maps, Consuming Web Services Using HTTP, Accessing Web Services. Creating Services. Threading. Android games Development, Publishing Android Applications. Handling Telephone Calls, Fonts.

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Textbook(s):

1. Beginning Android 4 Application Development by Wei-Menge Lee, John Wiley & Sons, 2012
2. Beginning Android 4 by Grant Allen, Apress, (2011), ISBN: 1430239840.
3. Beginning Android games by Mario Zechner, Apress, (2011), ISBN: 1430230428

Reference Material:

- Pro Android 4 by SatyaKomatineni and Dave MacLean , (2012), ISBN:1430239301Apress
- Professional Android 4 Application Development by Reto Meier, Wiley ,(2012), ISBN:1118237226

Course Title: Operating Systems**Course Code: CMPC-204****Course Structure: Lectures: 3/ Labs: 0****Credit Hours: 3****Pre-requisites: None****Course Objectives:**

To help students gain a general understanding of the principles and concepts governing the functions of operating systems and acquaint students with the layered approach that makes design, implementation and operation of the complex OS possible.

Course Syllabus:

Computing Environments. Types and Generation of Operating-System. Key Components. Virtual Machines, System Calls, System Boot, System Programs. Processes, Process Scheduling, Operations on Processes, Inter-process Communication, Communication in Client-Server Systems. Threads: Multithreading Models, Thread Libraries, Threading Issues. CPU Scheduling, Scheduling Criteria, Scheduling Algorithms. Thread Scheduling, Algorithm Evaluation. Process Synchronization, The Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization. Deadlocks Conditions & Handling. Main Memory Management. Virtual Memory Management. File System and Implementation. I/O Systems: STREAMS, Hardware, Performance, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O Requests to Bibliographical Notes, Hardware Operations. Case studies: Linux, Windows Operating Systems.

Textbook(s):

Operating System Concepts Essentials by Abraham Silberschatz, Peter B. Galvin and Greg Agne, Wiley; 8th Edition (July 5, 2008). ISBN-10: 0470128720

Reference Material:

- Applied Operating Systems Concepts by Silberschatz A., Peterson, J.L., & Galvin P.C. Wiley; 8th Edition (2011). ISBN-10: 1118112733

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- Modern Operating Systems by Tanenbaum A.S., Prentice Hall; 3rd Edition (2007). ISBN-13: 978-0136006633
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Course Title: Software Engineering

Course Code: CMPC-206

Course Structure: Lectures: 3/ Labs: 0

Credit Hours: 3

Prerequisites: None

Course Objectives:

To study various software development models and software development life cycles. The concepts of project management, change control, process management, software development and testing are introduced through hands-on team Projects.

Course Syllabus:

The Nature of Software, Nature of WebApps, The Software Process, Software Engineering Practice. Generic Process Models. Specialized Process Models. Systems Analysis and Design. Business Information Systems. Introduction to SDLC, SDLC Phases, System Planning, Preliminary Investigation, SWOT Analysis. Strategic Planning. Information Systems Projects. Requirements Engineering. Data & Process Modeling. Design within the Context of Software Engineering. Design Models. System Architecture. Architectural Styles. User Interface Design. Software Quality Assurance. Validation Testing, System Testing, Internal and External View of Testing. Project Management Concepts. Project Scheduling. Risk Management. Maintenance and Reengineering.

Textbook(s):

1. Software Engineering: A Practitioner's Approach by Roger S. Pressman, McGraw-Hill Science/Engineering/Math; 7th Edition (2009). ISBN-10: 0073375977
2. Systems Analysis and Design by Gary B. Shelly, Thomas J. Cashman and Harry J. Rosenblatt, Course Technology; 7th Edition (2007). ISBN-10: 1423912225

Reference Material:

- Software Engineering 8E by Ian Sommerville, Addison Wesley; 8th Edition (2006). ISBN-10: 0321313798
- Systems Analysis and Design by Gary B. Shelly, Thomas J. Cashman and Harry J. Rosenblatt, Course Technology; 7th Edition (2007). ISBN-10: 1423912225

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