

**Dept. of Computer Science and Engineering**  
Jahangirnagar University  
Syllabus for B.Sc. (Hons.) in Computer Science and Engineering  
(Effective from 2018-19)

**Detail Syllabus**  
**of**  
**Third Year Second Semester**

<b>Course code</b>	<b>:</b>	CSE 350	<b>Credit</b>	<b>:</b>	1.0
<b>Title</b>	<b>:</b>	Viva-Voce	<b>Prerequisite</b>	<b>:</b>	None
<b>Type</b>	<b>:</b>	<i>Viva-Voce</i>	<b>Contact hours</b>	<b>:</b>	-

**Rationale**

Viva-Voce is used to measure and evaluate the students through oral examination on their previous taught/learned courses so that students have ability to face viva-board confidently in their professional life.

**Course Objectives**

Measure and evaluate the students through oral examination on their previous taught/learned courses

**Students Learning Outcomes**

After successful completion of this course, students should be able to:

- Expose their views orally in different situations on diverse fields of Computer Science and Engineering

**Course Description**

<b>#</b>	<b>Title and Descriptions</b>
	The viva-voce will be held on all the courses of third year second semester.

**References**

The reading materials provided by the Course Teachers for all the courses of third year second semester

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<b>Course code</b>	:	BIS 351	<b>Credit</b>	:	3.0
<b>Title</b>	:	Management and Accounting	<b>Prerequisite</b>	:	None
<b>Type</b>	:	<i>Theory</i>	<b>Contact hours</b>	:	39

### Rationale

The course gives an introduction to management and accounting. It enables students to develop knowledge and skills to plan, control and manage financial affairs of individuals, communities, and businesses.

### Course Objectives

- To learn about basic concepts and principles of business and accounting
- To introduce the role of accounting and financial reporting in market economy
- To develop the skill of evaluating the performance of business organization

### Students Learning Outcomes

After successful completion of this course, students should be able to:

- Understand the accounting rules and regulations required for business enterprises
- Prepare financial statements in accordance with Generally Accepted Accounting Principles
- Explain the concepts and procedures of financial reporting, including income statement, statement of retained earnings, balance sheet, and statement of cash flows
- Apply management accounting ideas and experiences in making decisions in businesses

### Course Description

#	Title and Descriptions
1	Objectives and importance of accounting; Accounting as an information system; computerized system and applications in accounting;
2	Recording system: double entry mechanism; Accounts and their classification; Accounting equation;
3	Accounting cycle: journal, ledger, trial balance; Preparation of financial statements considering adjusting and closing entries; Accounting concepts (principles) and conventions.
4	Financial statement analysis and interpretation: ratio analysis.
5	Cost concepts and classification; Overhead cost: meaning and classification; Distribution of overhead cost; Overhead recovery method/rate;
6	Job order costing: preparation of job cost sheet and quotation price;
7	Inventory valuation: absorption costing and marginal/variable costing technique; Cost-Volume-Profit analysis: meaning, breakeven analysis, contribution margin approach, sensitivity analysis.
8	Short-term investment decisions: relevant and differential cost analysis. Long-term investment decisions: capital budgeting, various techniques of evaluation of capital investments

Recommended Books					
1.	Accounting Principles	J. J. Weygandt, D. E. Kieso	12 <sup>th</sup>	John Wiley & Sons	2015
2.	Fundamentals of Accounting of Course	R.E. Ross Claudia, B Gilbertson, Mark W. Lehman, O.D. Manson	7 <sup>th</sup>	PHI	2009
3.	Advanced accountancy	H. Chakrabarty	3 <sup>rd</sup>	Oxford University Press	1978
4	FINANCIAL ACCOUNTING: A MANAGERIAL PERSPECTIVE	R. NARAYANASWAMY	4 <sup>th</sup>	PHI	2011

<b>Course code</b>	:	CSE 353	<b>Credit</b>	:	3.0
<b>Title</b>	:	Human Computer Interaction	<b>Prerequisite</b>	:	Computer Peripherals, Computer Programming
<b>Type</b>	:	<i>Theory</i>	<b>Contact hours</b>	:	39

Rationale
The course gives an introduction to Human Computer Interaction design principles. Students will get basic knowledge about how to develop methodologies, explore various interaction paradigms, evaluate and implement interactive hardware and software computing systems for supporting human–computer interaction in a novel way.

Course Objectives
<p>Upon successful completion of this course the student will be able to understand:</p> <ul style="list-style-type: none"> <li>• The definitions and foundations of the HCI domain.</li> <li>• Strategies to study a human user population.</li> <li>• User-centered techniques for designing interfaces and interactive solutions.</li> <li>• Evaluation methods, quality factors, and data analysis techniques.</li> <li>• The research frontiers of HCI including universal design, responsive design and pervasive computing.</li> </ul>

Students Learning Outcomes
<p>After successful completion of this course, students should be able to:</p> <ul style="list-style-type: none"> <li>• Understand the basics of human and computational abilities and limitations.</li> <li>• Understand basic theories, tools and techniques in HCI.</li> <li>• Understand the fundamental aspects of designing and evaluating interfaces</li> </ul>

Course Description	
#	Title and Descriptions
1	<b>Human and computer fundamentals</b> Human memory, Thinking: Reasoning and Problem solving, Psychology and the design of interactive system, Text entry devices, Display devices, Devices for virtual reality and 3D interaction, Processing and Networks

<b>2</b>	<b>User Studies and UI design</b> Data collection, Interviews & Surveys, Observation, Diaries, Focus Groups, Ethnographic studies, Personas, Planning and conducting, Task analysis, requirements elicitation, mixed-fidelity prototyping, wireframes, storyboards, sketches & mockups
<b>3</b>	<b>Interaction Design</b> Frameworks and HCI, Ergonomics, Interaction styles: Navigation in 3D and 2D, Paradigms, WIMP, multimodality, BCI, cross-device interaction
<b>4</b>	<b>HCI in Software process</b> Usability engineering, Interactive design and prototyping, Design rationale, Usability support principles, Golden rules and heuristics, HCI patterns
<b>5</b>	<b>Evaluation and support system</b> Expert evaluation models: analytic methods, review methods, model-based methods, Approaches involving user: experimental methods, observation methods, query method, User support styles: command-based methods, context-sensitive help, wizards and assistants, adaptive help
<b>6</b>	<b>Cognitive models</b> Cognitive architecture, Hierarchical models, Linguistic models, Physical and device models, Task analysis
<b>7</b>	<b>Communication and collaboration model</b> Face-to-face communication, Conversation, Text-based communication, Group working, Speech act theory, Dialog design notation, Diagrammatic notations, Dialog semantics
<b>8</b>	<b>Ubiquitous computing</b> UbiComp, Ubiquitous computing application research, Virtual reality, Augmented reality, Information visualization
<b>9</b>	<b>Multimedia and Presentation</b> Hypertext, multimedia, world wide web, rich content, Animation, Static and dynamic web content
<b>10</b>	<b>HCI over various periods</b> Past and future of HCI: the past, present and future, perceptual interfaces, context-awareness and perception

Recommended Books					
1.	Human-Computer Interaction	Alan Dix, Janet E. Finlay, Gregory D. Abowd, Russell Beale	Third	Prentice-Hall	2004
2.	Human-Computer Interaction Handbook	Andrew Sears, Julie A. Jacko	Third	CRC Press	2009
3.	Research Methods in Human Computer Interaction	Jonathan Lazar, Jinjuan Feng and Harry Hochheiser	Second	Wiley Publishing	2010

<b>Course code</b>	:	CSE 355	<b>Credit</b>	:	3.0
<b>Title</b>	:	Introduction to Bioinformatics	<b>Prerequisite</b>	:	None
<b>Type</b>	:	<i>Theory</i>	<b>Contact hours</b>	:	39

## Rationale

This course is designed to enable students to apply information technology and computational intelligence in studying the living things specifically at the molecular level. Students can develop efficient methods and software tools for understanding the relationships among the members of large biological data sets, such as sequence alignment, gene finding, genome assembly, drug discovery, protein structure alignment, prediction of gene expression, genome-wide association studies, the modeling of evolution and cell division etc.

## Course Objectives

- To give a broad outline of bioinformatics and its scope and familiarize with the terminology
- To grow elementary understanding of the important notions of bioinformatics
- To develop the skill to utilize the tools and methods used in biological datasets
- To promote the programming skill to implement the basic algorithms in bioinformatics
- To grow the skill to deal with the multidisciplinary problems

## Students Learning Outcomes

After successful completion of this course, students should be able to:

- Explain and comprehend bioinformatics, genomics, proteomics, and phylogenetic concepts
- Work with and use commonly available tools and techniques efficiently on biological datasets (offline/online)
- Develop solutions to bioinformatics problem and write programs to implement basic algorithms

## Course Description

#	Title and Descriptions
1	<b>Review of molecular biology</b> Genes and DNA, RNA, Amino acids, Protein, Enzymes, genetic code, etc.
2	<b>Information organization and sequence databases, molecular evolution</b> Public databases, primary and secondary databases, natural selection, mechanisms of mutations, etc.
3	<b>Substitution matrices &amp; pairwise sequence alignment</b> Introduction, Identity substitution matrices, PAM, BLOSUM, Sliding window, dot plot The Needleman and Wunsch Algorithm, The Smith-Waterman Algorithm, FASTA, BLAST, etc.
4	<b>Brief introduction to Perl &amp; MySQL</b> <b>a. Programming</b> <i>Perl</i> : Downloading and installing Perl, Basic Perl syntax and logic, References, Subroutines and modules, Regular expressions, File handling and directory operations, Error handling, etc. <b>a.Database/DBMS</b> <i>MySQL</i> : Installing and configuring a MySQL server, Relational Database Design, Database access using SQL, etc.
5	<b>Multiple Sequence Alignment (MSA), &amp; Protein structure prediction</b>

	Multiple Sequence Alignment, Experimental methods of protein structure determination, Protein folding, Protein structure prediction methods, etc.
<b>6</b>	<b>Phylogenetics &amp; Hidden Markov Model (HMM)</b> Phylogeny and phylogenetics, Two classes of tree-generation methods, Application of phylogenetics to studies of the origin of modern humans, Phylogenetic Tree of Life, Introduction to Hidden Markov Model, etc.
<b>7</b>	<b>Genomics, Transcript and protein expression analysis</b> DNA sequencing-dideoxy method, Polymerase chain reaction (PCR), The human genome, Basic principles of gene expression, Proteome, etc.

Recommended Books					
1.	Concepts in Bioinformatics and Genomics	Jamil Momand (Author), Alison McCurdy (Author), Silvia Heubach (Contributor), Nancy Warter-Perez (Contributor)	1 <sup>th</sup>	Oxford University Press	2016
2.	Fundamental Concepts of Bioinformatics	Dan E. Krane (Author), Michael L. Raymer (Author)	1 <sup>th</sup>	Pearson	2002
3.	Building Bioinformatics Solutions: with Perl, R and MySQL	Conrad Bessant (Author), Darren Oakley (Author), Ian Shadforth (Author)	2 <sup>nd</sup>	Oxford University Press	2014
4.	Molecular Biology: Structure and Dynamics of Genomes and Proteomes	Jordanka Zlatanova (Author), Kensal E. van Holde (Author)	1 <sup>th</sup>	Garland Science	2015

<b>Course code</b>	:	CSE 357	<b>Credit</b>	:	3.0
<b>Title</b>	:	Microprocessors	<b>Prerequisite</b>	:	None
<b>Type</b>	:	Theory	<b>Contact hours</b>	:	39

Rationale
This course makes students familiar with the architecture and the instruction set of an Intel microprocessor. Students get the opportunity to study machine addressing, stack operations, subroutines, and programmed and interrupt driven I/O and the basic concepts of machine organization of a modern digital computer.

Course Objectives
<ul style="list-style-type: none"> <li>To learn about basic concepts and principles of microprocessor and instruction set architecture</li> <li>To study the structure and timing of typical microprocessors, memories, UARTS, timer/counters, serial devices and related devices, MUX and related control structures for building systems</li> <li>To become familiar with interrupt programming and hardware/software design tradeoffs</li> <li>To introduce various advanced processor architectures such as 80X86, Pentium and Multicore Processors</li> </ul>

## Students Learning Outcomes

After successful completion of this course, students should be able to:

- Design, build and program embedded systems including both hardware and software efficiently
- Explain the architecture of different types of microprocessor instructions, the use of procedures and macros, interrupts, the interfacing of various peripheral devices with the microprocessor etc.
- Compare the characteristics of various microprocessors
- Identify and explain the need for advance microprocessors

#	Topics and Descriptions
1.	<b>Introduction to Microprocessors and Microcomputer-Based Applications</b> Evolution of Microprocessor, Microprocessor Data Types, Microcomputer Hardware, Input/Output(I/O), Microcomputer System Software and Programming Concepts
2.	<b>Intel 8086 and its higher versions (80286, 80386)</b> Introduction, Internal architecture, 8086 Addressing modes, 80286 Memory Management, Protection, Basic 80386 Programming Model, 80286 and 80386 addressing modes
3.	<b>I/O Interfaces, DMA Controllers and Interrupts</b> Serial and Parallel Communication Interfaces, Synchronous and Asynchronous Communications, 8251 A Programmable Communication Interface; General Organization of a DMA controller, Organization of an 8237 and its associated logic, Interrupt and Interrupt service routine
4.	<b>Keyboard and Display</b> Keyboard design, Display Design, 8279 Keyboard Display Controller
5.	<b>Semiconductor Memory</b> General memory Organization and types of memory, General memory Organization, Static RAM and Dynamic RAM, 16K×8 memory module for a maximum mode 8088
6.	<b>Pentium Microprocessors</b> Introduction, Architecture, Register sets, Cache, Floating Point Operations, Addressing Modes, Paging, Instruction Set, Opcode, Interrupt, Protected Mode Operations, Hyper-Threading Technology.
7.	<b>Next Generation Microprocessor</b> Intel Core Architecture, Intel Dual Core, Core 2 Duo, Core 2 Quad, Core i3, Core i5, Core i7, Mobile Microprocessors, ARM, Helio, Atom.

## Recommended Books

1.	Microcomputer Systems: The 8086/8088 Family Architecture, Programming and Design	Yu-cheng Liu and Glenn A. Gibson	2 <sup>nd</sup>	Prentice-Hall of India	2011
2.	Microprocessors and Microcomputer-Based System Design	Mohammad Rafiquzzaman	2 <sup>nd</sup>	CRC Press	1995
3.	Advanced Microprocessor and Peripherals	K Bhurchandi , A. K. Ray	3 <sup>rd</sup>	McGraw Hill Education	2017
4.	The Intel Microprocessors: 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro Processor, Pentium II, Pentium III, Pentium 4 and Core2 with 64 - bit Extensions	Barry B. Brey	8 <sup>th</sup>	Pearson	2012

<b>Course code</b>	<b>:</b>	CSE-358	<b>Credit</b>	<b>:</b>	1
<b>Title</b>	<b>:</b>	Microprocessors and Assembly Language Lab	<b>Prerequisite</b>	<b>:</b>	None
<b>Type</b>	<b>:</b>	<i>Laboratory Work</i>	<b>Contact hours</b>	<b>:</b>	26

### Rationale

This lab course is designed to teach students about basic principles of microprocessor and assembly language programming skills and real time applications of Microprocessor as well as microcontroller.

### Lab Objectives

- To introduce students with the internal architecture of the Microprocessor.
- To give a basic knowledge of programming in Assembly language
- To give a practical experience of how to program with the microprocessor
- To utilize the Intel 8086-80586 instruction set and will perform programming exercises in MS-DOS mode

### Lab Outcome

After successful completion of this course, students should be able to:

- Write programs and solve problems in Assembly language
- Compare assembly programs with other programming languages

Exp. #	Title and Descriptions
1	Basics of Assembly Language Programming.
2	Introducing with Processor Status and Flag Register.
3	Programming with Flow Control Instructions.
4	Programming with Logic, Shift and Rotate Instructions.
5	Programming with Multiplication and Division Instructions.
6	Programming with Arrays and Addressing Modes.
7	Programming with String Instructions.
8	Introducing with Procedures.
9	Introducing with Files.

### Hardware and Software Requirements

<i>H/W Requirements</i>	<i>S/W Requirements</i>
Core i5, 1.8 GHz, 4 gig RAM, 500 meg disk space	MASM / TASM / Assembly Emulator

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<b>Course code</b>	<b>:</b>	CSE-359	<b>Credit</b>	<b>:</b>	3.0
<b>Title</b>	<b>:</b>	Computer Networks	<b>Prerequisite</b>	<b>:</b>	Data Communication
<b>Type</b>	<b>:</b>	<i>Theory</i>	<b>Contact hours</b>	<b>:</b>	39



## Rationale

This course gives students an opportunity to learn about computer network organization and implementation, theoretical understanding of computer networks and finally gaining practical experience in designing communication protocols, installation, monitoring, and troubleshooting of current LAN systems.

## Course Objectives

The objectives of the course are to

- Make students familiar with protocol stack of different network.
- Provides the way of channel sensing, channel sharing and transmission of IP and TCP packet.
- Give the idea of some real applications like DNS; Electronic Mail; The World Wide Web; Multimedia etc.
- Provide the technique of ensuring security of a network at application layer

## Students Learning Outcomes

After successful completion of this course, students should be able to:

- Design and analyze LAN for an educational/research institute or office.
- Simulate LAN traffic at MAC layer
- Configure different applications like DNS, SMTP, HTTP servers etc.
- Apply security to networks of a corporate office

## Course Description

#	Title and Descriptions
1	<b>Introduction</b> Basic concept of computer network; Network classification, structure/topology; Protocol Hierarchies; Open System Interconnection; Example networks.
2	<b>Physical layer</b> Guided physical transmission media, baseband and passband transmission, PSTN; circuit and packet switching, Mobile telephone system; ADSL.
3	<b>Data Link Layer</b> Data link layer design issues; Framing, Error detection and correction; Elementary data link protocols; Sliding window protocols; The data link layer in the Internet.
4	<b>Medium Access Sub-layer</b> Multiple Access Protocols: ALOHA; CSMA/CD Protocol; Collision-free protocols; Wireless LAN protocols; Ethernet; Bluetooth; Datalink layer switching.
5	<b>Network Layer</b> Network layer design issues; IP address and subnet masking, Routing algorithms; Congestion control algorithms; Internetworking; Network layer in the internet; Network layer in ATM networks.
6	<b>Transport Layer</b>

	The transport service; Elements of transport protocols; three-way handshake; TCP Congestion Control, The internet transport protocols; Application Layer: DNS-Domain Name System; Electronic Mail; The World Wide Web; Multimedia.
<b>7</b>	<b>Network Security</b> Secrecy; cryptography, substitution and transposition cipher; public and private key; RSA; basic of digital signature; message digest; Secure Hash Algorithm.

<b>Recommended Books</b>					
<b>1.</b>	Computer Networks	Andrew S. Tanenbaum	5 <sup>th</sup>	Prentice Hall	1988
<b>2.</b>	Data Communications and Networking	Behrouz A. Forouzan	5 <sup>th</sup>	Mcgraw-Hill Forouzan Networking Series	2007
<b>3.</b>	Data and Computer Communications	William Stallings	8 <sup>th</sup>	Pearson Prentice Hall	2007
<b>4.</b>	Internetworking with TCP/IP	Douglas E. Comer	5 <sup>th</sup>	Prentice Hall of India	2013

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<b>Course code</b>	:	CSE-360	<b>Credit</b>	:	1.0
<b>Title</b>	:	Computer Networks Laboratory	<b>Prerequisite</b>	:	Data Communication
<b>Type</b>	:	<i>Laboratory Work</i>	<b>Contact hours</b>	:	26

<b>Rationale</b>
This lab course is designed for the students to achieve a hands on experience on basic computer network. Theoretical lectures are completed by lab practice where theoretical knowledge is applied in an appropriate software environment. Students become familiar with the basic protocols of computer networks and can learn how these protocols can be used appropriately to assist in network design and implementation.

<b>Lab Objectives</b>
To configure different types of network using simulation or network hardware/software

<b>Lab Outcome</b>
<p>Upon successful completion of this lab, the students should be able to:</p> <ul style="list-style-type: none"> <li>• Configure practical network of an organization</li> <li>• Have a basic knowledge of the use of cryptography and network security</li> <li>• Identify deficiencies in existing protocols and formulate new and better protocols</li> <li>• Understand the issues surrounding Mobile and Wireless Networks</li> <li>• Have a working knowledge of datagram and internet socket programming</li> </ul>

Exp. #	Title
1	Verification of Some Fundamental Commands of Network Connections
2	Packet through HUB, Bridge and Switch with basic client server model
3	Configuration of a Router from Command Line Interface (CLI)
4	Connection multiple routers and incorporation of host between two routers
5	VLAN Configuration with layer 3 switch and router
6	Implementation of SMTP
7	Verification of Telnet and Secure Shell
8	DNS Server and Web Browsing
9	Observation of FTP and HTTP protocols
10	IP telephony system
11	Implementation of OSPF (Open Shortest Path First) Algorithm
12	Implementation of RSA algorithm for text/image transmission

Hardware and Software Requirements	
<i>H/W Requirements</i>	<i>S/W Requirements</i>
LAN card, cables connectors, switch, HUB, Router	CISCO Packet Tracer, Matlab 18

<b>Course code</b>	:	CSE-362	<b>Credit</b>	:	1
<b>Title</b>	:	Web Design and Programming Lab-II (JSP/Python)	<b>Prerequisite</b>	:	None
<b>Type</b>	:	Laboratory Work	<b>Contact hours</b>	:	26

Rationale
This lab course is designed to make students efficient in Web Design and Programming with Python through a hands-on guide to object-oriented python web programming, working with multiple types of servers, databases and web frameworks.

Lab Objectives
<p>This course is an introduction to server side programming for the World Wide Web. We'll examine Server side technologies in depth:</p> <ul style="list-style-type: none"> <li>• Server side programming with Python and Java</li> <li>• Understanding popular framework for Python and Java for web application</li> <li>• Programming in Python and JAVA with framework</li> <li>• Understanding security issues and its protection.</li> <li>• Structure Query Language (SQL) for interacting with databases</li> </ul>

**Lab Outcome**

After completing this Laboratory course, the students will have:

1. Detail knowledge about server side programming
2. Securing web application
3. Practical experience of Python and JSP programming

Exp. #	Title and Descriptions
1	Understanding and Programming with Python-I
2	Understanding and Programming with Python-II
3	Understanding and Programming with Python-III
4	Installing Django framework
5	Programming with Django Admin
6	Django form and its registration
7	Development and programming with Django model
8	Understanding and Programming with JSP-I
9	Understanding and Programming with JSP-II
10	Understanding and Programming with JSP-III
11	Understanding Spring Framework
12	Framework application with form
13	Framework application with Database

**Hardware and Software Requirements**

<i>H/W Requirements</i>	<i>S/W Requirements</i>
High configuration PCs equipped with required software	pyCharm and Eclipse

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