

NATIONAL UNIVERSITY



Fourth Year Seventh Semester Syllabus Department of Computer Science and Engineering

Four Year B.Sc. Honours Course

National University
Subject: Computer Science and Engineering
Syllabus for Four Year B.Sc. Honours Course
Year wise courses and marks distribution

FOURTH YEAR SEVENTH SEMESTER

Course Code	Course Title	Credit Hours
540201	Artificial Intelligence	3.0
540202	Artificial Intelligence Lab	1.5
540203	Compiler Design and Construction	3.0
540204	Compiler Design Lab	1.5
540205	Computer Graphics	3.0
540206	Computer Graphics Lab	1.5
540207	E-Commerce and Web Engineering	3.0
540208	E-Commerce and Web Engineering Lab	1.5
	Total Credits in 7th Semester	18.0

Course Code : 540201	Marks : 80	Credits : 3	Class Hours : 45
Course Title :	Artificial Intelligence		

Overview of AI, AI programming language: Prolog, Environment Types, Agent Types, Agent Model, Reactive Agents, Problem solving and searching: 8-puzzle problem, N-queen problem, general search, Review of Uninformed Search Strategies: breadth first search, uniform cost search, depth-first search, iterative deepening, bidirectional search; Informed search algorithms: best-first search, A* search, Heuristic searching, Memory Bounded Search (e.g. IDA*); Local Searches: Hill Climbing, Simulated Annealing, Constraint Satisfaction Problems. Genetic Algorithm. Motion planning: motion planning search, configuration, action and obstacle, Road map, Game Theory: motivation, minmax search, resource limits and heuristic evaluation, α - β pruning, stochastic games, partially observable games, Perceptron: Neurons – Biological and Artificial, Perceptron Learning, Linear Separability, Multi-Layer Neural Networks,

Backpropagation, Variations on Backprop, Cross Entropy, Weight Decay, Momentum, Machine Learning: Supervised Learning, Reinforcement Learning, General concepts of Knowledge, Knowledge representation, frame problem, representing time, events and actions, Logic in general—models and entailment, Propositional (Boolean) logic, Equivalence, validity, satisfiability, Inference rules and theorem proving, forward chaining, backward chaining, resolution, First Order Logic: Universal and Existential Quantifiers, Keeping Track of Change, Inference in first order logic Planning.

Reference Books:

1. Stuart J. Russel, Peter Norvig, *Artificial Intelligence: A Modern Approach*,
2. Stamations V. Katalopoulos, *Understanding Neural Networks and Fuzzy Logic*.
3. Barr and Feigenbaum, *Handbook of Artificial Intelligence Vol. I*, William Kaufmann
4. Ivan Bratko, *Programming for Artificial Intelligence*.

Course Code : 540202	Marks : 40	Credits : 1.5	Class Hours : --
Course Title :	Artificial Intelligence Lab		

Objectives: Laboratory assignments will be based on the Course CSE 540201. Lab assignments include basic AI technologies and algorithms using non procedural programming languages, e.g., LISP and/or PROLOG.

Course Code : 540203	Marks : 80	Credits : 3	Class Hours : 45
Course Title :	Compiler Design and Construction		

Introduction to compiler: Compiler, Analysis of the source Program, the phases of compiler, of the compiler, compiler construction tools.

A simple one pass compiler: syntax definition, CFG, parse tree, ambiguity, associativity of operators, lexical analysis.

Lexical analysis: the role of the lexical analyzer, input buffering, specification tokens, finite automaton, Thompson's construction, conversion of regular expression to DFA.

Basic parsing technique: Parser Bottom-up parsing, operator precedence parsing, operator precedence grammar, Top down parsing, Predictive parsing, LL1 grammar, LR parser (SLR, LALR).

Intermediate code generation: Intermediate languages, three address code.

Code generation: issues in the design of a code generator, target machine, basic block flow graph, code generator algorithm, DAG, peephole optimization.

Code optimization: Function preserving optimization, optimization of basic block loop optimization.

Error detection: reporting errors, Sources of error, syntactic error, semantic error, dynamic error, plan of error diction.

Reference Books:

1. Alfred V. Aho, Ravi Sethi, Jeffery D. Ullman, Compilers, Techniques and tools.
2. Alfred V. Aho, Jeffery D. Ullman, Principles of Compiler Design.
3. A.J Holub, Compiler Design in C.

Course Code : 540204	Marks : 40	Credits : 1.5	Class Hours : --
Course Title :	Compiler Design Lab		

Laboratory classes will be based on the Course CSE 540203.

Lex specification to recognize the following verb: is, am, are ,were, was, be, being,been,do,does,did,will,would,should,can,could,has,have,had,go. Lex specification to recognize the following words as different parts of speech: is, am, are,were,go,very, simply,quickly, gently,to,from,behind,between,if,then. Lex specification to recognize different keyword. Lex specification to recognize the identifier. Lex specification to recognize real numbers. Lex specification to recognize integer. Lex specification to recognize float. Lex specification to recognize for the positive and negative integer and float number. Lex specification to recognize different punctuation symbol. Lex

specification to recognize digit. Lex program to eat up comments. Lex program to find out user name. Lex program to recognize different types of operator. Checking the validity of an arithmetic expression using CFG. Converting Regular Grammar into Regular expression. Parsing any string using a CFG

Course Code : 540205	Marks : 80	Credits : 3	Class Hours : 45
Course Title :	Computer Graphics		

Graphics Input, storage, Output and Communications: Graphics input, storage, Communication Devices, Common Display devices, Raster Scan CRT.

Scan Conversion: Scan converting a Point, Line, Circle, Ellipse, Arcs, Rectangle, Region filling, Side Effects of Scan Conversion.

Two-dimensional and three-dimensional Graphics Transformation: Geometric Transformations, Coordinate Transformations, Composite Transformations, and Instance Transformation.

Two-dimensional and three-dimensional Viewing and Clipping: Viewing Transformations, Clipping Algorithms.

Mathematics of Projection: Perspective projection, Parallel projection.

Geometric representations: Wire frame model, Curve Design, Interpolation and Approximation.

Hidden Surfaces: Depth comparisons, Z-Buffer algorithm, The Painter's algorithm, Scan line algorithm.

Color and Shading models: Light and color, the phong model, Interpolative shading methods, texture.

Reference Books:

- 1) Roy A. Plastock and Gordon Kalley, *Schaum's Outline of Theory and Problems of Computer Graphics*, published by McGraw-Hill, 2nd Edition.
- 2) Foley and VanDam, *Computer Graphics Principles and Practice*, Published by Pearson, 2nd Edition.
- 3) *Schaum's Outline series*, Computer graphics
- 4) *Steven and Harrington*, Computer graphics: a programming approach.

Course Code : 540206	Marks : 40	Credits : 1.5	Class Hours : --
Course Title :	Computer Graphics Lab		

Laboratory classes will be designed based on CSE 540205 course.

Scan Convention Lines, Scan Converting Circles, Scan Converting Ellipses, Filling Rectangles,

Filling Polygons, Filling Ellipse Arcs, Pattern Filling, Clipping Lines, Clipping Circles and Ellipses, Clipping Polygons 2D Transformation, the window to View port Transformation Computer Graphics Programming: Open GL.

Course Code : 540207	Marks : 80	Credits : 3	Class Hours : 45
Course Title :	E-Commerce and Web Engineering		

Introduction to e-commerce: E-commerce Business Models and Concepts , E-Commerce

Payment Systems, E-Commerce Marketing Techniques, E-Commerce Applications: Business-toConsumer (B2C), Consumer-to-Consumer (C2C), Business-to-Business(B2B), Digital Government, Vision and mission of e-Government Web Security.

Introduction to Web Engineering : Web Browser and Web Server, Google, Basic concepts of Google products: Search, Maps, Translate, Chrome, YouTube, Android Phones, Gmail, Google Allo, Google Duo, Google+, Contacts, Calendar, Drive, Docs, AdWords, AdSense, Analytics, Google Classroom. Basic concepts of Google Algorithms: Hummingbird, Panda, Pigeon, Pirate and Penguin, etc. Basic concepts of SEO: on-page SEO, off-page SEO.

HTML and HTML5: HTML tag syntax, Basic HTML tags: !DOCTYPE, Title , Meta tags, Heading tags, Link, API, Image, Table, List, Audio, Video, iframe, Form and Form elements, Text Formatting tags.

CSS and CSS3: Basic concepts of CSS, CSS syntax, CSS Colors, CSS Box Model, **Java Scripts:** Basic Java Scripts variable, array, object, functions.

PHP and MySQL: PHP programming basics: variables, array, decisions making, looping, function. PHP scripts to inputs in forms. PHP Connect to MySQL, MySQL query and functions, PHP Queries: Create Database, Create Tables, Insert Data, Select Data, Update Data, Delete Data in MySQL, using PHP Forms to manipulate data in the database, Data Validation, Session, Security.

Reference Books:

1. Dave Chaffey, *E-Business and E-Commerce Management: Strategy, Implementation and Practice*, published by Prentice Hall, 5th Edition.
2. Efraim Turban, David King and Judy Lang, *Introduction to Electronic Commerce*, published by Prentice Hall, 3rd Edition.
3. Beginning Php 5 (Programmer to Programmer) by Chris Lea, Wanky Choi, Allan Kent, Ganesh Prasad, Chris Ullman.
4. Surid Sharkar, *CSS/Java Script*.
4. Web Design Complete Reference by Thomas A. Powell
5. Creating Web Pages with HTML Simplified

Sherry Willard Kinkoph

6. Web Design in a Nutshell (O'REILLY)
Jennifer Niederst

Course Code : 540208	Marks : 40	Credits : 3	Class Hours : --
Course Title :	E-Commerce and Web Engineering Lab		

Introduction:

Introduction to CPanel, Introduction to WHM, SSL, DNS: Primary DNS server and Secondary DNS server, Domain registration and Hosting.

HTML:

1. HTML editor, HTML Layouts,
2. Designing a simple HTML Document to show an article (using html, body head/title, meta content tags, different HTML tags to format Body contents).
3. Text alignment in table, introduction to form elements (textbox, checkbox, radio, submit, password, color, date, date time-local, email, month, number, range, search, tel, time, url, week, etc.), input restrictions and designing simple feedback/contact forms.

CSS and CSS3:

1. CSS website layout and responsive layout.
2. Using CSS to apply formatting text, forms, tables and link styles.

Java Scripts:

3. Use Java Scripts to create web pages containing custom welcome message (Date-time).
4. Use different control statements in Java Scripts to execute simple mathematical expressions (ifelse, Switch-case, for, while, do-while).
5. Java Scripts form validation.

PHP and MySQL:

6. Installing Apache (XAMPP), PHP 4/5 and integrating into windows platform, creating PHP documents with simple tags, installing My-SQL and connection between PHP and My-SQL.
7. Inserting data into My-SQL database using PHP forms.
8. PHP form validation.

Project: Design and develop a Complete Dynamic website with HTML, PHP and My-SQL having forms and also a flexible navigation menu which has links to all available section on the site.