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

First Year First Semester

Course code	**:**	CSE 100	**Credit**	**:**	1.0
Title	:	Viva-Voce	**Prerequisite**	**:**	None
Type	:	*Viva-Voce*	**Contact hours**	**:**	-

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	
#	**Title and Descriptions**
	The viva-voce will be held on all the courses of first year first semester.

References
The reading materials provided by the Course Teachers for all the courses of first year first semester

Course code	**:**	MATH 101	**Credit**	**:**	3.0
Title	**:**	Mathematics I (Matrix, Differential Calculus and Coordinate Geometry)	**Prerequisite**	**:**	None
Type	**:**	*Theory*	**Contact hours**	**:**	39

Rationale

The solution of systems of linear equations can be solved by Matrix. Differential calculus concerned with finding tangent lines and rates of change. Algebraic problem can be solved by geometry. So Matrix, Differential calculus and Coordinate geometry is essential for CSE graduates.

Course Objectives

- To learn about matrix, determinant and its application to the solution of systems of linear equations.
- To analyze functions and their graphs. It will be shown how calculus and graphing utilities, working together, can provide most of the important information about their behavior of functions.
- To provide students with a good understanding of the concepts two dimensional geometry.
- To Students will learn about co-ordinate, translation and rotation of axis, conic, conic section for two dimension.
- To learn about two/ three dimensional co-ordinate, conicoid i.e. sphere, cone, cylinder, parpabolid, ellipsoid, hyperboid

Students Learning Outcomes

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

- Use matrix to the solution of systems of linear equations.
- Analyze functions and their graphs and how calculus and graphing utilities, working together, can provide most of the important information about their behavior of functions.
- Understand co-ordinate and its translation and rotation, point, line, mid-point, distance and vector in two-dimensional space.
- Solve two/ three dimensional co-ordinate, conicoid i.e. sphere, cone, cylinder, parpabolid, ellipsoid, hyperboid problems

Course Description

#	Title and Descriptions
1	**Matrices** Definition of matrix; Different types of matrices; Algebra of matrices; Adjoint and inverse of a matrix; Elementary transformations of matrices; Matrix polynomials; Calay-Hamilton theory with uses of rank and nullity; Normal and canonical forms; Solution of linear equations; Eigenvalues and eigenvectors.
2	**Basic differentiation** Graphs and Equations: Functions and Models, Finding Domain and Range, Slope and Linear Functions, Nonlinear Functions and Models, Mathematical Modeling and Curve Fitting, Limits: A Numerical and

	Graphical Approach, Algebraic Limits and Continuity, Average Rates of Change, Differentiation Using Limits of, Difference Quotients, Differentiation Techniques: The Power and Sum–Difference Rules, Differentiation Techniques: The Product and Quotient Rules, The Chain Rule, Higher-Order Derivatives
3	**Application of Differentiation** Using First Derivatives to Find Maximum and Minimum Values and Sketch Graphs, Using Second Derivatives to Find Maximum and Minimum Values and Sketch Graphs, Graph Sketching: Asymptotes and Rational Functions, Using Derivatives to Find Absolute Maximum and Minimum Values, Maximum–Minimum Problems; Business and Economics Applications, Marginals and Differentials, Implicit Differentiation and Related Rates
4	**Exponential and logarithmic Differentiation** Exponential Functions, Logarithmic Functions, Applications: Uninhibited and Limited Growth Models, Applications: Decay, The Derivatives of and a^x and $\log_a{}^x$, Economics Applications
5	**2D Co-ordinate Geometry-1** Change of axes: transformation of coordinates. Simplification of equations of the curves. Pair of straight lines: Homogeneous second degree equations. Conditions for general second degree equations to represent a pair of straight lines. Angle between the lines. Pair of straight lines joining the origin to the points of intersection of the curve and a line.
6	**2D Co-ordinate Geometry-2** Circles and system of circles: Tangents and normals. Pair of tangents. Chord of contact. Orthogonal circles. Radical axis and its properties. Parametric coordinates.
7	**3D Co-ordinate Geometry** Rectangular coordinates. Direction cosines and angle between two lines. The plane and the straight lines. The equation of a sphere. The standard forms of equations of the central conicoids, cones and cylinders.

Recommended Books

1.	Calculus and its applications	Marvin L. Bittinger, David J. Ellenbogen and Scott A. Surgent	10th	Pearson	2012
2.	Textbook of Differential Calculus	Ahsan Akhtar & Sabiha Ahsan	2nd	PHI	2009
3.	Golden Co-ordinate Geometry	N. P. Bali	2nd	LUXMI	2008

Course code	**:**	ENG 103	**Credit**	**:**	3.0
Title	**:**	Communicative English	**Prerequisite**	**:**	None
Type	**:**	Theory	**Contact hours**	**:**	39

Rationale

For effective communication, competence in English language skill is necessary. This course gives opportunity to the students to know English grammars and to improve vocabulary, reading, writing, speaking and listening skils.

Course Objectives

- To learn from real life interaction which can help to reinforce the value of their studies.
- To explore the Communicative Approach and how to improve your English Communication skills
- Give students of an international community accurate and meaningful communicating skills which will include expressions for personal identification
- Deals with the practical and communicative aspects of the English Language by reinforcing and manipulating the sounds and grammatical patterns of the language needed in an international situation through dialogues

Students Learning Outcomes

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

- Cope students of an international community accurate and meaningful communicating skills which will include expressions for personal identification
- Deal with the practical and communicative aspects of the English Language by reinforcing and manipulating the sounds and grammatical patterns of the language needed in an international situation through dialogues

Course Description

#	Descriptions
1	**Vocabulary** Clues to the meaning of a word: Position in the clause, prefixes, suffixes, roots, revising and expanding vocabulary, Borrowing, New words from English: compounds and derivatives, meaning and formal relationship
2	**Grammar** Clause: structure, function, variation and expansion, The noun in the clause: number, determiners, The Pronoun in the clause: number, case, agreement and reference. The verb in the clause: form, tense, voice, mood, subject-verb agreement. The modifiers in the clause: adjective, adverb, infinitive, participles, The conjunctions and prepositions to suggest different relationships: time, space, cause, result, purpose, condition, exception, etc., Remedial grammar: Identifying and correcting errors and weaknesses.
3	**Speaking** The art of speaking, body language, how to ask questions, make requests and give instructions; How to respond to queries, invitations and statements; How to introduce and thank, express gratitude, regret or appreciation; How to communicate in particular everyday situations; How to express different concepts: ability, possibility, futurity, necessity, obligation, assumption, regularity, continuity, arrangement, comparison, etc.
4	**Reading** For skimming; For comprehension; For interpretation, Eye movement, chunking, speed reading and SQ3R method
5	**Writing** Spelling, punctuation, indenting, brackets, abbreviation, numbers and fractions, capitalization, underlining, hyphenation, etc, Organization of writing- of sentences in paragraph, and of paragraphs, in essays and letters. Practical Writing**:** personal & official correspondence, job application, CV.

6	**Listening** Lynchpin of Communication, Hearing and Listening, kind of listening, active listening, good listening, barriers of good listening negotiation skills, Introducing audio visual materials and/or movies to develop listening skills.
7	**Creativity and Inter-personal skills** Creativity: Times When you Are Creative, Ways in Which You can be Creative, Developing Your Creativity, Factors that Block Creativity, Mind-Mapping and the Learning Process, Team and Conflict Management, Communication in Teams, Group Discussions (GD), Structuring the GD, Interviews, Techniques of Interviewing, Preparing for an Interview, Kinds of Questions Expected at Interviews, The Interview Process

Recommended Books

1.	Communication Skills for Engineers	Sunita Mishra, C. Muralikrishna	2nd	Pearson	2011
2.	Applied English Grammar & Composition	P.C. Das	4th		1997
3.	How to Speak and Write Correctly	Joseph Devlin	2nd	McGraw-Hill	2013
4.	English Skills with Readings	John Langan , Zoe Albright	9th		2014

Course code	**:**	CSE 105	**Credit**	**:**	3.0
Title	**:**	Structured Programming	**Prerequisite**	**:**	None
Type	**:**	Theory	**Contact hours**	**:**	39

Rationale

This course is designed to introduce students in the algorithmic way of thinking and problem solving by computers. Students learn the fundamental principles of structured programming. Typical characteristics and mechanisms of a structured programming language are introduced and students are introduced to the design and development of structured programs in this language. C programming language is used as the course basis. Lectures are completed by lab practice where theoretical knowledge is applied in an appropriate software environment.

Course Objectives

- To make students familiar with basic programming principles, good programming style, structured approach to program design, development, testing and documentation

Students Learning Outcomes

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

- Formulate problems step by step and design computer programs in a structured way
- Identify programming data structures and describe programming methodologies

- Apply fundamental programming concepts using high-level programming language to solve problems

Course Description	
#	**Title and Descriptions**
1	**Structured Programming Language fundamentals** C overviews, History and Features, Basic Structure of C Program and Hello World Program, C Program Development Environment
2	**Variables, Constants, Data Types, Operators & Expression** Declaring variables and assigning values, input from keyboard, add comments, Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special Operators, Arithmetic Expressions, Evaluation of Expressions, Type Conversions in Expressions, Operator Precedence and Associativity.
3	**Program control statements** Decision Making Statements: if-else statement, switch statement; Looping Statements: for loop, while loop, nested if, do while loop, nested loop; Jump Statements: continue, break
4	**Functions** Function prototype, recursion, parameters, arguments, scope rules and storage classes.
5	**Arrays and Pointer** One and Multi-dimensional arrays, Character Arrays and Strings, Basic of Pointer, pointer expression, pointer arrays.
6	**User defined data types and Input/ Output** Structures, Unions, Enumerations, Standard input and output, Formatted input and output, File access; Variable length argument list; Command line parameters; Error Handling; Graphics; Linking; Library functions.
7	**Memory manipulation and Preprocessor** Dynamic Memory Allocation and Linked List, Macro substitution, File inclusion, Compiler Control Directives.

Recommended Books					
1.	Teach yourself C	Herbert Schildt	3rd	McGraw-Hill	1997
2.	Programming in ANSI C	E. Balagurusamy	7th	Tata Mcgraw-Hill	2016
3.	C: The Complete Reference	Herbert Schildt	4th	McGraw-Hill	2000
4.	C-How to Program	Paul Deitel and Harvey Deitel	7th	Prentice Hall	2017

Course code	**:**	CSE- 106	**Credit**	**:**	1
Title	**:**	Structured Programming Laboratory	**Prerequisite**	**:**	None
Type	**:**	Laboratory Work	**Contact hours**	**:**	26

Rationale
This lab course is designed for the students to achieve a hands on experience on basic programming. C programming language is used as the course basis. Theoretical lectures are completed by lab practice where theoretical knowledge is applied in an appropriate software environment.

Lab Objectives
• To introduce students to give practical experience on basic programming principles, good programming style, design and solve the problems in a structured approach.

Lab Outcome
Upon successful completion of this course, the students should be able to: • Solve problems step by step and design computer programs • Apply fundamental programming concepts using high-level programming language

Lab Course Description

Exp. #	**Title and Descriptions**
1	Introduction: - Code::Block or Dev-C++ or Visual C++ - How to write, save, compile and run a C program.
2	Variables, Constants, Data Types, Operators & Expression (PART-I)
3	Variables, Constants, Data Types, Operators & Expression (PART-II)
4	Managing Input and Output Operations and Conditional Statements
5	Looping Statements
6	Arrays and String
7	Search and Sorting
8	User-defined Functions
9	Recursion
10	Pointer
11	Structure and Union and File processing
12	Dynamic Memory Allocation and Linked list
13	Graphics Programming

Hardware and Software Requirements

H/W Requirements	*S/W Requirements*
Core i5, 1.8 GHz, 4 GB RAM, 500 MB disk space	**Popular C compilers/IDEs include:** Code::Block/ Microsoft Visual Studio Community

Course code	**:**	CSE- 107	**Credit**	**:**	3.0
Title	**:**	Electrical Circuits	**Prerequisite**	**:**	None
Type	**:**	Theory	**Contact hours**	**:**	39

Rationale

The course gives an introduction to electrical circuit theory. It provides a fundament for understanding and designing simple circuits and systems built with analog electrical circuit elements.

Course Objectives

- To use basic circuit theory to solve problems in electrical engineering and analyze/design simple circuits
- To use laboratory equipment such as voltmeter, ammeter, oscilloscope and signal generator
- To describe the most important components and functioning of the power distribution network
- To have knowledge about the energy production using, e.g., solar cells, and basic DC motors/generators

Students Learning Outcomes

Upon successful completion of this course, students will be able to-

- understand the basic theory and mathematical relationships in circuit analysis
- understand basic terms and results from the theory about circuits with resistances, capacitances and inductance components, as well as basic semiconductor components
- know the principles for ideal circuits and power grid components

Course Description

#	Descriptions
1	**Network sources and Analysis** Voltage sources; Voltage sources in parallel; Open and short circuits; Current sources in series and parallel; Mesh analysis; Nodal analysis; Star-delta and delta-star conversion.
2	**Basic Passive Elements** Resistors, inductors and capacitors in series and parallel; Transient response in capacitive networks; Charging and discharging phases; R-L transients; Storage cycle, Decay phase.
3	**Network Theorems 01** Superposition theorem; Thevenin's theorem; Norton's theorem;
4	**Network Theorems 02** Maximum power transfer theorem; Millman's theorem; Substitution theorem; Reciprocity theorem.
5	**AC: Part I** Fundamentals of AC and the Basic elements and Phasors: Generation of alternating voltage & currents; Sine wave; General format of sinusoidal voltage and currents; Phase & algebraic representations of sinusoids; Average & RMS (effective) values;
6	**AC: Part II**

	Response of basic R,L,C elements to a sinusoidal voltage & currents; frequency response of basic elements; Resonance; Average power & power factor; Complex numbers: Rectangular & polar form: Active & reactive power; Series & parallel resonance circuit; Qualify factor, Selectivity.
7	**Transformer** Construction and features of transformer; Transformer on no- load and on load; emf-equation; Phasor diagram; Equivalent circuits; Losses and efficiency.

Recommended Books

1.	Introductory Circuit Analysis	R. L. Boylestad	10th	Prentice Hall	2010
2.	Alternating Current Circuits	R. M. Kerchner, G. F. Corcoran	7th	Wiley	2010
3.	Electrical Circuits: An Introduction	K. C. A. Smith, R. E. Alley	2nd	University of Cambridge	1992
4.	Electric Machines	D. P. Kothari, I. J. Nagrath	4th	Tata McGraw-Hill	2004

Course code	**:**	CSE 108	**Credit**	**:**	1
Title	**:**	Electrical Circuits laboratory	**Prerequisite**	**:**	None
Type	**:**	Laboratory Work	**Contact hours**	**:**	26

Rationale

Through examples and laboratory exercises the students should achieve a practical knowledge of analog electronic circuit elements, exercise in use of basic laboratory equipment and an introduction to writing laboratory reports.

Lab Objectives

- to use laboratory equipment such as voltmeter, ammeter, oscilloscope and signal generator
- to describe the most important components and functioning of the power distribution network by experiment
- To have knowledge about the energy production using, e.g., solar cells, and basic DC motors/generators

Lab Outcome

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

Lab Course Description

Exp. #	Title	Contact Hours
1	Familiar with Electrical Lab components and Equipment	3
2	Measurement of DC Voltage and Current	3
3	Computer Analysis of Electrical Circuit	3

4	Measurement of Instrument Characteristics	3
5	Δ/Y Conversions and the Wheatstone Bridge	3
6	Network Theorems-I	3
7	Network Theorems-II	3
8	Investigation of Digital Oscilloscope and Measurement	3
9	Observation of RC and RL circuit	3

Hardware and Software Requirements	
H/W Requirements	*S/W Requirements*
Ammeter, Voltmeter, Oscilloscope, Power Supply, Pcs, Registers, Capacitors, Inductors, Transformers	OrCad software

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Course code	**:**	PHY- 109	**Credit**	**:**	3.0
Title	**:**	Physics	**Prerequisite**	**:**	None
Type	**:**	Theory	**Contact hours**	**:**	39

Rationale

The course gives an introduction to electricity and magnetism and optics. It provides a fundament for understanding and charge, electric filed, force on a current, dispersion and electrical and mechanical measurement.

Course Objectives

- To use basic circuit theory of charge, electric field and laws of electrical simple circuits
- To use laboratory equipment such as voltmeter, ammeter, oscilloscope and signal generator
- To describe the basic circuit theory of Magnetic field, force on current and magnetic properties of matter.

Students Learning Outcomes

Upon successful completion of this course, students will be able to-

- understand basic circuit theory of charge, electric field and laws of electrical simple circuits
- understand the basic circuit theory of Magnetic field, force on current and magnetic properties of matter
- know the principles of optics.

Course Description

#	**Descriptions**
1	**Charge, Electric field & Gauss's Law-I** Simple phenomena in electrostatics; Electrostatic induction and charge density; Coulomb's law; Electric field & field strength; Point charge in an electric field;

2	**Charge, Electric field & Gauss's Law-II** Dipole in an electric field; Electric flux; Gauss's law and some applications; Electric potential; Potential due to a point charge; Equipotential surfaces; Potential energy; Potential gradient; Capacitance and its calculation; Parallel plate capacitor with dielectric; Dielectric & Gauss's law; Electric vectors; Energy stored in an electric field
3	**Electric current, Simple circuits and Electrical Measurements-I** Current and Ohm's law; E.M.F. and potentiaFdifference; Kirehhoffs laws; Whetstone bridge; Single loop & multi loop circuits; Simple RC and RL circuits, Kirchhoff's laws.
4	**Electric current, Simple circuits and Electrical Measurements-II** The potentiometer; Moving coil Galvanometer; Ammeter; Voltmeter; Multimeter; Wattmeter & Energy meter; Measurements of Voltage, Current, Resistance, Inductance, Capacitance, Power and Energy.
5	**Magnetic Field & Force on Current** Coulomb's law; Magnetic field and field strength; Magnetic force on current; Ampere's law; Directions of current and field; Maxwell's cork screw rule; Fleming's left hand rule; Magnetic field near long wire; Magnetic field for solenoid; Biot-savart law. Faraday's law of electromagnetic induction; Fleming's right hand rule; Lenz's law.
6	**Magnetic properties of matter** Poles and dipoles; Coulomb's law for magnets & Gauss's theorem of magnetism; Dia-magnetism, Para-magnetism and Ferro-magnetism; Magnetomotive force and field intensity; Concept of self and mutual inductance; Coefficient of magnetic coupling; Rise of current and decay of current in Inductive circuit; Energy in magnetic field; Inductance in series and parallel; Hysteresis and eddy current losses.
7	**Optics** Refraction and total internal reflection; Group velocity and Phase velocity of light; Dispersion; Interference; Holography; Fresnel and Fraunhofer diffraction; Polarization of light wave.

Recommended Books

1.	Physics Part-II	DavidHalliday, Robert Resnick	2nd	Wiley Eastern Limited	1992
2.	Electricity and Magnetism	Edward M. Purcell, David J. Morin	3rd	Cambridge University Press	2013
3.	Introduction to Modern Optics	Grant R. Fowles	2nd	Dover Publications	1989
4.	Electricity, Magnetism, and Light	Wayne M. Saslow	1st	Academic Press	2004

Course code	**:**	URP 112	**Credit**	**:**	1
Title	**:**	Computer Aided Engineering Drawing Laboratory	**Prerequisite**	**:**	None
Type	**:**	Laboratory Work	**Contact hours**	**:**	26

Lab Objectives

- To enable students to produce 2D and 3D engineering drawings using CAD tools.

Lab Outcome

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

- Produce 2D and 3D engineering drawings using CAD tools

Lab Course Description

#	Title
1	Getting familiar with the Auto CAD Environment. Toolbars, working area, sub menus, working modes. Starting with some basic commands.
2	Study addressing schemes with different commands
3	Studying basic objects and their commands e.g. circle, donut rectangle, arc, ellipse, polygon
4	Studying commands that duplicate objects e.g. array, offset and modify commands e.g. trim, break, chamfer, fillet.
5	Studying Mirror, hatch, ltype, adding toolbars and object snap, zoom, text
6	Making Isometric objects with isometric settings
7	Applying dimensions (Aligned, Radius, Diameter, Angular, Leaders). Increasing / Decreasing working area, changing measuring scales
8	Changing properties of dimensions through style. Modifying properties of objects. Changing dimensions using stretch and extend
9	Changing views for 3d drawings, studying Solids and 3d objects box, sphere, cylinder, cone, wedge, torus, extrude, revolve

Hardware and Software Requirements

H/W Requirements	*S/W Requirements*
PCs	AutoCAD software