



BACHELOR OF SCIENCE

B.Sc.

Computer Science Syllabus

(SIX - SEMESTER PROGRAM)

Effective from session (2018-19)



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DEPARTMENT OF COMPUTER SCIENCE
UNIVERSITY OF LUCKNOW
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Department of Computer Science

University of Lucknow, Lucknow

B.Sc (Computer Science) Semester-wise Syllabus 2018-19

B.Sc. (Semester-I)			
S.N	Paper Code	Paper Name	Marks
1.	B.Sc.-101	Computer Fundamentals	80
2.	B.Sc.-102	System Analysis and Design	80
B.Sc. (Semester-II)			
S.N	Paper Code	Paper Name	Marks
1.	B.Sc.-201	Programming in C	80
2.	B.Sc.-202	Practical (C Language, Ms-Office)	100
B.Sc. (Semester-III)			
S.N	Paper Code	Paper Name	Marks
1.	B.Sc.-301	Data Structure Using C++	80
2.	B.Sc.-302	Practical (Data Structure using C++, Python)	100
B.Sc. (Semester-IV)			
S.N	Paper Code	Paper Name	Marks
1.	B.Sc.-401	Operating System	80
2.	B.Sc.-402	Management Information system	80
B.Sc. (Semester-V)			
S.N	Paper Code	Paper Name	Marks
1.	B.Sc.-501	Database and Software Engineering	80
2.	B.Sc.-502	Computer Architecture and Microprocessor	80
3.	B.Sc.-503	Advanced Computing Technologies	80
B.Sc. (Semester-VI)			
S.N	Paper Code	Paper Name	Marks
1.	B.Sc.-601	Application Development With java and .NET framework	80
2.	B.Sc.-602	Data Communication and Computer Network	80
3.	B.Sc.-603	Practical (Java, .NET framework, Microprocessor 8086, Database)	100
Total Marks			1400



Department of Computer Science
University of Lucknow, Lucknow
B.Sc (Computer Science) Fifth Semester Syllabus

Paper Title: Database and Software Engineering
Paper Code: B.Sc.-501

Paper Number: First
Maximum Marks: 80

Unit -I

Data, Information and Knowledge, Introducing Databases and Different kinds of database users, Concept of a Database, Interacting with a Database, Architecture of a Database, Using Relational Databases, Basics of Relational Databases, Using Relational Databases, Identifiers For Relations, characteristics of database, database system concepts and Data Independence, Content of Data Dictionary, Data administration function, DBMS, Concurrency control, Database security, Database recovery.

Unit -II

Traditional Data Model – ANSI/SPRC 3-level Architecture, Overview of three Traditional models, Hierarchical, Network and Relational Models, Comparison of these models, File organization technique—Random file organization technique, Multi key file organization technique, Entity relationship Model, (ER Model), Structured Query Language- Introduction, Data definition, views and queries in SQL, Specifying constraints and indexes in SQL, Data Manipulation, Data maintenance, Multiple Table Operations, Transaction integrity facilities.

Unit -III

Why Software Engineering? Software processes-Software Process model (Water Fall model, iterative, spiral model, Prototype Model, COCOMO Model) Software Requirements: Functional and non-functional requirements user requirements, system requirements Software requirement document, DFD, PERT Chart, ER Diagram.

Unit -IV

Software Testing –System testing, Component testing, Integration testing, Black Box testing, White Box testing, alpha testing, Beta testing, Validation VS Verification, Software requirement specification (SRS) and its characteristics, Cohesion and its types, Coupling and its major types.

Referenced Books:

- [1] Korth Silberschatz, Sudarshan, "Database System Concepts", McGraw-Hill Publication.
- [2] Bipin C. Desai, "An Introduction to Database System", Galgotia publication.
- [3] Pankaj Jalote, "Software Engineering: A Precise Approach", Wiley publication.
- [3] Rajib Mall, "Fundamentals of Software Engineering", PHI publication.

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Department of Computer Science
University of Lucknow, Lucknow
B.Sc (Computer Science) Fifth Semester Syllabus

Paper Title: Computer Architecture and Microprocessor	Paper Number: Second
Paper Code: B.Sc.-502	Maximum Marks: 80

Unit –I

Sequential circuit, Combinational Circuit, Flip-Flops (RS, Clocked RS, T, D, JK, Master Slave), Counters and its types, Registers, Encoder and Decoder, Half Adder, Full Adder, Half Sub-tractor, Multiplexer, De-Multiplexer.

Unit –II

Introduction of Microprocessor: Evolution of microprocessor, Embedded microprocessor, Bit-Slice Processor, RISC and CISC Processor, Vector Processor Array processor, Intel 8086 Microprocessor: Pin description of Intel 8086, operating model of 8086, Register organization of 8086, Bus Interface and Execution Unit (BIU and EU), Interrupts 8086 Read and write Bus Cycle.

Unit –III

8086 Instruction Group: Data transfer Instruction, Arithmetic Instruction, Logical Instruction processor Control Instructing, string Instructions, Interrupts instructions, Addressing modes of 8086 Micro-Processor

Unit –IV

Synchronous Data Transfer, Asynchronous Data Transfer, Interrupt Driven Data Transfer DMA Controller Address space partitioning – Memory mapped I/O scheme, I/O mapped I/O scheme.

Referenced Books:

- [1] V. Rajaraman and T. Radhakrishnan, "Digital Logic and Computer Organization", PHI Publication, Fourth Edition.
- [2] B. Ram, "Fundamentals of Microprocessor and Microcomputers", Dhanpat Rai Publications, Sixth Edition.
- [3] M. Morris Mano, "Computer System Architecture", PHI publication, Third Edition.

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Department of Computer Science
University of Lucknow, Lucknow
B.Sc (Computer Science) Fifth Semester Syllabus

Paper Title: Advanced Computing Technologies	Paper Number: Third
Paper Code: B.Sc.-503	Maximum Marks: 80

Unit –I

Cloud Computing, Characteristics of Cloud Computing, Service models, Deployment Models, Benefits, Characteristics and adoption of IaaS, PaaS and SaaS, Cloud based Services and Application.
Image processing, Element of visual perception, a simple image model, sampling and quantization, some basic relationships between pixel, image geometry in 2D, image enhancement in the spatial domain, Image Compression.

Unit –II

Artificial Intelligent, underlying assumptions, AI techniques, Problem as a state space search, Production system, Neural network, Artificial Neural Networks, Biological Neural Network, Neural Network Application: Signal Processing, Control, Pattern Recognition, Medicine, Speech Production, Speech Recognition, Typical Architectures: Single Layer Net, Multilayer Net, Competitive layer Net.

Unit –III

Grid Computing, benefits and services, Grid computing architecture, Green computing and its need, Green computing and saving money, Green computing and Environment, Steganography, Data Compression, Entropy encoding, Source encoding, JPEG standards.

Unit –IV

Cyber security, cyber crimes, major categories of cybercrimes, cyber terrorism, challenges in cyber security, cyber warfare, cybersecurity legal provisions, major cyber security agencies in India.

Referenced Books:

- [1] Arshdeep Bahga and Vijay Madisetti, "Cloud Computing: A Hands on Approach", University Press.
- [2] Bud E. Smith, "Green Computing", CRC Press Taylor and Francis group Publications.
- [3] Brijendra Singh, "Data Communication and Computer Networks", PHI Publication, Fourth Edition.
- [4] Brijendra Singh, "Network Security and Management", PHI Publication, Third Edition.
- [5] Elaine Rich, Kevin Knight and Shivshankar B Nair, "Artificial Intelligence", McGraw Hill publication, Third Edition.
- [6] Laurence Fausett, "Fundamentals of Neural Networks", CRC Press Taylor and Francis group Publications.
- [7] Andrew S. Tanenbaum, "Computer Network", PHI publication, Third Edition.



Department of Computer Science
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B.Sc (Computer Science) Sixth Semester Syllabus

Paper Title: Application Development With Java and .NET framework	Paper Number: First
Paper Code: B.Sc.-601	Maximum Marks: 80

Unit -I

Introduction, The Origin of .Net Technology, Common Language Runtime (CLR), Common Type System (CTS), Common Language Specification (CLS), Microsoft Intermediate Language (MSIL), Just-In -Time Compilation, Framework Base Classes

Unit -II

HTML Tags, Paragraphing, line Break tag, Bullet and Numbering tag, Text formatting tags, (Bold, Italic, Underline, strike through, subscript, superscript) Marquee tag, Hyperlink tag, Inserting Back ground image, Horizontal Rule, Changing the Background and fore ground color, Creating table, merging cells, splitter cells, Inserting Colum heading table caption etc. Java Script, Cascading Style Sheet (CSS).

Unit -III

Control Flow Statements, Iterations, looping Structure, Array : Accessing Array elements, Multidimensional Arrays, Dynamic Arrays, Lbound and Ubound statements Option Base Statement, Interacting with the basic Controls, Forms, Form Collection, Controlling one form within another MDI form, command Buttons, Label Control, Text Box Control, Capturing the Key Strokes, List Box Controls, Combo Box Controls, more Controls : Radio Buttons, Scrollbars, timer Control, Running Lights Application, Image Control, Drive List Box, Searching a drive the directory list box, file Box copying a file, Deleting a File, Renaming a File, Moving a File.

Unit -IV

Java Programming Language and its oops features, Java features, java and world wide web, java environment and JDK (Java Development toolkit), Process of compilation, Java tokens, Identifiers, operators, variables and its declaration rules, data types, type-casting, java operators, control statement and looping structure in java, exception handling in java, servlet life cycle, swing and java Beans.

Referenced Books:

- [1] Christian Nagel, Bill Evjen, Jay Glynn, Karli Watson, Morgan Skinner "Professional C# 2012 and .NET 4.5", Wiley Publication.
- [2] Conrad Akunga, "Mastering C# 7.2 and .NET core 2.1 Application Development, Kindle Edition.
- [3] Ivan Bayross, "Web enabled commercial application Development using HTML, Javascript, DHTML and PHP", BPB Publication, 4th Revised Edition.
- [3] E Balagurusamy, "Programming with Java a primer", McGraw Hill Publication, 3rd Edition.



Department of Computer Science
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B.Sc (Computer Science) Sixth Semester Syllabus

Paper Title: Data Communication and Computer Network	Paper Number: Second
Paper Code: B.Sc.-602	Maximum Marks: 80

Unit -I

Data, Information, Data Vs Information, Data Communication and its Component, Communication Media, Data transmission Modes, Modem and its major types, Computer network and its advantages, World Wide Web, Internet, LAN, MAN, WAN, Bridge, router, Switch, Repeater.

Unit -II

OSI reference Model, TCP/IP Model, OSI Model Vs TCP/IP Model, Network topologies, IEEE Standards for Local Area Networks, IEEE 802.3 Ethernet Technologies, IEEE 802.4 Token Bus, IEEE 802.5 Token Ring, IEEE 802.6 Distributed, Queue Dual Bus, FDDI.

Unit -III

Sliding Window Protocols, Point-to-Point Protocol (PPP), Multiple Access Protocols, Error Detection and Error Correction, IPV6, IPV4, FTP, SMTP.

Unit -IV

Network Security and AIC triad (availability, integrity and confidentiality), Cryptography: Notion of Plain Text, Encryption, Key, Cipher Text, Decryption and cryptanalysis, Public Key Encryption, digital Signatures and Authentication.

Referenced Books:

- [1] Brijendra Singh, "Data Communication and Computer Networks", PHI Publication, Fourth Edition.
- [2] Brijendra Singh, "Network Security and Management", PHI Publication, Third Edition.
- [3] Behrouz A Forouzan, "Data Communication and Networking", McGraw Hill Publication, Fifth Edition.

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B.Sc - 603 Practical (Java, .NET framework, Microprocessor 8086, Database) MM-100

List of Exercise based on Java, .NET framework, Microprocessor 8086, Database:

Java:

1. Input output based simple java program
2. Control statement based java program
3. Looping structure based java program
4. Implementation of arrays and strings
5. Implementation nested loops.
6. Implementation of OOPs Concepts ,
7. Implementation of access modifiers.

HTML and CSS implementation using .NET framework:

1. Implementation of single and paired tags
2. Implementation of tables and frames
3. Implementation of cell spacing and cell padding
4. Implementation of marquee
5. Implementation of row span and column span
6. Implementation of java with HTML
7. CSS attachment and Implementation

Exercise based on Database (Oracle latest version):

1. Database, record and field creation.
2. Schema building
3. Implementation of DDL command
4. Implementation of DML command
5. Primary key, foreign key and composite key Implementation
6. Records insertion and retrieval through queries
7. Database connection to HTML page and inserting and retrieval of records through HTML pages.

Exercise based on Microprocessor 8086:

1. Implementation of Data transfer instructions
2. Implementation of Arithmetic Instructions
3. Implementation of logical instructions
4. Implementation of Branching Instructions
5. Implementation of Adders and Subtractors

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