



**Department of Information Technology  
Central University of Kashmir  
Tullamull Campus, Ganderbal.**

**Syllabus for B. Tech. CSE 7th Semester**

**[27/5/2020]**

S. No	Course Code	Course Title	Credits	Evaluation		
				CIA	ESE	Total
1.	BTCS 701	Microprocessor	4	40	60	100
2.	BTCS 702	Web Design & Development	4	40	60	100
3.	BTCS 703	Seminar	2	100	-	100
4.	BTCS 704	Web Design & Development Laboratory	2	40	60	100
5.	BTCS 705	Microprocessor Lab	2	40	60	100
6.	BTCS 706	Compiler Design	4	40	60	100
7.	BTCS --	Elective 2	4	40	60	100
Total			22			

ELECTIVE II						
S. No	Course Code	Course Title	Credits	Evaluation		
				CIA	ESE	Total
1.	BTCS 710	Wireless Communication	4	40	60	100
2.	BTCS 711	Mobile Computing	4	40	60	100
3.	BTCS 712	Multimedia	4	40	60	100
4.	BTCS 713	Remote Sensing	4	40	60	100
5.	BTCS 714	Python Programming	4	40	60	100
6.	BTCS 715	Theory of Languages	4	40	60	100
7.		SWAYAM MOOC Course (Department Approved)				100

# **BTCS 701: Microprocessor**

## **Unit I**

Introduction to microprocessor, Evolution and Applications of microprocessors. 8085 microprocessor: Architecture, Block diagram, Pin diagram of 8085 microprocessor.

## **Unit II**

The 8086 Microprocessor Architecture: Introduction to 8086 microprocessor, Internal architecture of 8086, Memory segmentation, 8086 flags, Internal registers, physical address generation, Pin description in maximum & minimum modes.

## **Unit III**

Addressing modes of 8086, Instruction execution timing, assembler instruction format, data transfer instructions, arithmetic instructions, branch instructions, looping instructions, NOP and HLT instructions, flag manipulation instructions, logical instructions, shift and rotate instructions, directives and operators, programming examples.

## **Unit IV**

Interrupt definition, Maskable and non-maskable interrupts, vectored interrupts, 8086 interrupts, hardware, special instruction and condition produced by instruction Interrupt types, dedicated interrupts and software interrupts, Interrupt acknowledgement cycle, Interrupt priorities. I/O interfacing, Isolated I/O & memory mapped I/O, Memory interfacing.

## **References:**

1. Microprocessor Architecture, Programming & Applications with 8085: Ramesh S Gaonkar; Wiley Eastern Ltd.
2. Microprocessors and interfacing: Hall; TMH
3. The Intel Microprocessors 8086- Pentium processor: Brey; PHI
4. The 8088 & 8086 Microprocessors-Programming, interfacing, Hardware & Applications: Triebel & Singh; PHI
5. Microcomputer systems: the 8086/8088 Family: architecture, Programming & Design: Yu-Chang Liu & Glenn A Gibson; PHI.
6. Advanced Microprocessors and Interfacing: Badri Ram; TMH.

# **BTCS 702: Web Design & Development**

## **Unit 1: Concept of HTML**

Internet and World Wide Web, Architecture, Role of Webservers, DNS, Web Browsers, Web Programming; Client side Vs Server side. HTML –Concepts of Hypertext, Elements of HTML syntax ,Head and Body Sections, Building HTML documents, Inserting texts, Images, Hyperlinks, Backgrounds and Color controls, Table layout and presentation, List types and its tags, HTML Forms and Form Elements.

## **Unit 2: CSS, Java Script**

Creating CSS, applying CSS to HTML documents, CSS Rules, Classes, CSS types. Java Script (Constants, Variables and data types, Operators, Window Object, document object and string function). JavaScript Objects (Math, String, Array, Date), Event Handling and Form Validation.

## **Unit 3: PHP**

Basic Syntax of PHP, Variables and constants, Data type, Operators, Decisions, Lopping, Arrays, Strings, Functions, Form Data Processing, querystrings, Cookies and sessions.

## **Unit 4: PHP and My SQL**

Basic commands with PHP examples, Connection to sever, creating database, selecting a database listing database, listing table names, creating a table, inserting data, queries, deleting database, deleting data and tables.

## **References:**

1. Jon Duckett, HTML & CSS Design and Build Websites, JOHN WILEY & SONS, INC.
2. Thomas A. Powell, HTML & CSS: The Complete Reference, Fifth edition.
3. Robin Nixon, Learning PHP, MYSQL, JavaScript, CSS & HTML5, O'REILLY Media, Inc.
4. Robert Schifreen, The Web Book: The Ultimate guide to HTML, CSS, JavaScript, PHP, & MySQL, OAKWorth Business Publishing Ltd., First Edition.
5. Doug Bierer, PHP7 programming Cookbook, PACKT Publishing.
6. Steven Holzner, PHP: The Complete Reference.

**Course Outcomes:**

On the successful completion of the course, students will be able to

**CO1.** Understand the concept of server side and client side programming languages, acquire knowledge about the basic concept of writing the scripts, use of various HTML elements.

**CO2.** Understand the use of CSS types, CSS selectors and CSS rules.

**CO3.** Describe the function of JavaScript as a dynamic webpage creating tool, know variable naming rules and JavaScript data types, define functions and methods and form validation.

**CO4.** Understand the use of PHP forms, embedding of PHP into HTML programs, concept of cookies and sessions.

**CO5.** Understand the principles behind using MySQL as a backend DBMS with PHP.

# **BTCS 706: Compiler Design**

## **Unit – I**

Introduction to Translators (interpreter, compiler & cross-compiler), Phases of compilation and overview, Introduction to GCC. Regular language, finite automata, regular expression and their applications to lexical analysis, from regular expression to finite automata, Implementation of lexical analyzers, lexical-analyzer generator, LEX-compiler, Formal grammars and their application to syntax analysis, ambiguity.

## **Unit – II**

Context-free language and grammar Parsers, Top down parsing, Shift reduce parsing, operator grammar, operator precedence parsing, predictive parsers. LL(1) grammar, LR(0), SLR(1), LR(1), LALR(1) grammars and Bottom-up parsing, ambiguity and LR parsing, LALR(1) parser generator.

## **Unit – III**

Syntax-directed Translation schemes, Implementation of Syntax directed Translators, Intermediate code, postfix notation, Parse trees & syntax trees, three address code, quadruple & triples, translation of assignment statements, Boolean expressions, statements that alter the flow of control, postfix translation, translation with a top down parser. Attribute grammar, syntax directed definition, evaluation and flow of attribute in a syntax tree.

## **Unit – IV**

Data structure for symbols tables, representing scope information, symbol attributes and management. Run-time environment: Procedure activation, parameter passing, value return, memory allocation, and scope. Error Detection & Recovery: Lexical Phase errors, syntactic phase errors semantic errors. Code improvement local optimization, global optimization, loop optimization.

## **References:**

1. Alfred V. Aho, Monica S. Lam, Ravi Sethi & Jeffrey D. Ullman, *Compilers: Principles, Techniques, and Tools*, 2nd edition, Prentice Hall, 2006.
2. Allen I. Holub, *Compiler Design in C*, PHI, 2003.
3. Dhamdhare D. M., *Compiler construction principle and practice-*, Mac. Millan India, New Delhi.
4. C. N. Fischer and R. J. LeBlanc, *Crafting a compiler with C*, Benjamin Cummings.
5. J.P. Bennet, *Introduction to Compiler Techniques*, 2nd Edition, TMH, 2003.
5. Henk Alblas and Albert Nymeyer, *Practice and Principles of Compiler Building with C*, PHI, 2001.

## **Elective 2**

### **Wireless communication**

#### **Unit I: Introduction to Applied Wireless communication**

Generations in wireless communication with special reference to 4G and 5G, issues in previous generations Principles of cellular networks, Performance criteria. Elements and technique of Cellular Radio System Design: Concept of frequency reuse, channels, Co channel interference, reduction Hand off mechanisms, Cell splitting, cell sectorization.

#### **Unit II: Wireless Architectural overview**

Digital Cellular System: GSM, Architecture, Layer Modeling, Transmission, GSM channels and Channel Modes, various elements of GSM like BSS ,BTS, MSC, VLR, HLR and their interpretation. Introduction to Broadcast Systems, DAB, Digital Radio Mondiale(DRM), HD Radio Technology, Digital Video broadcasting(DVB), Direct to home(DTH).

#### **Unit III: Wireless Propagation Channels**

Co-Channel Interference, Design of antenna system - Omni directional and directional, Lowering the antenna height, antenna tilting ,Types of Non co-channel interference- adjacent channel Interference, Near-End-Far-End interference, Effects on Near-End mobile units, Cross-Talk, Effects on coverage and interference by applying power decrease, antenna height decrease, Beam Tilting, Link calculation, narrowband and wide band models.

#### **Unit IV: Signal processing in wireless systems**

Principles of Diversity, Macrodiversity, Microdiversity, signal combining techniques, Equalizers:-linear and Decision Feedback Equalizers, coding overview (channel and speech), Frequency management and Channel Assignment: Frequency spectrum utilization, Handoffs and Dropped Calls: Types of Handoff: soft, hard, inter cellular, intra cellular, Mobile Assisted Handoff and Soft Handoff, Cell-site Handoff and Intersystem handoff .

#### **References:**

1. Lee: Cellular and Mobile Communication McGraw Hill.
2. D. P. Agrawal and Q. AnZeng: Wireless and Mobile Systems, Cengage Learning.
3. Andreas. F. Molish, "Wirless Communication," John Wiley- India, 2006
4. FaherKamilo: Wireless Digital Communication, Prentice Hall of India, New Delhi.
5. G. J. Mullet: Introduction to Wireless Telecommunication Systems and Networks, Cengage Learning.
6. Raj Kamal: Mobile Computing, Oxford University Press.
7. Mobile Communication by SHILLER.

# Mobile Computing

## Unit 1: Introduction

Basic Concepts, Principle of Cellular Communication, overview of 1G, 2G, 2.3G, 3G and 4G, GSM and CDMA architecture. Mobile Agent: Mobile Objects and Agents, Mobile program, Mobile Agent issues.

## Unit 2: Routing in Base Station Subsystem

Directory look up, mail box, routing data to mobile, routing table update, permanent and temporary address schemes, home domain directory, location directory. Routing: TCP/IP and other protocols, Ad-hoc networking protocols, Mobile Ipv4 and Ipv6, Mobile Internetworking Architecture, Internet Mobility issues, Route optimization, Wireless TCP, GPRS services, IP over CDMA.

## Unit 3: Channel Allocation

Basic Strategies, congestion control, Static and Dynamic routing, concept of Channel Borrowing. Wireless ATM: Channel borrowing. Access Scheduling techniques in cellular systems Slotted Aloha access. Mobile Data Communication: WLANs (Wireless LANs) IEEE802.11 standard, Mobile IP.

## Unit 4: Mobile Computing

Database requirements, computing within a building, within a city and outside city. Mobility Management, Mobile Devices: PDA, Mobile OS. Wireless Application Protocol (WAP). Wireless markup Languages (WML). Wireless Internet, remote data access, Global Positioning, Document Tracing, Health Care, Warehouse, Automated Vending.

**Case study:** Future directions in mobile networks: A survey of recent work from publications including some case studies on Ad hoc networks.

## References:

1. Richard Wheeler, "Mobility: processes, computers and Agents", Pearson
2. Charles Perkins, "Mobile IP: Design principle and practices", Pearson
3. Charles Perkins, "Ad hoc Networks", Addison Wesley.
4. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", Wiley, 2002, ISBN 0471419028.
5. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second edition, 2004.

# **Multimedia Computing**

## **Unit I**

Introduction: Multimedia, Multimedia Applications, Building Blocks, Goal and Objectives, Multimedia and Internet, Media and Data Streams; Sound, Audio, Images, Video and Animation, Multimedia networking, Communication Systems. Multimedia Database Systems, Optical Storage Media; Computer Technology, Multimedia Operating Systems.

## **Unit II**

Multimedia Configuration: Multimedia PC Workstation Components, Multimedia Platform, Multimedia Development Tool, Authoring Tool, Multimedia O.S.: File System (File Formats: TIFF, BMP, PCX, GIF etc), Process Management.

## **Unit III**

Multimedia Audio ,Basic Sound Concepts, Audio Capture, Speech and Sound Processor, Sound Recovery Techniques, WAV-File Formats-for-Sound, Data Compression . Color modules, Digital Imaging: Image Compression techniques: LZW, DCT, Run Length Coding, JPEG, MPEG, Hypertext and Hypermedia, MHEG.

## **Unit IV**

Still and Moving Images: Video Capture, Animation, Video Processing, AVO File Format, AVI File Format, NTSC, PAL, SCAM, HDTV System, Video/Audio Conferencing Techniques, Video/Audio Conferencing Standards, Video Streaming.

## **References:**

1. “Multimedia Computing Communications & Applications ” by Ralf Steinmetz, KlaraNahrstedt , , Pearson Education (2004)
2. Principles of Multimedia by Parekh Ranjan, Tata McGraw-Hill(2007)
3. Judith Jefcoate, Multimedia in practice: Technology and Application.
4. Multimedia Systems, By John E Koegal, Buford, IIBK. (1994)



# Remote Sensing

## Unit I

Introduction of Remote Sensing ,Electro Magnetic Spectrum - Effects of Atmosphere- Scattering, Absorption, Adsorption, reflection, refraction, diffraction. Atmospheric window, Energy interaction with surface features, Spectral reflectance of earth objects and land covers. Resolution types, Satellites, orbits and missions.

## Unit II

Historical development, Opto mechanical electro optical sensors, across track and Along track scanners, multi spectral scanners, characteristics of different types of platforms, medium and high resolution missions. Data products, characteristics and formats

## Unit III

Sources of Errors: scene, sensor and atmospheric causes. Error correction: geometric and Radiometric, visual and digital interpretation. Digital analysis and classification image formation, visualization: Image enhancement, filters– Baye’s theorem. Image classification: unsupervised and supervised. Photogrammetry: Principles, aerial photo-aerial camera -viewing and measuring systems floating mark, height information and Flight planning.

## Unit IV

Orientation interior, relative and absolute, direct georeferencing, collinearity and coplanarity conditions, effect of orientation elements. Principles of Aerotriangulation, orthorectification and ortho mosaic. GPS: Different segments, Satellite Configuration, GPS signal structure, GPS receivers.

## References:

1. Robert A. Schowengerdt, Remote Sensing.: Models and Methods for Image Processing, Third Edition, Academic Press, 2007, ISBN-13: 978-0123694072
2. Gottfried Konecny, Geoinformation: RS, Photogrammetry and Geographic Information Systems, Second Edition, CRC; 2nd edition, 2009. ISBN 0 - 415 23795 – 7.
3. Paul R.Wolf, Elements of Photogrammetry, McGraw-Hill Science, 2001, ISBN 0070713464, 9780070713468
4. Karl Kraus, Photogrammetry, Fundamentals and standard processes, Dümmler, 2000, ISBN 978 3 11019007 6
5. W.G.Rees, Physical principles of remote sensing, second edition, Cambridge University Press, 2001, ISBN 0 - 521 66034 3.
6. Emilio Chuvieco; Alfredo Huete; Fundamental of Satellite Remote Sensing, December 2009, CRC Press
7. Edward M. Mikhail, James S. Bethel, J. Chris McGlone; Introduction to Modern Photogrammetry, 2001, John Wiley & Sons Inc

# Python Programming

## Unit 1

**Introduction:** Origins, Need of Python Programming, Features, Downloading and Installing Python, Running Python, Python Documentation, Comparing Python, Running Python Scripts. Variables: Variables, Assignment, Keywords, Input- Output, Indentation. Types: Integers, Floating Point Numbers, Strings, Booleans. Operators and Expressions: Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations.

## Unit 2

**Data Structures Lists:** Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences. Comprehensions. Control Flow: if, if-else, nested if-else, for, While, break, and continue. Functions: Defining, Calling Functions, Passing Arguments, keyword Arguments, Default Arguments, Variable-length arguments, Function Returning Values, Scope of the Variable in a Function – Global and Local Variables.

## Unit 3

**Object Oriented Programming OOP in Python:** Classes, methods, Constructor, inheritance, overriding methods, data hiding and Polymorphism, Difference between an error and Exception, Handling Exception, try except block, Raising Exceptions, User Defined Exceptions.

## Unit 4

**Python libraries:** Creating NumPy arrays, indexing and slicing in NumPy, NumPy data types, manipulating array shapes, Introduction to Pandas, Matplotlib, Installing packages via PIP.

## References:

1. Python Programming: A Modern Approach, Vamsi Kurama, Pearson.
2. Learning Python, Mark Lutz, Orielly.
3. Core Python Programming, Wesley J.Chun, Second Edition, Pearson.
4. Dive into Python 3, Mark Pilgrim, Apress.
5. Learning NumPy Array, Ivan Idris, PACKT Publishing.

# Theory of Languages

## Unit I

**INTRODUCTION:** Why and how to study programming languages History and evolution; Programming paradigms; Good, bad, and successful languages. **OVERVIEW OF SELECTED LANGUAGES:** Tours of JavaScript, [Ruby | Python], Java, [Clojure | Haskell | Scala | ML], C and C++, [Go | Rust | Swift], with emphasis on new features and means of comparison. **LANGUAGE SPECIFICATION:** Mathematical definition of language; Syntax, semantics and pragmatics; Forms of syntax specification: CFG, BNF, EBNF, other notations; A look at semantic specification; Differences between syntax errors and static semantic errors.

## Unit II

**NAMES AND BINDINGS:** The meaning of and importance of name, binding, scope (static and dynamic) and extent (static, stack, and heap); Application to constants, variables, types, subroutines, and modules; Shallow vs. deep binding; Closures; Aliasing, overloading, and polymorphism. **TYPES:** Type systems; Static vs. dynamic typing, strong vs. weak typing, and manifest vs. implicit typing; Type checking, type equivalence, type coercion, and type inference; Primitive types, numbers, text, enumerations, and pointers; Tuples (products), unions (sums), arrays, sets, streams, regular expressions; Abstract and generic types; Covariance, Contravariance, and Invariance; Construction, assignment, equality-testing, and destruction; Dependent types.

## Unit III

**EXPRESSIONS AND STATEMENTS (CONTROL FLOW):** Operator precedence, associativity, arity and fixity; Evaluation order, short-circuiting; Structured and unstructured control flow; Sequencing, selection, iteration, recursion and non-determinacy. **SUBROUTINES:** The runtime stack and activation records; Calling conventions; Passing arguments and returning values; Higher-order functions and functional programming; Closures revisited; Pattern matching for function arguments; Exceptions; Coroutines; Generic subroutines.

## Unit IV

**ABSTRACTION, ENCAPSULATION, AND OBJECT-ORIENTATION:** Modules, abstract data types; Tenets of object-orientation: encapsulation, inheritance and dynamic method binding; Issues with multiple inheritance; Implementation issues; Class-based vs. prototype-based systems; Pure vs. hybrid object systems. **CONCURRENCY:** Motivation; Threads vs. events; Asynchronous programming: callbacks, promises, and async/await; Multiprocessing vs. multithreading; Communication and synchronization issues; Shared memory vs. message passing; Language-intrinsic concurrency vs. library managed concurrency; Implementation.