HINDUSTHAN COLLEGE OF ENGINEERING AND TECHNOLOGY

(An Autonomous Institution Affiliated to Anna University, Chennai)

(Approved by AICTE, New Delhi, Accredited by NAAC with 'A' Grade)

COIMBATORE 641 032

M.C.A. (COMPUTER APPLICATIONS)

HINDUSTHAN
EDUCATIONAL AND CHARITABLE TRUST

HICET

REGULATION 2016

(CHOICE BASED CREDIT SYSTEM)

Curriculum & Syllabus

2018-2019

VISION AND MISSION OF THE INSTITUTION

VISION

To become a premier institution by producing professionals with strong technical knowledge, innovative research skills and high ethical values.

MISSION

- To provide academic excellence in technical education through novel teaching methods.
- To empower students with creative skills and leadership qualities.
- To produce dedicated professionals with social responsibility.

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HICET * HINDUSTHAN COLLEGE OF ENGG & TECH
Chairman

Dean (Academics)
HiCET

VISION AND MISSION OF THE DEPARTMENT

VISION

Our Vision is to equip and enrich the young minds professionally through experience, understanding, learning & implementation and to raise the level of Employability, by enhancing the individual skill sets.

MISSION

- To enhance Technical Knowledge through practical implementation.
- Inculcate culture, ethics and morality.
- To induce technical and analytical skills for societal benefits.

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL
Chairman
HINDUSTHAN COLLEGE OF ENGG & TECH

Dean (Academics)
HiCET

PROGRAM OUTCOMES (POs)

a. Ability to apply knowledge of mathematics, computer science and domain knowledge to solve problems in the computational world.

b. Ability to evaluate, analyze and use available technological solutions to design and implement the same.

c. Ability to work with complex computing problem environment, use knowledge both technical and research to provide valid conclusions of experiments based on analysis and interpretation of data.

d. Ability to use/evaluate the various software tools and networking requirements for solutions.

e. Ability to adhere to the professional ethics, follow cyber rules and regulations and be a responsible citizen.

f. Ability to be a lifelong learner in the field of computer science.

g. Ability to demonstrate the knowledge and understanding of hardware, software, networking and Finance requirements for the Society.

h. Ability to communicate effectively with the fellow members and also with other uses of the computing community and society.

i. Ability to experience the industrial environment for understanding the impact of computational solutions in a global and societal context.

j. Ability to become leaders, entrepreneurs, and provide solutions to complex problems in life.

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL
Chairman

Dean (Academics)
HiCET

GRADUATE ATTRIBUTES (PSOs)

- Knowledge of solving complex computing problems
- Independent learning for continual development.
- Societal and environmental concern.
- Individualism and Team work.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

To produce graduates with the ability to

- Work productively as IT professional both at supportive and leadership roles.
- Advance successfully in their chosen career path utilizing technical abilities, leadership qualities, communication and interpersonal skills with high regard to legal and ethical responsibilities.
- Build their profession adapting to the changes in the technology with lifelong learning.

Chairman - BoS
MCA - HiCET

HINDUSTHAN ACADEMIC COUNCIL Chairman HINDUSTHAN COLLEGE OF ENGG & TECH

Dean (Academics)
HiCET

CURRICULUM

HINDUSTHAN EDUCATIONAL AND CHARITABLE TRUST
HICET

Hindusthan College of Engineering and Technology

(An Autonomous Institution, Affiliated to Anna University, Chennai
Approved by AICTE, New Delhi& Accredited by NAAC with 'A' Grade)
Coimbatore, Tamil Nadu.

TÜVRheinland CERTIFIED

DETAILS OF CHANGES CARRIED OUT IN CURRICULUM & SYLLABUS
CBCS PATTERN
POST GRADUATE PROGRAMMES
M.C.A MASTER OF COMPUTER APPLICATIONS
REGULATION-2016

For the students admitted during the academic year 2018-2019 and onwards

SEMESTER I

S.No.	Course Code	Course Title	L	T	P	C	CIA	ESE	TOTAL
		THEORY							
1	16MA1124	Mathematical Foundation for Computer Applications	3	1	0	4	40	60	100
2	16CA1201	Computer Organization and Architecture	3	0	0	3	40	60	100
3	16CA1202	Fundamentals of Web Design	3	0	0	3	40	60	100
4	16CA1203	Programming in C	3	0	0	3	40	60	100
5	16CA1204	Database Management Systems	3	0	0	3	40	60	100
		PRACTICAL							
6	16CA1001	Web Design Laboratory	0	0	4	2	50	50	100
7	16CA1002	Programming in C Laboratory	0	0	4	2	50	50	100
8	16CA1003	DBMS Laboratory	0	0	4	2	50	50	100
9	16HE1031	Communication Skill Development I	0	0	2	1	50	50	100
		Total	**15**	**1**	**14**	**23**	**400**	**500**	**900**

SEMESTER II

S.No.	Course Code	Course Title	L	T	P	C	CIA	ESE	TOTAL
		THEORY							
1	16CA2201	Software Engineering	3	0	0	3	40	60	100
2	16CA2202	Operating Systems	3	0	0	3	40	60	100
3	16CA2203	Object Oriented Programming	3	0	0	3	40	60	100
4	16CA2204	Design and Analysis of Algorithms	3	0	0	3	40	60	100
5	16CA2205	Data Structures using C	3	0	0	3	40	60	100
		PRACTICAL							
6	16CA2001	OOPS Laboratory	0	0	4	2	50	50	100
7	16CA2002	Algorithms Laboratory	0	0	4	2	50	50	100
8	16CA2003	Data Structures Laboratory	0	0	4	2	50	50	100
9	16HE2032	Communication Skill Development II	0	0	2	1	50	50	100
		Total	**15**	**0**	**14**	**22**	**400**	**500**	**900**

ACADEMIC COUNCIL * TECH * HINDUSTHAN COLLEGE OF ENGG * Chairman

For the students admitted during the academic year 2018-2019 and onwards

SEMESTER III

S.No.	Course Code	Course Title	L	T	P	C	CIA	ESE	TOTAL
THEORY									
1	16BA3251	Organizational Behaviour	3	0	0	3	40	60	100
2	16CA3201	Computer Networks	3	0	0	3	40	60	100
3	16CA3202	Compiler Design and Analysis	3	0	0	3	40	60	100
4	16CA3203	Java Programming	3	0	0	3	40	60	100
5	16CA3204	Computer Graphics and Multimedia	3	0	0	3	40	60	100
PRACTICAL									
6	16CA3001	Software Engineering Tools Laboratory	0	0	4	2	50	50	100
7	16CA3002	Java Programming Laboratory	0	0	4	2	50	50	100
8	16CA3003	Computer Graphics and Multimedia Laboratory	0	0	4	2	50	50	100
9	16CA3004	Career & Soft Skill Development - I	0	0	2	1	50	50	100
		Total	**15**	**0**	**12**	**22**	**400**	**500**	**900**

SEMESTER IV

S.No.	Course Code	Course Title	L	T	P	C	CIA	ESE	TOTAL
THEORY									
1	16CA4201	Operation Research	3	1	0	4	40	60	100
2	16CM4321	Embedded Systems	3	0	0	3	40	60	100
3	16CA4202	Network Programming	3	0	0	3	40	60	100
4	**16CA43XX**	**Professional Elective I**	3	0	0	3	40	60	100
5	**16CA43XX**	**Professional Elective II**	3	0	0	3	40	60	100
PRACTICAL									
6	16CM4001	Embedded Systems Laboratory	0	0	4	2	50	50	100
7	16CA4002	Network Programming Laboratory	0	0	4	2	50	50	100
8	16CA4003	Career & Soft Skill Development - II	0	0	2	1	50	50	100
9	16CA4701	Technical Seminar/ Technical Publications	0	0	4	2	50	50	100
		Total	**15**	**1**	**14**	**23**	**400**	**500**	**900**

LIST OF PROFESSIONAL ELECTIVES

ELECTIVE – I &II COMMON									
S.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**CIA**	**ESE**	**TOTAL**
THEORY									
1.	16CA4301	TCP/IP	3	0	0	3	40	60	100

Chairman - BoS
MCA - HiCET

HINDUSTHAN ACADEMIC COUNCIL * Chairman * HINDUSTHAN COLLEGE OF ENGG & TECH *

Dean (Academics)
HiCET

2.	16CA4302	Software Project Management	3	0	0	3	40	60	100
3.	16CA4303	Software Testing	3	0	0	3	40	60	100
4.	16CA4304	Software Quality Management	3	0	0	3	40	60	100
5.	16CA4305	Cyber Security	3	0	0	3	40	60	100
6.	16BA4352	Accounting and Financial Management	3	0	0	3	40	60	100

For the students admitted during the academic year 2017-2018 and onwards

SEMESTER V

S.No.	Course Code	Course Title	L	T	P	C	CIA	ESE	TOTAL
THEORY									
1	16CA5201	PHP Programming	3	0	0	3	40	60	100
2	16CA5202	Python Programming	3	0	0	3	40	60	100
3	**16CA53XX**	**Professional Elective III**	3	0	0	3	40	60	100
4	**16CA53XX**	**Professional Elective IV**	3	0	0	3	40	60	100
5	**16CA53XX**	**Professional Elective V**	3	0	0	3	40	60	100
	16CA54XX	**Open Elective (Optional)**	3	0	0	3	40	60	100
PRACTICAL									
6	16CA5001	PHP Programming Laboratory	0	0	4	2	50	50	100
7	16CA5002	Python Programming Laboratory	0	0	4	2	50	50	100
8	16CA5801	Mini Project	0	0	8	4	50	50	100
		Total	**15**	**0**	**16**	**23**	**350**	**450**	**800**

SEMESTER VI

S.No.	Course Code	Course Title	L	T	P	C	CIA	ESE	TOTAL
PROJECT									
1	16CA6901	Project Work	0	0	24	12	100	100	200
Total			**0**	**0**	**24**	**12**	**100**	**100**	**200**

LIST OF PROFESSIONAL ELECTIVES

ELECTIVE – III RESEARCH ORIENTED									
S.No.	**Course**	**Course Title**	**L**	**T**	**P**	**C**	**CIA**	**ESE**	**TOTAL**
THEORY									
1	16CA5301	Big Data Analytics	3	0	0	3	40	60	100
2	16CA5302	Data warehousing and Data	3	0	0	3	40	60	100

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH * Chairman

Dean (Academics)
HiCET

		Mining							
3	16CA5303	Cloud computing	3	0	0	3	40	60	100
4	16CA5304	Mobile computing	3	0	0	3	40	60	100
5	16CA5305	Semantic Web Services	3	0	0	3	40	60	100
6	16CA5306	Security in computing	3	0	0	3	40	60	100

ELECTIVE – IV &V INDUSTRY ORIENTED									
S.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**CIA**	**ESE**	**TOTAL**
THEORY									
1.	16CA5307	Web Graphics	3	0	0	3	40	60	100
2.	16CA5308	Middleware Technology	3	0	0	3	40	60	100
3.	16CA5309	Management Information Systems	3	0	0	3	40	60	100
4.	16CA5310	E-Commerce	3	0	0	3	40	60	100
5.	16CA5311	Professional Ethics	3	0	0	3	40	60	100
6.	16BA5353	Human Resource Management	3	0	0	3	40	60	100

OPEN ELECTIVES

S.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**CIA**	**ESE**	**TOTAL**
THEORY									
1	16CAX4XX	Network Security	3	0	0	3	40	60	100
2	16CAX4XX	Fundamentals of Cloud Computing	3	0	0	3	40	60	100

CREDIT DISTRIBUTION

Semester	**I**	**II**	**III**	**IV**	**V**	**VI**	**TOTAL**
Credits	23	22	22	23	23	12	**125**

Chairman, Board of Studies **Dean – Academics** **Principal**

Chairman - BoS
MCA - HiCET

Dean (Academics)
HiCET

PRINCIPAL
Hindusthan College Of Engineering & Technology
COIMBATORE - 641 032.

SYLLABUS

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16MA1124	MATHEMATICAL FOUNDATION FOR COMPUTER APPLICATIONS	3	1	0	4

Course Objective

1. To understand the concepts and operations of matrix algebra needed for computing graphics modeling.
2. To understand and apply the class of functions which transform a finite set into another finite set which relates to input output functions in computer science.
3. To impart discrete knowledge in computer engineering through finite automata and Context free grammars

Unit	Description	Instructional hours
I	**MATRIX ALGEBRA** Matrices, Rank of Matrix - Eigen Values and Eigen Vectors - Inverse of a Matrix - Cayley Hamilton Theorem.	12
II	**BASIC SET THEORY AND RELATIONS** Basic Definitions - Venn Diagrams and set operations - Laws of set theory - Principle of inclusion and exclusion - Permutation and Combination - Relations - Properties of relations - Matrices of relations - Closure operations on relations.	12
III	**FUNCTIONS AND MATHEMATICAL LOGIC** Functions - injective, subjective and objective functions - Propositions and logical operators - Truth table - Propositions generated by a set, Equivalence and implication - Basic laws- Some more connectives - Functionally complete set of connectives- Normal forms - Proofs in Propositional calculus.	12
IV	**FORMAL LANGUAGES** Languages and Grammars - Classification of Grammars - Context Free Grammars and Languages – Derivations.	12
V	**FINITE STATE AUTOMATA** Concepts of Automata Theory – Finite Automata – Types of finite Automata - Deterministic Finite State Automata(DFA), Non Deterministic Finite State Automata (NFA) – Transition Diagrams - Equivalence of DFA and NFA.	12
	Total Instructional hours	**60**

Course Outcome

CO1: Acquire the basic knowledge of matrix, set theory, functions and relations concepts needed for designing and solving problems.
CO2: Acquire the knowledge of logical operations and predicate calculus needed for computing skill Able to design and solve Boolean functions for defined problems.
CO3: Apply the acquired knowledge of formal languages to the engineering areas like Compiler. Design
CO4: Apply the acquired knowledge of finite automata theory and design discrete problems to solve by computers.

REFERENCE BOOKS:

R1. Kenneth H.Rosen, "Discrete Mathematics and Its Applications", Tata McGraw Hill, Fourth Edition, 2002 (Unit 1,2 & 3).
R2. Hopcroft and Ullman, "Introduction to Automata Theory, Languages and Computation", Narosa Publishing House, Delhi, 2002. (Unit 4,5)
R3. A.Tamilarasi & A.M.Natarajan, "Discrete Mathematics and its Application", Khanna Publishers, 2nd Edition 2005.
R4. JurajHromkovic, "Theoretical Computer Science", Springer Indian Reprint, 2010.
R5. A Text Book of Matrix Algebra, Third Edition, Suddhedu Biswas, PHI learning Private Limited – 2012
R6. David Makinson, "Sets, Logic and Maths for Computing", Springer Indian Reprint, 2011.

Chairman - BoS
MCA HiCET

HINDUSTHAN ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH * Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA1201	COMPUTER ORGANIZATION AND ARCHITECTURE	3	0	0	3

Unit	Description	Instructional hours
I	**DIGITAL FUNDAMENTALS** Number Systems and Conversions – Boolean Algebra and Simplification – Minimization of Boolean Functions – Karnaugh Map, Logic Gates – NAND – NOR Implementation.	8
II	**COMBINATIONAL AND SEQUENTIAL CIRCUITS** Design of Combinational Circuits – Adder / Subtractor – Encoder – Decoder – MUX / DEMUX – Comparators , Flip Flop – Triggering – Master – Slave Flip Flop – State Diagram and Minimization – Counters – Registers.	10
III	**BASIC STRUCTURE OF COMPUTERS & PARALLEL PROCESSING** Functional Units – Basic Operational Concepts – Bus Structures – Performance and Metrics – Instruction and Instruction Sequencing – Addressing Mode – ALU design – Fixed point and Floating point operation.	9
IV	**PROCESSOR DESIGN** Processor basics – CPU Organization – Data path design – Control design – Basic concepts – Hard wired control – Micro programmed control – Pipeline control – Hazards – super scalar operation	9
V	**MEMORY, I/O SYSTEM AND PARALLEL PROCESSING** Memory technology – Memory systems – Virtual memory – Caches – Design methods – Associative memories – Input / Output system – Programmed I/O – DMA and Interrupts – I/O Devices and Interfaces – Multiprocessor Organization – Symmetric multiprocessor – Cache Coherence – Clusters: Non Uniform Memory Access - Vector Computation.	9
	Total Instructional hours	**45**

COURSE OUTCOME

CO1 : Able to design digital circuits by simplifying the Boolean functions.
CO2 : Able to understand the organization and working principle of computer hardware components.
CO3 : Able to understand mapping between virtual and physical memory.
CO4 : Acquire knowledge about multiprocessor organization and parallel processing
CO5 : Able to trace the execution of an instruction through the processor.

REFERENCE BOOKS :

R1. Morris Mano, "Digital Design", Prentice Hall of India, Fourth Edition 2007.
R2. Carl Hamacher, ZyonkoVranesic, SafwatZaky and NaraigManjikian, " Computer Organization and Embedded Systems", Sixth Edition, Tata Mc Graw Hill, 2012.
R3. William Stangling, "Computer Organization & Architecture – Designing for Performance" 9th Edition 2012.
R4. David A. Patterson and John L. Hennessy, " Computer Organization and Design: The Hardware / Software Interface", Fourth Edition, Morgan Kaufmann/Elsevier, 2009.
R5. John P. Hayes, " Computer Architecture and Organization", Third Edition, Tata McGraw Hill, 2014.

Chairman - BoS
MCA - HiCET

HINDUSTHAN ACADEMIC COUNCIL Chairman HINDUSTHAN COLLEGE OF ENGG & TECH

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA1202	FUNDAMENTALS OF WEB DESIGN	3	0	0	3

COURSE OBJECTIVE

1. To understand the concepts and architecture of the World Wide Web.
2. To understand and practice mark up languages.
3. To understand and practice embedded dynamic scripting on client side Internet Programming.
4. To understand and practice web development techniques on client-side.
5. To design a creative and dynamic website.

Unit	Description	Instructional hours
I	**INTRODUCTION TO WWW** Internet Standards – Introduction to WWW – WWW Architecture – SMTP – POP3 – File Transfer Protocol - Overview of HTTP, HTTP request – response — Generation of dynamic web pages.	9
II	**UI DESIGN** Markup Language (HTML): Introduction to HTML and HTML5 - Formatting and Fonts - Commenting Code – Anchors – Backgrounds – Images – Hyperlinks – Lists – Tables – Frames - HTML Forms.	9
III	**CASCADING STYLE SHEET (CSS)** The need for CSS, Introduction to CSS – Basic syntax and structure - Inline Styles – Embedding Style Sheets - Linking External Style Sheets – Backgrounds - Manipulating text - Margins and Padding - Positioning using CSS.	9
IV	**SCRIPTING LANGUAGES** HTML – forms – frames – tables – web page design - JavaScript introduction – control structures – functions – arrays – objects – simple web applications.	9
V	**DYNAMIC HTML** Dynamic HTML – introduction – cascading style sheets – object model and collections – event model – filters and transition – data binding – data control – ActiveX control – handling of multimedia data.	9
	Total Instructional Hours	**45**

COURSE OUTCOME

CO1: Explain the history of the internet and related internet concepts that are vital in understanding web development.
CO2: Discuss the insights of internet programming and implement complete application over the web.
CO3: Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet.
CO4: Utilize the concepts of JavaScript
CO5: Create and maintain responsive websites and employ strategies with user-centered design methodologies.

REFERENCE BOOKS:

R1. Harvey & Paul Deitel& Associates, Harvey Deitel and Abbey Deitel, "Internet and World Wide Web - How To Program", Fifth Edition, Pearson Education, 2011.
R2. Thomas A. Powell, "HTML & CSS: The Complete Reference", Fifth Edition Tata McGraw-Hill 2010.
R3. Thomas A Powell, Fritz Schneider, "JavaScript: The Complete Reference", Third Edition, Tata McGraw Hill, 2013.
R4. Margaret Levine Young, "Internet and WWW", 2nd Edition, Tata McGraw Hill, 2002.
R5. Jeff Rule, Dynamic HTML: The HTML Developer's Guide, Addison-Wesley, 1999.

Chairman - BOS MCA - HICET

Chairman HINDUSTHAN COLLEGE

Dean (Academics) HICET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA1203	PROGRAMMING IN C	3	0	0	3

COURSE OBJECTIVE

1. To understand the basic concepts of problem solving approaches using C
2. To develop optimal program structure using conditional and iterative control structures and functions.
3. To design, implement, test, and apply the basic C programming concepts.
4. Apply the techniques of structured (functional) decomposition to break a program into smaller pieces and describe the mechanics of parameter passing.

UNIT	DESCRIPTION	TOTAL INSTRUCTIONAL
I	**INTRODUCTION TO C LANGUAGE** Overview of 'C' language - Constants, Variables and Data Types - Operators, Expressions and Assignment statements - Managing Input/Output Operations - Formatted I/O - Decision Making - Branching - IF, Nested IF - Switch - goto - Looping- While, do, for statements	9
II	**ARRAYS AND FUNCTIONS** Arrays - dynamic and multi-dimensional arrays - Character arrays and Strings - Two dimensional character arrays - String handling Functions - User defined Functions - Categories of Functions – Recursion - Functions using Arrays, Storage Classes	9
III	**STRUCTURES AND UNIONS** Basics of Structures-Declaring a Structure - Array of Structures –Nested Structures-Passing Structures elements to Functions- Passing entire Structure to Function - Structures within Structures-Union-typedef and enumeration types-bit fields.	9
IV	**POINTERS** Pointers - Declaration, Accessing a variable, dynamic memory allocation, Pointers versus Arrays, Array of pointers, Pointers & Strings, Pointers to functions and structure Pointers, Pointer to Pointer	9
V	**FILE MANAGEMENT** File Management in C - Data hierarchy- Files and Streams - Sequential access file-Random access file – Preprocessors, Command Line Arguments	9
	Total Instructional hours	**45**

COURSE OUTCOME

CO1: Able to design a computational solution for a given problem.
CO2:Able to break a problem into logical modules that can be solved (programmed).
CO3:Able to transform a problem solution into programs involving programming constructs
CO4:Able to write programs using structures, strings, arrays, pointers and files for solving complex computational problem.
CO5:Able to introduce modularity using functions and pointers which permit ad hoc run-time polymorphism

REFERENCE BOOKS :

R1. E.Balagurusamy " Programming in ANSI C " , 6th Edition, Tata McGraw Hill, 2012
R2. Yashavant P. Kanetkar "Understanding Pointers In C" , BPB Publications, NewDelhi, 2010
R3. Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", Oxford University Press, 2013
R4. Kamthane, A.N., "Programming with ANSI and Turbo C", Pearson Education, Delhi,2009.
R5. Byron C Gottfried, Programming with C, Schuams' outline series, 2nd edition, Tata McGraw Hill, 2006.

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH * Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA1204	DATABASE MANAGEMENT SYSTEMS	3	0	0	3

COURSE OBJECTIVE

1. To understand the fundamentals of data models and conceptualize and depict a database system using ER diagram
2. To make a study of SQL and relational database design
3. Understand and successfully apply logical database design principles, including E-R diagram and database normalization
4. To know about the data storage techniques an query processing
5. To impart knowledge in transaction processing, concurrency control techniques and recovery procedures

Unit	Description	Instructional hours
I	**INTRODUCTION** Purpose of Database Systems – view of Data – Database languages – Database Architecture – Database users and Administrators – Database Schema – Keys – Relational Algebra – Tuple Relational Calculus	9
II	**SQL, PROGRAMMING AND TRIGGERS** SQL Data Definition – Basic Structure of SQL QUERIES – Basic Operations – Aggregate Functions – Nested Sub queries – Join Expressions – Views – Transactions – Functions and Procedures – Triggers.	9
III	**NORMAL FORMS** Entity-Relationship – Basic Concepts – Constraints – Removing attributes in Entity sets – ER Diagram – First Normal Forms – Second Normal Form – Third normal Form – Boyce Codd Normal Forms.	9
IV	**DATA STORAGE AND INDEXING** Storage and File Structure: Physical Storage media – Magnetic Disk an Flash Storage – RAID – File organization – Organization of records in File – Indexing and Hashing: Basic Concepts – Ordered Indices – B+Tree Index Files – Multiple Key Access – Static Hashing – Dynamic Hashing	9
V	**TRANSACTION MANAGEMENT** Transaction Concept and Model – Transaction Atomicity and Durability – Transaction isolation – Serializability – Transaction Isolation and Atomicity – Concurrency control : Lock-based Protocols – Deadlock Handling.	9
	Total Instructional hours	**45**

Course outcome

CO1: Understand the basic concepts of the database and data models.
CO2: Design a Database using ER diagrams and map ER into Relations and normalize the relations
CO3: Acquire the knowledge of query evaluation to monitor the performance of the DBMS.
CO4: Develop a simple database supplications using normalization.
CO5: Acquire the knowledge about different special purpose database and to critique how they differ from traditional database systems

REFERENCE BOOKS:

R1. Abraham Silberschatz, Henry F.Korth and S.Sundarshan "Database System Concepts", Sixth Edition, McGraw Hill, 2010.
R2. Raghu RamaKrishnan, Johannes Gehrke, "Database Management Systems", 3rd Edition, McGraw Hill Publishers, 2003.
R3. RamezElmasri and ShamkantB.Navathe, "Fundamental Database Systems", Third Edition, Pearson education, 2003.
R4. C. J. Date, "An Introduction to Database Systems", 8th Edition, Addison Wesley Publishers, 2004.
R5. Peter Rob, Carlos coronel, "Data base system concepts" , Ceange Learning 2008

Chairman - BoS
MCA - HiCET

HINDUSTHAN ACADEMIC COUNCIL * Chairman * HINDUSTHAN COLLEGE OF ENGG & TECH

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA1001	WEB DESIGN LABORATORY	0	0	4	2

COURSE OBJECTIVE

1. To be familiar with elements, Tags and Basic structure of HTML files.
2. To develop the concept of basic and advanced text formatting.
3. To designing of webpage-Document Layout, Working with List, Working with Tables.
4. To work with List, HTML elements box, Positioning and Block properties in CSS.
5. To know the usage of JavaScript for validation.

S.no	Description of the experiments	Practical hours
1	Create a web page with the following using HTML (i). To embed an image map in a web page. (ii). To fix the hot spots. (iii). Show all the related information when the hot spots are clicked.	6
2	Create a web page with all types of Cascading style sheets.	3
3	Implement Client Side Scripts for Validating Web Form Controls using JavaScript.	3
4	Designing Quiz Application Personal Information System/ Using JavaScript	3
5	Develop and demonstrate a HTML file that includes JavaScript that uses functions for the following problems: (i). Parameter: A string Output: The position in the string of the left-most vowel. (ii). Parameter: A number Output: The number with its digits in the reverse order.	3
6	Write an HTML code to display your CV on a web page.	3
7	Write an HTML code to create a Home page having three links: About Us, Our Services and Contact Us. Create separate web pages for the three links.	6
8	Write an HTML code to create a Registration Form. On submitting the form, the user should be asked to login with this new credentials.	6
9	Write an HTML code to create your Institute website, Department website and Tutorial website for specific object.	6
10	Write an HTML code to create a frameset having header, navigation and content sections.	6
	Total Instructional hours	**45**

COURSE OUTCOME

CO1: Design and develop basic web pages using HTML and CSS.
CO2: Use graphics in Web pages.
CO3: Use tables in Web pages.
CO4: Link pages to create a Web site.
CO5: Design and develop web pages using CSS for layout

Chairman - BoS
MCA - HiCET

HINDUSTHAN ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH * Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA1002	PROGRAMMING IN C LABORATORY	0	0	4	2

COURSE OBJECTIVE

1. Understand the basic concepts of C programming, its data types
2. Practice the use of conditional and looping statements
3. Implement programs based on structures, unions, enumerations
4. Implement arrays, functions and pointers
5. Gain skills to handle strings and files

S.no	Description of the experiments	Practical hours
1	Programs to understand the concept of data types and expressions	3
2	Conditional and control statements	6
3	Arrays-Single and Multi dimensional arrays	6
4	Defining and Handling of Strings	6
5	Implementation of functions and recursive functions	6
6	Structures, array of structures and Union	6
7	Implementation of pointers, operation on pointers and dynamic storage allocations	6
8	Creating and processing data files	6
	Total Instructional hours	**45**

Course Outcome

CO1: To know the concepts of Problem Solving
CO2: To demonstrate the ability to analyze, use, and create user defined functions.
CO3: To demonstrate the ability to understand and use Pointers
CO4: To demonstrate the ability to understand and use Exception handling and I/O
CO5: To design and write programs in C Language using Arrays, Structures and Unions and to create diversified applications in C.

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL ★ HINDUSTHAN COLLEGE OF ENGG & TECH ★ Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA1003	DBMS LABORATORY	0	0	4	2

COURSE OBJECTIVE

1. To give a good formal foundation on the relational model of data
2. To develop conceptual understanding of database management system
3. To understand how a real world problem can be mapped to schemas
4. To develop understanding of different applications and constructs of SQL, PL/SQL.
5. To introduce the concepts of transactions and transaction processing

S.no	Description of the experiments	practical hours
1	Execute a DDL, DML, DCL and TCL commands for a Table	3
2	Execute SQL Functions	3
3	Execute various Joins an Sub Queries	3
4	Create and Manipulate various DB Objects for a Table	3
5	Write PL/SQL Procedure for an application using Exception Handling	3
6	Write PL/SQL Procedure for an application using Cursors.	6
7	Write a PL/SQL program to prepare reports for an application using Functions.	6
8	Write a PL/SQL block for transaction operations of a typical application using Triggers	6
9	Write a PL/SQL block for transaction operations of a typical application using Packages	6
10	Design and develop an application using any Front end and Back end tool.	6
	Total Instructional hours	**45**

COURSE OUTCOME

CO1: Ability to create database Tables
CO2: Ability to formulate SQL queries based on the problems given
CO3: Ability to apply PL/SQL
CO4: Ability to declare and enforce integrity constraints on a database
CO5: Ability to Normalize the database.

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH * Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16HE1031	COMMUNICATION SKILL DEVELOPMENT I	0	0	2	1

COURSE OBJECTIVE

1. To help the learners to Improve their communicative skills
2. To help the learners to prepare resume, letter writing and report.
3. To help the learners to participate in GD's, increase confidence and to understand their own strengths.
4. Gaining active listening and responding skills,
5. Effective participation in Interview

S.no	Description of the experiments	Practical hours
1	**I. PC based session (Weightage 40%)**	**15**
	A. English Language Lab (15 Periods)	
	Listening Comprehension: Listening and typing – Listening and sequencing of sentences – Filling in the blanks - Listening and answering questions.	5
	Reading Comprehension Filling in the blanks - Close exercises – Vocabulary building - Reading and answering questions.	5
	Speaking: Phonetics: Intonation – Ear training - Correct Pronunciation – Sound recognition exercises – Common Errors in English. Conversations: Face to Face Conversation – Telephone conversation – Role play activities (Students take on roles and engage in conversation	5
2	**B. Discussion of audio-visual materials (6 periods) (Samples to learn and practice**	**6**
	Resume / Report Preparation / Letter Writing Structuring the resume / report - Letter writing / Email Communication - Samples	1
	Presentation skills: Elements of effective presentation – Structure of presentation - Presentation tools – Voice Modulation – Audience analysis - Body language – Video samples	1
	Soft SkillS Time management – Articulateness – Assertiveness – Psychometrics – Innovation and Creativity - Stress Management & Poise - Video Samples	2
	Group Discussion: Why is GD part of selection process ? - Structure of GD – Moderator – led and other GDs - Strategies in GD – Team work - Body Language - Mock GD –Video samples	1
	Interview Skills Kinds of interviews – Required Key Skills – Corporate culture – Mock interviews- Video samples	1
3	**II. Practice Session (Weightage – 60%) 24 periods**	**24**
	Resume / Report Preparation / Letter writing: Students prepare their own resume and report	2
	Presentation Skills: Students make presentations on given topics	8
	Group Discussion: Students participate in group discussions.	6
	Interview Skills: Students participate in Mock Interviews	8
	Total Instructional hours	**45**

Chairman - BoS
MCA

HINDUSTHAN ACADEMIC COUNCIL * Chairman * HINDUSTHAN COLLEGE OF ENGG & TECH

Dean (Academics)
HiCET

REFERENCE BOOKS:

R1. Anderson, P.V, **Technical Communication**, Thomson Wadsworth , Sixth Edition, New Delhi, 2007.
R2. Prakash, P, **Verbal and Non-Verbal Reasoning**, Macmillan India Ltd. Second Edition, New Delhi, 2004.
R3. John Seely, **The Oxford Guide to Writing and Speaking**, Oxford University Press, New Delhi, 2004.
R4. Evans, D, **Decisionmaker**, Cambridge University Press, 1997.
R5. Thorpe, E, and Thorpe, S, **Objective English**, Pearson Education, Second Edition, New Delhi, 2007.
R6. Turton, N.D and Heaton, J.B, **Dictionary of Common Errors**, Addision Wesley Longman Ltd., Indian reprint 1998.

Guidelines for the course

1. A batch of 60 students is divided into two groups – one group for the PC- based session and the other group for the Class room session.
2. The English Lab (2 Periods) and the Career Lab (2 Periods) may be handled by any competent teacher
3. **Record Notebook:** At the end of each session of English Lab, review exercises are given for the students to answer and the computer evaluated sheets are to be compiled as record notebook. Similar exercises for the career lab are to be compiled in the record notebook.
4. **Internal Assessment:** The 15 marks (the other 5 marks for attendance) allotted for the internal assessment will be based on the record notebook compiled by the candidate. 10 marks may be allotted for English Lab component and 5 marks for the Career Lab component.
5. **End semester Examination:** The end-semester examination carries 40% weightage for English Lab and 60% weightage for Career Lab.

Course Outcome	CO1: Display competence in oral, written, and visual communication. CO2: Show an understanding of opportunities in the field of communication. CO3: Communicate ethically. CO4: Demonstrate positive group communication exchanges. CO5: Apply appropriate communication skills across settings, purposes, and audiences. CO6: Build and maintain healthy and effective relationships.

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HICET * HINDUSTHAN COLLEGE OF ENGG & TECH
Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA2201	SOFTWARE ENGINEERING	3	0	0	3

COURSE OBJECTIVE

1. To provide an insight into the processes of software development
2. To understand and practice the various fields such as analysis, design, development, testing of software Engineering.
3. To develop skills to construct software of high quality with high quality with high reliability.
4. To apply metrics and testing techniques to evaluate the software.

Unit	Description	Instructional hours
I	**INTRODUCTION** Software Engineering paradigms – Waterfall Life cycle - spiral Model - Agile Process Model – Prototype model – Planning – Software Project Scheduling – Risk analysis and Management – Requirement and Specification.	9
II	**SOFTWARE DESIGN** Abstraction – Modularity – Software Architecture – Cohesion – Coupling- Various Design Concepts and notations – Documentation – Dataflow Oriented design – Jackson System development.	9
III	**SOFTWARE TESTING AND MAINTENANCE** Software Testing Fundamentals – Software testing strategies – Black Box Testing – White Box Testing – System Testing – Testing Tools – Test Case Management – Software Maintenance Organization – Maintenance Report.	9
IV	**SOFTWARE METRICS** Scope – Classification of metrics – Measuring Process and Product attributes – Direct and Indirect measures – Cost Estimation – Reliability – Software Quality Assurance – Standards.	9
V	**SCM & WEB ENGINEERING** Need for SCM – Version Control – SCM Process – Software Configuration Items – Taxonomy – CASE Repository.	9
	Total Instructional hours	**45**

COURSE OUTCOME

CO1: Get an insight into the processes of software development
CO2:Able to understand the problem domain for developing SRS and various models of software engineering.
CO3:Able to Model software projects into high level design using DFD, UML Diagram.
CO4:Able to Measure the product and process performance using various metrics
CO5:Able to Evaluate the system with various testing techniques and strategies.

REFERENCE BOOKS :

R1. Roger S. Pressman, "Software Engineering: A Practitioner Approach", Eighth edition, McGrawHill, 2015.
R2. Richard Fairley, " Software Engineering Concepts", Tata McGraw Hill Edition, 2010
R3. Sommerville, "Software Engineering", Sixth Edition, Addison Wesley-Longman, 2016.
R4. Roger S. Pressman, David Lowe, "Web Engineering: A Practitioner's Approach", Special Indian edition, McGrawHill, 2009.
R5. Ali Behforroz, Frederick J.Hudson, "Software Engineering Fundamentals", Oxford Indian Reprint, 2012
R6. Kassem A. Saleh, "Software Engineering", First Edition, J.Ross Publishing, 2009.
R7. Jibitesh Mishra, Ashok Mohanty, "Software Engineering", Pearson Education, First Edition, 2012

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH * Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA2202	OPERATING SYSTEMS	3	0	0	3

COURSE OBJECTIVE

1. To be aware of the evolution and fundamental principles of operating system, processes and their communication
2. To understand the various operating system components like process management, memory management, process management and device management.
3. To know about file management and the distributed file system concepts in operating systems
4. To be aware of components of operating system with relevant case study.

Unit	Description	Instructional hours
I	**INTRODUCTION** Definition of OS-Mainframe System-Desktop Systems-Multi processor System-Distributed-Clustered-Real time Systems-Handheld Systems-Operating System Structure-System Components-Services-System Calls-System Programs-System Design and Implementation	8
II	**PROCESS MANAGEMENT** Concepts-Process Scheduling-Operations on Processes-Co-operating Processes-Inter Process Communication-CPU Scheduling-Scheduling Concepts-Criteria-Scheduling Algorithms-Multiprocessor Scheduling - Real time Scheduling.	10
III	**PROCESS SYNCHRONIZATION** Critical Section-Synchronization Hardware-Semaphores-Problems of Synchronization-Critical Regions - Monitors – Deadlocks –Characterization - Handling Deadlocks - Deadlock Prevention-Avoidance – Detection - Deadlock Recovery.	9
IV	**MEMORY MANAGEMENT** Storage Hierarchy-Storage Management Strategies – Contiguous - Non Contiguous Storage Allocation-Single User-Fixed Partition-Variable Partition-Swapping - Virtual Memory - Basic Concepts-Multilevel Organization-Block, Mapping - Paging - Segmentation – Page Replacement Methods – Locality - Working Sets.	9
V	**I/O AND FILE SYSTEMS** Disk Scheduling-File Concepts-File System Structure-Access Methods-Directory Structure-Protection-Directory Implementation-Allocation Methods-Free Space Management-Case Study: Linux System.	9
	Total Instructional hours	**45**

Course Outcome

CO1: Able to understand the operating system components and its services
CO2: Implement the algorithms in process management and solving the issues of IPC
CO3: Able to demonstrate the mapping between the physical memory and virtual memory
CO4: Able to understand file handling concepts in OS perspective
CO5: Able to understand the operating system components and services with the recent OS.

REFERENCE BOOKS:

1. Silberschatz and Galvin, Operating System Concepts, 9th Edition, John Wiley & Sons, Inc., 2012
2. Milankovic M., Operating System Concepts and Design, 2nd Edition, McGraw Hill, Reprint 2008
3. P.C.Bhatt, An Introduction to Operating Systems-Concepts and Practice, Prentice Hall Of India, 2010
4. H.M.Deitel, An Introduction to Operating Systems, 2nd Edition, Pearson Education, 2002
5. Andrew S. Tanenbaum, Herbert Bos - Modern Operating Systems, Prentice Hall 2014.

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL ★ HINDUSTHAN COLLEGE OF ENGG & TECH ★ Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA2203	OBJECT ORIENTED PROGRAMMING	3	0	0	3

COURSE OBJECTIVE

1. To learn the fundamental concepts of Object oriented Programming
2. To learn how C++ supports Object Oriented principles such as abstraction, polymorphism etc
3. To understand and apply the principles hiding, localization and modularity in software development.
4. Use the generic programming features of C++ including the STL
5. Design and implement reliable and maintainable object-oriented applications of moderate complexity composed of several classes

Unit	Description	Instructional hours
I	**FUNDAMENTALS** Object Oriented Programming concepts - Encapsulation - Programming Elements - Program Structure - Enumeration Types - Functions and Pointers - Function Invocation - Overloading Functions - Scope and Storage Class - Pointer Types - Arrays and Pointers - Call by Reference - Assertions.	8
II	**IMPLEMENTING ADTS AND ENCAPSULATION** Structure Pointer Operators - Unions - Bit Fields - Data Members and Member Functions - Classes - Constructors and Destructors - Copy Constructors - Inline Functions - Static Members and Member Functions- Friend Function and Friend Class - this Pointer - Constness - implementation of simple ADTs - Namespace.	10
III	**POLYMORPHISM** Overloading - Overloading Operators - Unary Operator Overloading - Binary Operator Overloading - Overloading of Friend Functions - Function Selection - Pointer Operators.	9
IV	**TEMPLATE & STL** Template - Function Templates - Class Templates - Parameterizing - STL - Visitation - Iterators - containers - List - List Iterators – Algorithms - Function Adaptors.	9
V	**INHERITANCE & I/O STREAMS** Inheritance - Base Class - Derived Class - Visibility - Code Reuse - Inheritance and Constructors- Static and Dynamic Binding - Virtual Functions - Pure Virtual Functions and Abstract Base Class - Exceptions - Handlers - Standard Exceptions - I/O Streams - I/O Manipulators	9
	Total Instructional hours	**45**

COURSE OUTCOME

CO1: Able to understand and design the solution to a problem using object-oriented programming concepts.
CO2: Able to use proper class protection mechanism to provide security.
CO3: Able to demonstrate the use of virtual functions to implement polymorphism.
CO4: Understand and implement the features of C++ including templates, exceptions and file handling for providing programmed solutions to complex problems
CO5: Able to reuse the code with extensible Class types, User-defined operators and function overloading

REFERENCE BOOKS :

R1. Bhushan Trivedi, "Programming with ANSI C++", Oxford Press, Second Edition, 2012.
R2. HM Deitel and PJ Deitel "C++ How to Program", Seventh Edition, 2010, Prentice Hall
R3. Ira Pohl, "Object–Oriented Programming Using C++", Pearson Education, 2 Edition, 2003.
R4. E Balagurusamy, "Object oriented Programming with C++", 6th edition, 2013, Tata McGraw Hill
R5. Bhave , " Object Oriented Programming With C++", Pearson Education , 2009

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH * Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA2204	DESIGN AND ANALYSIS OF ALGORITHMS	3	0	0	3

COURSE OBJECTIVE

1. To study about the fundamentals of problem solving and algorithm analysis.
2. To understand the problem using Divide and conquer methods and Greedy technique.
3. To learn about Dynamic programming techniques to solve Knapsack problem.
4. To study about N Queens problem, sum of subset problem using Backtracking method.
5. To learn about approximation algorithm for NP-hard and NP-complete problems

Unit	Description	Instructional hours
I	**INTRODUCTION** Fundamentals of algorithmic problem solving – Important problem types – Fundamentals of the analysis of algorithm efficiency – analysis frame work – Asymptotic notations – Mathematical analysis for recursive and non-recursive algorithms.	8
II	**DIVIDE AND CONQUER METHOD AND GREEDY METHOD** Divide and conquer methodology – Merge sort – Quick sort – Binary search – Binary tree traversal – Multiplication of large integers – Strassen's matrix multiplication – Greedy method – Prim's algorithm – Kruskal's algorithm – Dijkstra's algorithm.	10
III	**DYNAMIC PROGRAMMING** Computing a binomial coefficient – Warshall's and Floyd' algorithm – Optimal binary search tree – Knapsack problem – Memory functions.	9
IV	**BACKTRACKING AND BRANCH AND BOUND** Backtracking – N-Queens problem – Hamiltonian circuit problem – Subset sum problem – Branch and bound – Assignment problem – Knapsack problem – Travelling salesman problem.	9
V	**NP-HARD AND NP-COMPLETE PROBLEMS** P & NP problems – NP-complete problems – Approximation algorithms for NP-hard problems – Travelling salesman problem – Knapsack problem.	9
	Total Instructional hours	**45**

COURSE OUTCOME

C01: Able to prove the correctness and analyze the running time of the basic algorithms for those classic problems in various domains.
C02: Able to apply the algorithms and design techniques to solve problems.
C03: Able to apply prior knowledge of standard algorithms to solve new problems, and mathematically evaluate the quality of the solutions.
C04: Able to produce concise technical writing for describing the solutions and arguing their correctness.
C05: Able to analyze the complexities of various problems in different domains.

REFERENCE BOOKS:

R1. Anany Levitin "Introduction to the Design and Analysis of Algorithms" Pearson Education 2003.
R2. Ellis Horowitz, Sartaj Sahni and SanguthevarRajasekaran, "Fundamentals of computer algorithms", 2nd Edition, Prentice Hall, 2008.
R3. Horowitz, Sahni, Anderson-Freed, "Fundamentals of Data Structures in C", 2nd Edition, University Press, 2007.
R4. G. A.V.PAI, "Data structures and algorithms, concepts, Techniques and Applications", 1st Edition, Tata McGraw Hill, 2008.
R5. Parag Dave & Himanshu Dave, "Design and Analysis of Algorithms", 2nd Edition, Pearson Education, 2008.

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH * Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA2205	DATA STRUCTURES USING C	3	0	0	3

COURSE OBJECTIVE

1. To understand the linear and non linear data structure available in solving problems.
2. To know about the sorting and searching techniques and its efficiencies
3. Identify different solutions for a given problem; analyze advantages and disadvantages to different solutions.
4. To study the systematic way of solving problems, various methods of organizing large amounts of data
5. To employ the different data structures to fing the solutions for specific problem.

Unit	Description	Instructional hours
I	**INTRODUCTION AND LIST** Introduction – Overview – How to create programs and analyze them – Abstract Data Types ((ADT) – Arrays and its representation – Structures – Ordered Lists - Representation of Arrays – Simple applications.	9
II	**STACKS AND QUEUES** Stacks: Operations on stacks - Applications of Stack – Polish Expression and their Compilation using Stacks – infix to postfix conversion – evaluation of Expression – Queues : Representation of Queues, Operation on Queues - Priority Queues – Applications on Queue.	9
III	**LINEAR DATA STRUCTURE** Linear Linked List: Operations on Linear List using singly Linked Storage structures - Circular linked lists. Doubly linked list - Polynomial manipulation using linked list – garbage collection and compaction using linked list	9
IV	**NON LINEAR DATA STRUCTURE** Trees: Need for non linear structures – Tress and its representation – Binary Tree – Operations on binary tree – Binary tree traversal – Huffman Algorithm – Binary search tree. Graphs s: Representation of graph – Matrix representation of graphs – list structures – Graph Traversals – Breadth first search – Depth first search – Shortest path Algorithm.	9
V	**SEARCHING AND SOTING** General Background – Exchange sorts – Selection and Tree Sorting – Insertion Sorts – Merge and Radix Sort – Heap Sort – Shell Sort – External Sort – Basic Search Techniques – Tree Searching – General Search Trees – Hashing.	9
	Total Instructional hours	**45**

COURSE OUTCOME

CO1: Able to understand the concepts of data structure, data type and array data structure
CO2: Able to analyze algorithms and determine their time complexity
CO3: Able to implement linked list data structure to solve various problems
CO4: Able to understand and apply various data structures such as stacks, queues, trees and graphs to solve various computing problems using C.
CO5: Able to design and apply appropriate data structure for solving computing problems

REFERENCE BOOKS :

R1. Jeen-Paul Tremblay and Paul; G Sorenson, "An Introduction to Data Structures with applications", Second edition, McGraw Hill Book Company, 2008
R2. Ellis Hoerowitz& Sartaj Sahni" Fundamentals of Dta Structures in C:, 2008, Computer Science
R3. Mark Allen Weiss "Data Structures and Algorithm Analysis in C", Addison Wesley Second Edition, 2007
R4. Tanenbaum A.S.Langram Y. Augestein M J " DAtaaStructures using C", Peasson Education, 2012.
R5. Reema Thareja, "DataStructures using C", Oxford Press 2014.

Chairman - BoS
MCA - HiCET

HINDUSTHAN ACADEMIC COUNCIL Chairman HINDUSTHAN COLLEGE OF ENGG & TECH

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA2001	OOPS LABORATORY	0	0	4	2

COURSE OBJECTIVE

1. To make the student learn an object oriented method of solving problems.
2. To make the student to identify and practice the object-oriented programming concepts and techniques.
3. To practice the use of C++ classes and class libraries, modify existing C++ classes.
4. To develop C++ classes for simple applications and to apply the object oriented programming principles in software development.

S.no	Description of the experiments	Practical hours
1	Write a C++ program to perform String Concatenation • using Arrays • Using Functions • Using Arrays & functions • Using Pointers & Functions	3
2	Write a C++ Program to illustrate Enumeration and Function Overloading	3
3	Write a C++ Program to illustrate Scope and Storage class	3
4	Implementation of ADT such as Stack and Queues	3
5	Write a C++ Program to illustrate the use of Constructors and Destructors and Constructor Overloading	3
6	Write a program to Illustrate Friend Function and Friend Class	3
7	Write a Program to illustrate Static member and methods	3
8	Write a Program to illustrate Bit fields	
9	Write a Program to overload as binary operator, friend and member function	3
10	Write a Program to overload unary operator in Postfix and Prefix form as member and friend function	
11	Write a Program to illustrate Iterators and Containers	3
12	Write a C++ Program to illustrate function templates	3
13	Write a C++ Program to illustrate Class templates	3
14	Write C++ Programs and incorporating various forms of Inheritance	3
15	Write a C++ Program to illustrate Virtual functions	3
16	Write a C++ program to illustrate Exception Handling	3
17	Write a C++ program to demonstrate the concept of I/O Streams	3
	Total Instructional hours	**45**

Course Outcome

CO1: To apply object-oriented programming features to program design and implementation
CO2: To demonstrate the ability to analyze, use, and create functions, classes, to overload operators.
CO3: To demonstrate the ability to understand and use inheritance and Pointers when creating or using classes and create templates
CO4: To demonstrate the ability to understand and use Exception handling and I/O Streams
CO5: To design and write programs that make appropriate use of advanced object-oriented facilities common to many object-oriented languages such as classes, message passing, overloading and inheritance.

Chairman - BoS
MCA - HiCET

HINDUSTHAN COLLEGE OF ENGG & TECH ACADEMIC COUNCIL Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA2002	ALGORITHMS LABORATORY	0	0	4	2

COURSE OBJECTIVE

1. To implement various sorting techniques.
2. To implement searching algorithm using divide and conquer method
3. To implement shortest path algorithms using Floyd's algorithm and Warshall's algorithm.
4. To implement minimum spanning tree of graph using Prim's algorithm and Kruskals algorithm
5. To implement subset sum problem using backtracking method

S.no	Description of the Experiments	Practical hours
1	Quick Sort	3
2	Merge Sort	3
3	Binary Search	3
4	Warshall's Algorithm	3
5	Floyds Algorithm	3
6	Dijkstra's Algorithm	6
7	Prim's Algorithm	6
8	Knapsack Problem – Dynamic Programming	6
9	Knapsack Problem – Greedy Method	6
10	Subset Sum Problem – Backtracking	6
	Total Instructional hours	**45**

COURSE OUTCOME

CO1: Able to demonstrate a familiarity with major algorithms and data structures.
CO2: Able to apply important algorithmic design paradigms and methods of analysis.
CO3: Analyze worst-case running times of algorithms using asymptotic analysis.
CO4: Synthesize divide-and-conquer algorithms, Derive and solve recurrences describing the performance of divide-and-conquer algorithms.
CO5: Able to implement the dynamic-programming paradigm.

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * TECH * HINDUSTHAN COLLEGE OF ENGG & TECH
Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA2003	DATA STRUCTURES LABORATORY	0	0	4	2

COURSE OBJECTIVE

1. To develop skills to design and analyze simple linear and non linear data structures
2. To Strengthen the ability to identify and apply the suitable data structure for the given real world problem
3. To Gain knowledge in practical applications of data structures
4. To analyze performance of Algorithm
5. To use appropriate searching and sorting methods.

S.NO	DESCRIPTION OF THE EXPERIMENTS	TOTAL PRACTICAL HOURS
1	Program for adding two Polynomials.	3
2	Program for implementing Stack operations.	3
3	Program for implementing Queue operation.	3
4	Implementation of circular Queue.	3
5	Program for operations on Single Linked List.	3
6	Program for inserting and deleting elements in Double Linked List.	3
7	Program to implement Towers of Hanoi Problem.	3
8	Program to Convert an infix expression to postfix.	3
9	Program to sort elements in using sorting techniques.	3
10	Program to search an element using the search techniques.	6
11	Program to perform depth first search and breath first search using graph.	6
12	Program to perform tree traversal (In-order, pre-order, post-order) using binary search tree.	6
	Total Instructional hours	**45**

COURSE OUTCOME

CO1: To learn elementary data structures such as stacks, queues, linked lists, trees and graphs.
CO2: To design and analyze the time and space efficiency of data structure.
CO3: To identify the appropriate data structure for given problem.
CO4: To have practical knowledge on the applications of data structures.
CO5: To design algorithms to solve the problems.

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * TECH * HINDUSTHAN COLLEGE OF ENGG & TECH
Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16HE2032	COMMUNICATION SKILL DEVELOPMENT II	0	0	2	1

COURSE OBJECTIVE

1. To help the learners to improve their communicative skill.
2. To facilitate the learners to improve the pronunciation of words with proper stress.
3. To help the learners acquire the soft skills and interpersonal skills which will help the student to excel in their workplace
4. To inculcate the habit of reading and to improve the active vocabulary among the learners.
5. To enhance the performance of students in placement, interviews and Group discussion

S.no	Description of the experiments	Practical hours
1	Vocabulary Building Splitting Syllables Stress and Shift of words and sentences Common errors in Speaking Letter writing Writing Application, Bio-data, Resume, Curriculum Vitae. Reading Comprehension and Answering Multiple Choice questions and Fill ups.	15
2.	Listening to audio files and answering questions Planning for an event Extempore Speech - On the spot topics for speech Practice Identifying tonal variations expressing E-Mail writing Listening to Presentation Skills (GD & Debate) Group Discussion	10
3.	Reading Practice: Dr.Abdul Kalam's "Wings of Fire" Report Writing Paper Presentation Listening to Telephonic Conversation & Situational Conversation	10
4.	Debate Note Taking Interview Skills	10
	Total Instructional hours	**45**

RECORD LAY OUT

1. Every student has to maintain a record in which he / she have to incorporate the following details.
2. Students have to collect materials related to topics for Group Discussion / Debate
3. 10 assignments of Lab observations related to Presentation Skills about 200 words each
4. Covering letter with Bio data / Resume / Curriculum Vitae

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HiCET * Chairman * HINDUSTHAN COLLEGE OF ENGG & TECH

Dean (Academics)
HiCET

5. Paper Presentation Topics with source materials to be pasted in the record

COURSE OUTCOME	CO1: Display competence in oral, written, and visual communication. CO2: Show an understanding of opportunities in the field of communication. CO3: Communicate ethically. CO4: Demonstrate positive group communication exchanges. CO5: Apply appropriate communication skills across settings, purposes, and audiences. CO6: Build and maintain healthy and effective relationships

Chairman - BoS
MCA

HINDUSTHAN ACADEMIC COUNCIL * Chairman * HINDUSTHAN COLLEGE OF ENGG & TECH

Dean (Academics)
HiCET

SYLLABUS

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16BA3251	ORGANIZATIONAL BEHAVIOUR	3	0	0	3

Course Objective

1. To understand the focus, purpose and importance of organizational behaviour.
2. To understand the various aspects related to individuals behaviour in an organization.
3. To comprehend the formation of organization structure and the influence and role of Groups in organisation
4. To expose the students to various leadership styles and the influence of Power and politics in organization.
5. To know the dynamics of organizational behaviour.

Unit	Description	Instructional Hours
I	**FOCUS AND PURPOSE** Definition, need and importance of organizational behaviour – Nature and scope – Frame work – Organizational behaviour models.	5
II	**INDIVIDUAL BEHAVIOUR** Personality – types – Factors influencing personality – Theories – Learning – Types of learners – The learning process – Learning theories – Organizational behaviour modification. Misbehaviour – Types – Management Intervention. Emotions - Emotional Labour – Emotional Intelligence – Theories. Attitudes – Characteristics – Components – Formation – Measurement- Values. Perceptions – Importance – Factors influencing perception – Interpersonal perception- Impression Management. Motivation – importance – Types – Effects on work behavior.	12
III	**GROUP BEHAVIOUR** Organization structure – Formation – Groups in organizations – Influence – Group dynamics – Emergence of informal leaders and working norms – Group decision making techniques – Team building - Interpersonal relations – Communication – Control.	10
IV	**LEADERSHIP AND POWER** Meaning – Importance – Leadership styles – Theories – Leaders Vs Managers – Sources of power – Power centers – Power and Politics.	8
V	**DYNAMICS OF ORGANIZATIONAL BEHAVIOUR** Organizational culture and climate – Factors affecting organizational climate – Importance. Job satisfaction – Determinants – Measurements – Influence on behavior. Organizational change – Importance – Stability Vs Change – Proactive Vs Reaction change – the change process – Resistance to change – Managing change. Stress – Work Stressors – Prevention and Management of stress – Balancing work and Life. Organizational development – Characteristics – objectives –. Organizational effectiveness	10
	Total Instructional Hours	**45**

Course Outcome

CO1: Students will be familiar with the features and importance of organizational behaviour.
CO2: Can recognize aspects like personality, learning, emotions, attitudes, perceptions, motivation etc which will affect individual's behaviour in an organization.
CO3: Enables to understand and handle group behaviour effectively.
CO4: Gives an understanding on various leadership styles and the influence of Power and Politics in organization.
CO5: Ensures to have a better understanding on the dynamics of organizational behaviour.

REFERENCE BOOKS:

R1 - Stephen P. Robins, Organisational Behavior, PHI Learning / Pearson Education, 15th edition, 2013.
R2 - Fred Luthans, Organisational Behavior, McGraw Hill, 11th Edition, 2011.
R3 - Schermerhorn, Hunt and Osborn, Organisational behavior, John Wiley, 9th Edition, 2011.
R4 - UdaiPareek, Understanding OrganisationalBehaviour, 2nd Edition, Oxford Higher Education, 2013.

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HICET * HINDUSTHAN COLLEGE OF ENGG & TECH
Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA3201	COMPUTER NETWORKS	3	0	0	3

Course Objective

To understand networking concepts and basic communication model
To understand network architectures and components required for data communication.
To analyze the function and design strategy of physical, data link, network layer and transport layer
To acquire knowledge of various application protocol standard developed for Internet
To understand various security algorithms over application layer

Unit	Description	Instructional Hours
I	**NETWORK FUNDAMENTALS** Uses of Networks – Categories of Networks -Communication model –Data transmission concepts and terminology – Protocol architecture – Protocols – OSI – TCP/IP – LAN Topology - Transmission media	9
II	**DATA LINK LAYER** Data link control - Flow Control – Error Detection and Error Correction - MAC – Ethernet, Token ring, Wireless LAN MAC – Blue Tooth - Bridges.	9
III	**NETWORK LAYER** Network layer – Switching concepts – Circuit switching – Packet switching –IP — Data grams – IP addresses- IPV6– ICMP – IGMP - Routing Protocols – Distance Vector – Link State- BGP.	9
IV	**TRANSPORT LAYER** Transport layer –service –Connection establishment – Flow control – Transmission control protocol – Congestion control and avoidance – User datagram protocol. -Transport for Real Time Applications (RTP).	9
V	**APPLICATION LAYER** Applications - DNS- SMTP – WWW –SNMP- Security –threats and services - DES- RSA- web security –SSL	9
	Total Instructional Hours	45

Course Outcome

CO1: Understand the basic concepts in computer networking.
CO2: Apply the functions of different layers and in depth knowledge of datalink layer.
CO3: Analyze the different protocols and network layer components.
CO4:. Identify the basic functions of transport layer and congestion in networks.
CO5:.Explain the working of application layer.

REFERENCE BOOKS :

R1 - Larry L. Peterson & Bruce S. Davie, "Computer Networks – A systems Approach", Fourth Edition, Harcourt Asia / Morgan Kaufmann, 2009
R2 - William Stallings, "Data and Computer Communications", Nineth Edition, Prentice Hall , 2011.
R3 - BehrouzA.Forouzan, Data Communication and Networking, 5th Edition, Tata McGraw Hill, 2014
R4 - Andrew S.Tannenbaum David J. Wetherall, "Computer Networks" Fifth Edition , Pearson Education 2011
R5 - James F. Kurose, Keith W. Ross, "Computer Networking: A Top-down Approach, Pearson Education, Limited, sixth edition,2012

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH * Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA3202	COMPILER DESIGN AND ANALYSIS	3	0	0	3

COURSE OBJECTIVE

1. To introduce the major concept areas of language translation and compiler design.
2. To enrich the knowledge in various phases of compiler and its use
3. To extend the knowledge of parser
4. To develop an awareness on code optimization techniques, machine code generation
5. To provide practical programming skills necessary for constructing a compiler

Unit	Description	Instructional Hours
I	**INTRODUCTION** Language Processors – Structure of a compiler -The phases of a compiler- Cousins of the compiler-The grouping of phases-Compiler-construction tools. Simple syntax-directed translation : Introduction -Syntax definition-Syntax-directed translation-Parsing –A translator for simple expressions-Lexical analysis.	9
II	**LEXICAL ANALYSIS** The role of the lexical analyzer-Input buffering-Specification of tokens-Recognition of tokens-A language for specifying lexical analyzers-Finite automata-From a regular expression to an NFA-Design of a lexical analyzer generator-Optimization of DFA - based pattern matchers.	9
III	**SYNTAX ANALYSIS** Introduction: The role of the parser-Context-free grammars-Writing grammar-Top down parsing-Bottom-up parsing-Operator-precedence parsing-LR parsers-Using ambiguous grammars-Parser generators.	9
IV	**INTERMEDIATE CODE GENERATION** Variants of Syntax Tree – Three Address Code – Types and Declarations – Type checking – Rules of type checking – Type Conversion – Control Flow – Back patching	9
V	**CODE GENERATION** Issues in the Design of a Code Generator – The Target Language – Addresses in the Target Code – Basic Blocks and Flow Graphs – Optimization of Basic Blocks - A Simple Code Generator – DAG Representation of Basic Blocks – Peephole Optimization – Code Generation from DAG- Register Allocation and Assignment	9
	Total Instructional Hours	45

Course Outcome

CO1: To Acquire the knowledge of compiler & its features
CO2: To Understand the role of a lexical analyzer and identify and design top down and bottom up Parsing techniques
CO3: To Construct a syntax tree and generate three address codes
CO4: To Compare flow graphs and basic blocks and write efficient codes using peephole optimization
CO5:To Implement various optimization and code generation algorithms for the design of a compiler

REFERENCE BOOKS:

R1 - Alfred V. Aho, Monica S.Lam, Ravi Sethi, Jeffrey D.Ullman, —Compilers: Principles, Techniques and Tools, Second Edition, Pearson Education,2013.
R2 - Allen I. Holub, "Compiler Design in C", Prentice-Hall software series, 2012
R3 - Randy Allen, Ken Kennedy, "Optimizing Compilers for Modern Architectures: A Dependence based Approach", Morgan Kaufmann Publishers, 2012
R4 - Steven S. Muchnick, "Advanced Compiler Design and Implementation", Morgan Kaufmann Publishers - Elsevier Science, India, Indian Reprint 2013.
R5 - Keith D Cooper and Linda Torczon, "Engineering a Compiler", Morgan Kaufmann Publishers Elsevier Science, 2012.

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * TECH * HINDUST
Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA3203	JAVA PROGRAMMING	3	0	0	3

Course Objective

1. To impart the fundamental concepts of core JAVA.
2. To explain the concepts of Multithreading
3. To explore the skills in program development using Exception handling and I/O programming
4. To gain the built in knowledge of standalone and web applications.
5. To understand the concepts needed for database connectivity.

Unit	Description	Instructional Hours
I	**INTRODUCTION** Java Features – The Byte Code – Lexical issues - Class Fundamentals – Objects – Overloading Methods – Passing and returning objects – Recursion – Controlling access to members – this keyword - static and final keyword..	9
II	**INHERITANCE & PACKAGES** Nested classes – Inheritance – Using super keyword – Multi Level hierarchy – Method Overriding - Dynamic Method Dispatch – The Object class – Abstract classes - Packages – Access modifiers – Importing packages – Interfaces – Applying interfaces.	9
III	**EXCEPTION HANDLING & THREADS** Exception handling – Using try catch – Nested try- throw – throws – finally – Built in exceptions – user defined exceptions - Chained exceptions; Threads – Thread model – Creating a thread – Thread priorities – Synchronization – Multithreading – Suspending, resuming and stopping threads.	9
IV	**FRAMES & APPLETS** Java Frame – basic GUI components – Delegation event model - Event Classes– Source of events – Event Listener Interface – Applet Programming.	9
V	**FILES & DATABASES** I/O streams – Reading/Writing console – Files - Manipulating Databases with JDBC – Case Study on System class and Utility classes.	9
	Total Instructional Hours	**45**

Course Outcome

CO1:Apprehend the syntax, semantics of Java programming language and create applications using classes and objects
CO2: Design and create new applications by applying reusability and Packages concept
CO3: Apply Multithreading concepts to execute parallelism and explore the concept of Exception handling.
CO4: Implement programs using Frames, Event handlers and Applets
CO5:Synthesize rich applications using I/O, Files, JDBC and System/Utility classes

REFERENCE BOOKS:

R1- Herbert Schildt, "JAVA - The Complete Reference", Ninth Edition 2014, McGraw-Hill Education,
R2- RashmiKanta Das, "Core Java for Beginners", Third Edition, First Reprint 2015, Vikas Publishing House Pvt Ltd, ISBN – 978-93259-6850-9.
R3-Deitel, Deitel, "Java How to Program", Tenth Edition, PHI, 2015

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH * Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA3204	COMPUTER GRAPHICS AND MULTIMEDIA	3	0	0	3

Course Objective

1. Understand the fundamentals of graphics and multimedia.
2. Gain knowledge in the concepts of 2D and 3D graphics programming.
3. Acquire skills related to multimedia compression and animation
4. Formulate a working definition of interactive multimedia;
5. provides an idea of multimedia authoring and presentations

Unit	Description	Instructional Hours
I	**2D PRIMITIVES** Output primitives- Line drawing , Circle drawing and Ellipse drawing algorithms - Attributes of output primitives - Two dimensional Geometric transformations – Basic Transformation – Matrix representations – Composite transformations – Other transformations - Two dimensional viewing - Cohen-Sutherland Line Clipping, Sutherland Hodgeman Polygon clipping algorithms	9
II	**3D CONCEPTS** Parallel and Perspective projections - Three dimensional object representation - Polygon, Curved lines, Quadric surfaces – Spline Representations - 3D transformations - Viewing – Projections -Visible surface Identification – Classification of Visible Surface Detection Algorithms – Back face detection – Depth Buffer Method – A Buffer Method.	9
III	**COLOR MODELS AND COLOR APPLICATIONS** Color Models - RGB, YIQ, CMY, HSV - Animations - General Computer Animation, Raster, Key frame.	9
IV	**MULTIMEDIA BASICS** Introduction and definitions – Multimedia Authoring Systems – Multimedia Authoring – Editing and Authoring tools – VRML – Graphics and Image Representation	9
V	**MULTIMEDIA SYSTEMS** Compression -Types of Compressions: Lossless - Lossy - Video compression - Image Compression standards – JPEG standard –JPEG 2000 –JPEG LS standard	9
	Total Instructional Hours	45

Course Outcome

CO1: Demonstrate 2D transformation using 2D primitives.
CO2: Implement 3D projections and transformations.
CO3: Identify the different color models.
CO4: Understand the basics of multimedia.
CO5: Illustrate the multimedia authoring systems and compression types

REFERENCE BOOKS

R1 - Donald Hearn, M.Pauline Baker, Computer Graphics C Version, Pearson Education, 2011.
R2 - Ze-Nian Li and Mark S.Drew, Fundamentals of Multimedia, PHI Learning, 2008
R3 - F.S.Hill,Computer Graphics using OPENGL, 2nd edition, Pearson Education,2009
R4 - Prabhat K Andleigh, KiranThakrar, Multimedia systems design, 1st Edition, PHI,2009

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH * Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name Of The Course	L	T	P	C
MCA	16CA3001	SOFTWARE ENGINEERING TOOLS LABORATORY	0	0	4	2

Course Objective

1. To understand the basic concepts of software engineering, life cycle models and project management concepts
2. To understand in detail about the requirement analysis and requirement engineering processes.
3. To understand the concepts and principles involved in software design.
4. To understand the concepts and various types of software testing and project implementation techniques.
5. To understand the techniques involved in software project management and Risk management.

S.No	Description Of The Experiments
1	Practicing the different types of case tools such as (Rational Rose & other Open Source) used for all the phases of Software development life cycle.
2	Implementation of the Data modeling using CASE Workbenches and develop online railway reservation system.
3	Implementation of the Data modeling using CASE Workbenches for Library management system.
4	Implementation of the Project management using CASE Workbenches and develop Payroll processing application.
5	Implementation of the Source code generators using CASE Workbenches and develop Inventory system
6	Implementation of the Source code generators using CASE Workbenches for Payroll system
7	Implementation of the User-interface development using CASE Workbenches and develop Library management system
8	Implementation of the Programming using CASE Workbenches and Create a dictionary
9	Implementation of the Verification and validation using CASE Workbenches for Payroll system
10	Implementation of the Verification and validation using CASE Workbenches for Library management system

Total Instructional Hours 45

Course Outcome

CO1: Ability to identify the minimum requirements for the development of application.
CO2: Ability to develop, maintain, efficient, reliable and cost effective software solutions.
CO3: Ability to critically thinking and evaluate assumptions and arguments.

Software required:

- **Languages**: C/C++/Java/JSDK/Web browser.
- Any front end tool (like VB, VC++) etc
- **Any backend tool** (Oracle, Ms-Access, SQL) etc.
- **Any CASE tool** (Rational Rose or other Open Source)

Dean (Academics)
HiCET

Chairman - BoS
MCA - HiCET

COUNCIL * Chairman * HINDUSTHAN COLLEGE OF ENGG & TECH

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA3002	JAVA PROGRAMMING LABORATORY	0	0	4	2

Course Objective

1. To impart the basic programming constructs in Java to develop simple object oriented programs
2. To explore the skills in program development using Exception handling and multi-threading concepts.
3. To develop applications using I/O Streams
4. To gain programming skills to establish database connectivity
5. To gain the built in knowledge of standalone and web applications

Expt. No.	Description of the Experiments
1.	Create an Employee payroll application using classes, objects and constructors. Create objects for three different employees and calculate HRA, DA and total pay
2.	Create a Banking Application to calculate simple interest and compound interest using Abstract class, Packages and Interface.
3.	Write a Java program to illustrate Method Overloading to calculate the area of the following shapes (i) Square (ii) Rectangle (iii) Circle
4.	Write a Java program to implement multi threading concepts
	Write a Java program to illustrate Method Overriding for the following:
5.	Get the empid, name, grade, salary, designation from the user. Create a base class employee and display the employee details using show( ) method. Create a derived class sports employee and display the sports details using show( ) method.
	Write a Java Program to throw a User Defined Exception for the following
6.	Credit Point Validation
	Age Less Than Twenty
	Write a Java program to implement the following in-built exceptions:
7.	Array Index Out Of Bounds Exception
	Arithmetic Exception
8.	Develop with suitable hierarchy, classes for Point, Shape, Rectangle, Square, Circle, Ellipse, Triangle, Polygon, etc. Design a simple test application to demonstrate dynamic polymorphism.
9.	Write a window based Graphic User Interface applications using frames and applets to simulate a calculator application. Use Grid Layout to place the components
10.	Write a java program to implement different forms of Inheritance for employee information system.
	Write a java program with Database Connectivity for the following web based application to check the status of student result.
11.	Create a Database for student with the following fields: Regno, Name, Mark1, Mark2, Mark3, Mark4, Mark5 and Grade.
	Create a HTML for getting Regno from the user.
	Create an application program for displaying the student details for the corresponding Regno

Total Practical Hours 45

Chairman - BoS
MCA - HiCET

Chairman
HINDUSTHAN COLLEGE OF ENGG & TECH

Dean (Academics)
HiCET

Course Outcome	CO1:Develop programs using OOPS concepts. CO2: Analyze the various Java packages and understand the way the classes are organized CO3:Implement programs using Input and Output in Java. CO4:Execute programs in Applet, AWT and Event handlers in Java. CO5:Design programs using Database connectivity

Software required:

- Java 2.0, NetBeans 8.0

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL
Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name Of The Course	L	T	P	C
MCA	16CA3003	COMPUTER GRAPHICS AND MULTIMEDIA LABORATORY	0	0	4	2

Course Objective

1. The objectives of the course are to: Understand the need of developing graphics applications.
2. Learn the hardware involved in building graphics applications.
3. Learn algorithmic development of graphics primitives like: line, circle, ellipse, polygon etc.
4. Learn the representation and transformation of graphical images and pictures.
5. Learn the concept of Color Generation.

S.No	Description Of The Experiments
1	**LINE DRAWING AND CIRCLE DRAWING ALGORITHMS** Implement Line drawing algorithm like DDA, Bresenham's Line Drawing, Mid circle drawing
2	**TWO DIMENSIONAL TRANSFORMATIONS:** Creation of two dimensional objects and applying simple transformations like Translation, Scaling, Rotation and applying Composite transformations
3	**THREE DIMENSIONAL TRANSFORMATIONS**: Creation of simple three dimensional objects like cube, cone and cylinder and applying simple transformations like Translation, Scaling, Rotation and applying Composite transformations.
4	**IMAGE EDITING:** Image enhancement, Image transformation from color to gray scale and vice versa, Image manipulation and Image optimization for web - Usage of editing tools, layers, filters, special effects and color modes.
	Total Instructional Hours 45

Course Outcome

CO1: Understand the basic concepts of computer graphics.
CO2: Apply clipping and filling techniques for modifying an object.
CO3: Understand the concepts of different type of geometric transformation of objects in 2D and 3D.
CO4: Understand the practical implementation of modeling, rendering, viewing of objects in 2D.
CO5: Understand the concepts of Viewing, Curves and surfaces

Software required:

- Turbo C , Adobe PhotoShop 6

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL ★ HINDUSTHAN COLLEGE OF ENGG & TECH ★ Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name Of The Course	L	T	P	C
MCA	16CA3004	CAREER AND SOFT SKILL DEVELOPMENT – I	0	0	2	1

Course Objective

1. To enhance the performance of students in placement, interviews and Group discussion.
2. To understand team dynamics & effectiveness.
3. To learn leadership qualities and practice them.

S.NO	DESCRIPTION OF THE EXPERIMENTS	PRACTICAL HOURS
1	1. Introduction to Communication 2. The Process of Communication. 3. Verbal and Non- Verbal communication. . 4. Barriers of Communication. 5. Dyadic Communication.	15
2.	1. Listening Process 2. Purpose of Listening 3. Common Barriers to the Listening Process 4. Measures to improve listening skill 5. Intensive Listening and Listening for specific information.	10
3.	1. Reading and understanding written materials. 2. Techniques of reading, skimming, and Scanning. 3. General Principles of Writing. 4. Writing Memo, circular and Notice. 5. Report Writing.	10
4.	1. Group Discussion Techniques. 2. Developing body language. 3. Practicing etiquette . 4. Delivering a Presentation. 5. Developing interpersonal relationship. 6. Types of Interviews and Career Planning.	10
	TOTAL INSTRUCTIONAL HOURS	**45**

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH * Chairman

Dean (Academics)
HiCET

RECORD LAY OUT

1. Every student has to maintain a record in which he / she has to incorporate the following details.
2. Students have to collect materials related to topics for Group Discussion / Debate.
3. 10 assignments of Lab observations related to Presentation Skills about 200 words each.
4. Covering letter with Bio data / Resume / Curriculum Vitae.
5. Paper Presentation Topics with source materials to be pasted in the record.

Course Outcome	CO1: Display competence in oral, written, and visual communication. CO2: Show an understanding of opportunities in the field of communication. CO3: Demonstrate positive group communication exchanges. CO4: Apply appropriate communication skills across settings, purposes, and audiences. CO5: Build and maintain healthy and effective relationships.

REFERENCE BOOKS:

R1 - Interactive Multimedia Programs on Managing Time and Stress.
R2 - Personality Development (CD-ROM), Times Multimedia, Mumbai.
R3 - Robert M Sherfield "Developing Soft Skills" 4th edition, New Delhi: Pearson Education, 2009.

WEB SOURCES:

W1 - http://www.kent.ac.uk/careers/cv/coveringletters.htm
W2 - http://www.mindtools.com/pages/article/newCDV_34.htm

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * Chairman * COLLEGE OF ENGG & TECH

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA4201	OPERATIONS RESEARCH	3	1	0	4

Course Objective

1. To provide the concept and an understanding of basic concepts in Operations Research Techniques for Analysis and Modeling in Computer Applications.
2. To understand, develop and solve mathematical model of linear programming problems
3. To understand, develop and solve mathematical model of Transport and assignment problems
4. To Understand network modeling for planning and scheduling the project activities
5. To Understand and differentiate the different queuing models

Unit	Description	Instructional Hours
I	**LINEAR PROGRAMMING MODELS** Mathematical Formulation - Graphical Solution of linear programming models – Simplex method – Artificial variable Techniques- Variants of Simplex method	12
II	**TRANSPORTATION AND ASSIGNMENT MODELS** Mathematical formulation of transportation problem- Methods for finding initial basic feasible solution – optimum solution - degeneracy – Mathematical formulation of assignment models – Hungarian Algorithm – Variants of the Assignment problem	12
III	**INTEGER PROGRAMMING MODELS** Formulation – Gomory's IPP method – Gomory's mixed integer method – Branch and bound technique.	12
IV	**SCHEDULING BY PERT AND CPM** Network Construction – Critical Path Method – Project Evaluation and Review Technique – Resource Analysis in Network Scheduling	12
V	**QUEUEING MODELS** Characteristics of Queuing Models – Poisson Queues - (M / M / 1) : (FIFO / ∞ /∞), (M / M / 1) : (FIFO / N / ∞), (M / M / C) : (FIFO / ∞ / ∞), (M / M / C) : (FIFO / N / ∞) models.	12
	Total Instructional Hours	**60**

Course Outcome

CO1: Able to understand and apply linear, integer programming to solve operational problem with constraints
CO2: Able to Apply transportation and assignment models to find optimal solution in warehousing and Travelling,
CO3: Able to Demonstrate project scheduling using PERT and CPM
CO4: Able to Identify and analyze appropriate queuing model to reduce the waiting time in queue.
CO5: Able to Interpret optimization concepts in real world problems

REFERENCE BOOKS:

R1 - Taha H.A., "Operations Research : An Introduction " 8th Edition, Pearson Education, 2008.
R2 - A.M.Natarajan, P.Balasubramani, A.Tamilarasi, "Operations Research", Pearson Education, Asia, 2014.
R3 - Prem Kumar Gupta, D.S. Hira, "Operations Research", S.Chand& Company Ltd, New Delhi, 3rd Edition , 2008.
R4 - John W. Chinneck "Feasibility and Infeasibility in Optimization Algorithms and Computational Methods' Springer, 2008
R5 - Ibe, O.C. "Fundamentals of Applied Probability and Random Processes", Elsevier, U.P., 1st Indian Reprint, 2007.
R6 - Gross, D. and Harris, C.M., "Fundamentals of Queueing Theory", Wiley Student, 3rd Edition, New Jersy, 2008

Chairman - BoS
MCA - HiCET

HINDUSTHAN ACADEMIC COUNCIL * Chairman * HINDUSTHAN COLLEGE OF ENGG & TECH

Dean (Academics)
HiCET

Programme	Course code	Name of the course	L	T	P	C
MCA	16CM4321	EMBEDDED SYSTEMS	3	0	0	3

Course Objective

1. To gain knowledge about how the I/O devices are interfaced with 8051 microcontroller
2. To Learn Assembly language programming in 8051.
3. To understand the Basic concepts of 8051 microcontroller and Embedded systems
4. To understand the basic embedded system design.
5. To understand various case studies.

Unit	Description	Instructional Hours
	INTRODUCTION TO 8-BIT MICROCONTROLLER	
I	Intel 8051 Architecture- Processor and Memory Organization-Interrupts of 8051 - Addressing Modes - Instruction Set –Memory mapped I/O - I/O mapped I/O- Assembly Language Programming Using 8051	9
II	**INTERFACING WITH 8051** Input- Output Interfacing – Bus Standards – PCI – ISA – Timing And Control – Input Output Devices –Serial And Parallel Communication – Motor Control- Programming Display Devices – ARM Architecture.	9
III	**EMBEDDED SYTEM** Embedded Systems- Processor Embedded Into A System-Embedded Hardware And Software Units- Applications-Design Process-Inter Process Communication – Signal Functions –Mailbox - Pipes –Memory Management Device, Files And I/O Subsystem – Basic Design of RTOS	9
IV	**SYSTEM DESIGN TECHNIQUES** Design methodologies- Design flows - Requirement Analysis – Specifications- System analysis and architecture design – Quality Assurance techniques- Distributed embedded systems – MPSoCs and shared memory multiprocessors	9
	CASE STUDY	
V	Automated Teller Machine - Alarm Clock - Audio player – Automatic Chocolate Vending Machine - Digital still camera – Telephone answering machine - Engine control unit – Antilock Braking System.	9
	Total Instructional Hours	45

Course Outcome

CO1: Able to understand 8051 microcontroller functions
CO2: Able to gain basic knowledge in ARM architecture
CO3: Able to design and control real time control systems
CO4: Acquire the knowledge of embedded system design and implement real time functions
CO5: Able to design embedded system based on case studies

REFERENCES BOOKS:

R1 - Rajkamal, "Embedded System: Architecture, Programming And Design" Tata Mcgraw-HillEducation, Second Edition, 2008.
R2 - Marilyn Wolf, "Computers As A Components" Third Edition, Morgan Kaufmann Series 2012.
R3 - B.KanthRao, "Embedded Systems" PHI Learning Private Limited, 2011
R4 - Jonathan W.Valvano, "Embedded Microcomputer Systems Real Time Interfacing", Third Edition Cengage Learning, 2012.
R5 - K.V.K.K.Prasad, "Embedded Real-Time Systems: Concepts, Design & Programming", Dream Tech Press, 2005

Chairman - BoS
MCA - HiCET

HINDUSTHAN ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH * Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA4202	NETWORK PROGRAMMING	3	0	0	3

Course Objective

1. To state the major components and describe the architecture of the LINUX operating system
2. To use SHELL programming to create simple tools for the information processing
3. To understand IPC using various techniques and Signal Generation
4. To understand usage of TCP/UDP / Raw sockets
5. To explain Socket programming to design client- server environment

Unit	Description	Instructional Hours
I	**INTRODUCTION TO LINUX & SHELL** Introduction to Linux - Basic commands and file handling commands, Standard I/O, pipes and standard error related commands, Task Control commands UNIX Shell Scripting Introduction - Loop control, Arrays and Arithmetic, Case, Co-routines, practicing sample shell scripts	9
II	**IPC & SIGNALS** Process control – Process relationships - Signals generation and handling, signal functions – Interprocess Communication using PIPE, FIFO, MESSAGE QUEUE, SHARED MEMORY, SEMAPHORES	9
III	**ELEMENTARY TCP SOCKETS** Introduction to Socket Programming –Introduction to Sockets – Socket address Structures – Byte ordering functions – address conversion functions – Elementary TCP Sockets – socket, connect, bind, listen, accept, read, write , close functions –Concurrent Server. TCP Echo Server – TCP Echo Client	9
IV	**ELEMENTARY UDP SOCKETS** Elementary UDP sockets – UDP echo Server – UDP echo Client- Domain name system – gethostbyname function – gethostbyadr function –getservbyname and getservbyport functions	9
V	**ADVANCED SOCKETS** Threaded servers – thread creation and termination – TCP echo server using threads – Mutexes – condition variables – raw sockets – ping program – trace route program	9
	Total Instructional Hours	**45**

Course Outcome

CO1 :Understanding the basics of Linux Environment and Code programs on Shell Scripts
CO2 :Demonstrate Signal Handling mechanism and implement programs using various IPC techniques
CO3: Design and implement client-server applications using Elementary TCP Sockets & UDP Sockets
CO4: Understanding DNS and implement its various functions.
CO5: Design and Implement applications using Multithreading and Advanced Socket programming

REFERENCE BOOKS:

R1 - W. Richard Stevens, B. Fenner, A.M. Rudoff, "Unix Network Programming – The Sockets Networking API", 3rd edition, Pearson, 2009
R2 - W. Richard Stevens, S.A Rago, "Advanced Programming in the Unix environment", 2nd edition, Pearson, 2013
R3 –B.M.Harwani, Unix and Shell programming, Oxford University Press, 2013
R4 - Matthew, Neil and Richard Stones, "Beginning Linux Programming". John Wiley and Sons, 2011

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH * Chairman

Dean (Academics)
HiCET

Programme	Course code	Name of the course	L	T	P	C
MCA	16CM4001	EMBEDDED SYSTEMS LABORATORY	0	0	4	2

Course Objective

1. Demonstrate the 8051 and ARM kit ,instruction set & write Assembly Language program
2. Apply the programming concepts to 8051 and ARM Microcontroller
3. Use proper peripheral devices and interface to 8051
4. Formulate the concept of mail box in RTOS.
5. Demonstrate ARM based interfacing

S.No	Description Of The Experiments
	8051 Experiments using kits
1	Basic arithmetic and Logical operations
2	Square & Cube of a number
3	Matrix Addition and Subtraction
4	Sorting, Largest & Smallest of an array
5	1's and 2's complement of a number
6	Stepper motor control interface
	ARM Experiments using kits
7	Blinking of LED's connected through PORTS
8	Relay control
9	Interfacing PWM and LED
10	Mailbox
	Total Instructional Hours **45**

Course Outcome

CO1: Analyze the performance of 8051 programs for various types of inputs.
CO2: Formulate the design logic of ARM programs
CO3: Develop one industrial application using peripheral devices
CO4: Interface various modules with 8051 and ARM
CO5: Develop mailbox and enable intra process communication using RTOS

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH * Chairman

Dean (Academics)
HiCET

Programme	Course code	Name of the course	L	T	P	C
MCA	16CA4002	NETWORK PROGRAMMING LABORATORY	0	0	4	2

Course Objective

1. To Understand the Basic Linux Commands and to implement simple programs in Shell Scripts.
2. To understand IPC using various techniques and Signal Generation
3. To understand the use of client/server architecture in application development using TCP ,UDP and Raw Sockets
4. To Understand the Concept of Domain Name System
5. To achieve the concept of synchronization using various techniques

S.No	Description of the Experiments	Total Practical Hours
1	Implementation of Basic Linux Commands, I/O redirection & Pipes and Task Control	
2	Implementation of Basic Shell Scripts	
3	Implementation of Connection oriented service using TCP	
4	Implementation of Connectionless Oriented Service using UDP	
5	Implementation of IPC using PIPE, FIFO, SHARED MEMORY, MESSAGE QUEUE	
6	To illustrate the concept of interrupt signal using signal handler and division by zero using sigaction.	
7	Implement Domain name System using its various Functions	
8	To implement multiple client chatting with a single server	
9	Implement a program for producer and consumer problem to achieve synchronization using semaphores	
10	Implement producer consumer problem using mutex and conditional variables	
11	To implement a trace route program given an IP address.	
12	Implement a Ping program in C	
	Total Instructional Hours	**45**

Course Outcome

CO1 :Understanding the basics of Linux Environment and Code programs on Shell Scripts
CO2 :Demonstrate Signal Handling mechanism and implement various IPC techniques
CO3: To design and implement client-server applications using Connection oriented and Connectionless methods
CO4: Construct various functions of DNS.
CO5: Design and Implement applications to achieve Synchronization using semaphores and Mutex and code Ping and Trace route using Raw Sockets.

Software required:

- C with Unix
- Telnet

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH * Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name Of The Course	L	T	P	C
MCA	16CA4003	CAREER AND SOFT SKILL DEVELOPMENT - II	0	0	2	1

S.No	Description of The Experiments	Practical Hours
1	1. Vocabulary skill. 2. Common Errors in Speaking. 3. Making of Sentences. 4. Writing formal letters. 5. Real Life conversations. 6. Stress and Intonation.	15
2.	1. Positive Attitude & Self Confidence 2. Motivation Skills & Personality Development. 3. Goal Setting. 4. Career Planning. 5. Presentation Skills.	10
3.	1. Interview skills. 2. Debate. 3. Effective use of body language. 4. Group Dynamics 5. Managing Team Performance & Team Conflicts	10
4.	1. Time Management 2. Problem Solving Skill 3. Report Writing 4. E-Mail Writing. 5. Note Making	10
	INSTRUCTIONAL HOURS	**45**

RECORD LAY OUT

1. Every student has to maintain a record in which he / she have to incorporate the following details.
2. Students have to collect materials related to topics for Group Discussion / Debate.
3. 10 assignments of Lab observations related to Presentation Skills about 200 words each.
4. Covering letter with Bio data / Resume / Curriculum Vitae.
5. Paper Presentation Topics with source materials to be pasted in the record.

COURSE OUTCOME

CO1: Display competence in oral, written, and visual communication.
CO2: Handle Engineering Ethics and Human Values.
CO3: Make effective presentations.
CO4: Show an understanding of opportunities in the field of communication.
CO5: Communicate ethically.

REFERENCE BOOKS:

R1 - International English Language Testing System Practice Tests, Cambridge University Press..
R2 - Personality Development (CD-ROM), Times Multimedia, Mumbai.
R3 - Robert M Sherfield and et al. "Developing Soft Skills" 4th edition, New Delhi: Pearson Education,2009.

WEB SOURCES:

W1 - http://www.kent.ac.uk/careers/cv/coveringletters.htm
W2 - http://www.mindtools.com/pages/article/newCDV_34.htm

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGINEERING * Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA4701	TECHNICAL SEMINAR/TECHNICAL PUBLICATIONS	0	0	4	2

Course Objective

1. Train the students to critically evaluate a well-defined set of research subjects.
2. To summarize the findings concisely in a paper of scientific quality.
3. Ability to understand a topic, communicate it and identify the issues.
4. To promote and develop presentation skills and import a knowledgeable society.
5. Effective use oral and written forms of communication, that results in integrative thinking.

Sl. No.	Description of the Experiments
1.	Every student selects a topic related to current trends and the same should be approved by the respective committee. This selection should have at least 5 distinct primary sources.
2.	Every student must write a short review of the topic and present it to fellow students and faculty (discuss the topic – expose the flaws – analyze the issues) every week.
3.	The faculty should evaluate the short review and award marks with respect to the following. a. Has the student analyzed – not merely quoted – the most significant portions of the primary sources employed? b. Has the student offered original and convincing insights? c. Plagiarism to be checked.
4.	Every student should re-submit and present the review article including issues/ comments/ conclusions which had arisen during the previous discussion.
5.	Every student should submit a final paper as per project specifications along with all short review reports (at least 4 internal reviews) and corresponding evaluation comments.
6.	Every student should appear for a final external review exam to defend themselves.
	Total Practical Hours **45**

Course Outcome

CO1: understand the role that effective presentations have in public/professional contexts.
CO2: Gain experience in formal/ informal presentation.
CO3: Access information in a variety of ways appropriate to a discipline, including locating and using library collections and services and other search tools and databases
CO4: Obtain, select, store, create and use support materials appropriately
CO5: Ability to write technical documents and give oral presentations related to the work completed.

Chairman - BoS
MCA - HiCET

HINDUSTHAN ACADEMIC COUNCIL COLLEGE OF ENGG & TECH Chairman

Dean (Academics)
HiCET

ELECTIVE I & II

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA4301	TCP/IP	3	0	0	3

Course Objective

1. Understand the IP addressing schemes.
2. Understand the fundamentals of network design and implementation
3. Understand the design and implementation of TCP/IP networks
4. Understand on network management issues
5. Learn to design and implement network applications

Unit	Description	Instructional Hours
I	**INTRODUCTION** Internetworking concepts and architecture model – class ful Internet address CIDR – Sub netting and Supernetting – AARP – RARP – IP Routing – ICMP – IPV6.	9
II	**TCP** Services – header – connection establishment and termination – interactive data flow – bulk data flow – timeout and retransmission – persist timer – keep alive timer – futures and performance.	9
III	**IP IMPLEMENTATION** IP global software organization –routing table–routing algorithms – fragmentation and reassembly – error processing (ICMP) – Multicast Processing (IGMP).	9
IV	**TCP IMPLEMENTATION - I** Data structure and input processing – transmission control blocks – segment format – comparison– finite state machine implementation – Output processing – mutual exclusion –computing the computing the TCP Data length.	9
V	**TCP IMPLEMENTATION - II** Timers – events and messages – timer process – deleting and inserting timer event – flow control and adaptive retransmission– congestion avoidance and control – urgent data processing and push function.	9
	Total Instructional Hours	**45**

Course Outcome

CO1 : Design and implement TCP/IP networks
CO2 : Understand the IP addressing schemes and the fundamentals of network design and implementation
CO3 :Develop data structures for basic protocol functions of TCP/IP
CO4 : Understand the Design and implement network applications..
CO5 : Design the data structures for maintaining multiple local and global timers.

REFERENCE BOOKS :

R1 - Douglas E Comer, "Internetworking with TCP/IP Volume one", Pearson Education 6thEdition 2013
R2 - W.Richard Stevens "TCP/IP Illustrated"Vol 1. Pearson Education, 2014
R3 - Forouzan, " TCP/IP Protocol Suite" Second Edition, Tata MC Graw Hill, 2010

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL Chairman KUMARAGURU COLLEGE OF ENGG & TECH

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA4302	SOFTWARE PROJECT MANAGEMENT	3	0	0	3

Course Objective

1. Match organizational needs to the most effective software development model and to Plan and manage projects at each stage of the software development life cycle (SDLC)
2. Create project plans that address real-world management challenges
3. Develop the skills for tracking and controlling software deliverables
4. To learn the cost estimation techniques during the analysis of the project.
5. To understand the quality concepts for ensuring the functionality of the software

Unit	Description	Instructional Hours
I	**INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT** Project Definition – Contract Management – Activities Covered By Software Project Management – Overview Of Project Planning – Stepwise Project Planning.	9
II	**PROJECT EVALUATION** Strategic Assessment – Technical Assessment – Cost Benefit Analysis – Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation.	9
III	**ACTIVITY PLANNING** Objectives – Project Schedule – Sequencing And Scheduling Activities – Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity On Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning And Control.	9
IV	**MONITORING AND CONTROL** Creating Framework – Collecting The Data – Visualizing Progress – Cost Monitoring – Earned Value – Prioritizing Monitoring – Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types Of Contract – Stages In Contract Placement – Typical Terms Of A Contract – Contract Management – Acceptance.	9
V	**MANAGING PEOPLE AND ORGANIZING TEAMS** Introduction – Understanding Behavior – Organizational Behaviour: A Background – Selecting The Right Person For The Job – Instruction In The Best Methods – Motivation – The Oldman–Hackman Job Characteristics Model – Working In Groups – Becoming A Team – Decision Making – Leadership – Organizational Structures – Stress – Health And Safety – Case Studies.	9
	Total Instructional Hours	**45**

Course Outcome

CO1: Understand the activities during the project scheduling of any software application.

CO2: Understand the risk management activities and the resource allocation for the projects.

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * TECH * DEGREE * HINDUSTHAN * Chairman

Dean (Academics)
HiCET

CO3: Apply the software estimation and recent quality standards for evaluation of the software projects

CO4: Acquire knowledge and skills needed for the construction of highly reliable software project

CO5: Create reliable, replicable cost estimation that links to the requirements of project planning and managing

REFERENCE BOOKS :

R1- Bob Hughes and MikeCotterell "Software Project Management", Third Edition, TATA McGraw Hill Edition 2009.
R2. Royce, "Software Project Theory", Pearson Education, 2005.
R3.S. A. Kelkar, "Software Project Management: A Concise Study", PHI Learning, 2013

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH *
Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA4303	SOFTWARE TESTING	3	0	0	3

Course Objective

1. To introduce the concepts of Software bugs and its impact.
2. To understand the basic concepts, types and the way in which effective and efficient testing can be performed
3. To identify the issues in testing management and understand test planning.
4. To introduce various testing techniques along with software production.
5. To understand the standard principles to check the occurrence of defects and its removal.

Unit	Description	Instructional Hours
I	**INTRODUCTION** Testing as an Organization –Bugs– Software Bugs – Reasons for Bugs – Cost of Bugs – Responsibilities of Software Tester –Software Development Process: Product Component – Life Cycle Models – Testing Realities	9
II	**TESTING FUNDAMENTALS** Examining the Specification – Testing the Software with Blinders On – Examining the Code – Testing the Software with X Ray Glasses.	9
III	**TESTING TYPES** Configuration Testing - Compatibility Testing: Overview –Platform and Application Version – Standards and Guidelines – Foreign Language Testing: Translation Issues – Localization Issues – Configuration and Compatibility Issues – Usability Testing – **Web Site Testing:** Black Box Testing – Gray Box Testing – White Box Testing – Configuration and Compatibility Testing – Usability Testing– Functional(Regression) & Non-Functional(Performance) –Agile.	9
IV	**AUTOMATED TESTING AND TEST TOOLS** Benefits – Test Tools – Software Automation – Random Testing – Bug Bashes and Beta Testing: Test Sharing – Beta Testing – Outsourcing Your Testing – Testing for Software Security. **Test Documentation**: Planning your Test Effort: Goal of Planning – Planning Topics – Writing and Tacking Test Cases: Goal – Test Case Planning– Design – Cases – Procedures – Test Case Organization and Tracking	9
V	**REPORTING THE FINDINGS** Getting Bugs Fixed – Isolating and Reproducing Bugs – Bug Life Cycle – Bug Tracking System – Measuring the Success –KPI's & SLA's **Software Quality Assurance**: **A Case Study on Test Life Cycle**	9
	Total Instructional Hours	**45**

Course Outcome

CO1: To Understand the tester responsibilities and the software development process.

CO2: To Understand the fundamentals of testing to perform an effective and efficient testing

CO3: Test the software by applying testing techniques to deliver a product free from bugs

CO4: Perform automated testing using test tools and document the testing procedures

CO5: To Appreciate the bug tracking system and the importance of software quality assurance.

REFERENCE BOOKS :

R1- Ron Patton, Software Testing, Pearson Education, 2nd Edition, Sixteenth Impression,2011
R2-Elfriede Dustin, Effective Software Testing, Pearson Education, 2008
R3- Boris Beizer, Software Testing Techniques, Dream Tech Press, 2009.

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * VINAYAKA MISSIONS KIRUPANANDHA VARIYAR ENGINEERING COLLEGE & TECH * Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA4304	SOFTWARE QUALITY MANAGEMENT	3	0	0	3

Course Objective

1. To introduce the quality management process and its activities
2. To explain the standards and metrics of software.
3. To distinguish between the various activities of quality assurance, quality planning and quality control
4. To understand the importance of standards in the quality management process and their impact on the final product
5. To understand the principles of defect prevention and identify the defects in the software

Unit	Description	Instructional Hours
I	**INTRODUCTION** Quality Control & Assurance–Software Process Assessment - Overview – Assessment Phases – Assessment Principles – Assessment Conduct – Implementation Consideration – Quality Management – Quality Assurance Plan – Considerations –Verification and Validation.	9
II	**CONFIGURATION MANAGEMENT** Need for Configuration Management – Software Product Nomenclature – Configuration Management Functions – Baselines – Responsibilities – Need for Automated Tools – Plan –SCM Support Functions – The Requirement Phase Design Control – The Implementation Phase – Test Phase – SCM Tools – Configuration Accounting and Audit– Release Management Through Source Control.	9
III	**SOFTWARE STANDARDS AND INSPECTION** Definitions – Reason for Software Standards – Benefits – Establishing Standards – Guidelines – Types of Reviews – Inspection Objectives – Basic Inspection Principles – The Conduct of Inspection – Inspection Training.	9
IV	**TESTING AND MANAGING SOFTWARE QUALITY** Testing: Principles – Types – Planning – Development – Execution and Reporting –Tools & Methods – Real Time Testing – Quality Management Paradigm – Quality Motivation – Measurement Criteria – Establishing a Software Quality Program – Estimating Software Quality.	9
V	**DEFECT PREVENTION** Principles of Software Defect Prevention – Process Changes for Defect Prevention – Defect Prevention Considerations – Management Role – Framework for Software Process Change – Managing Resistance to Software Process Change – Case studies	9
	Total Instructional Hours	**45**

Course Outcome

CO1: Understand the concepts of quality control and quality management in software
CO2: Understand the concept of software configuration management
CO3: Analyse the different types of software standards for quality assurance
CO4: Apply quality assurance tools and techniques to ensure software quality
CO5: Illustrate quality assurance plans and prevent the defects in the software

REFERENCE BOOKS :

R1-Watts S. Humphrey, "Managing the Software Process, Addison Wesley, Nineteenth Impression", 2013
R2-Roger Pressman S, "Software Engineering: A Practitioner's Approach", 7th Edition, McGraw Hill, 2010.
R3 - Jeff Tian, "Software Quality Engineering: Testing, Quality Assurance and Quantifiable Improvement" ,wiley India, 2009
R4 - Chris Hawkins, Margaret Ross, Geoff , "Software Quality Management VI: Quality Improvement Issues", Springer 2012

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH * Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA4305	CYBER SECURITY	3	0	0	3

Course Objective

1. Develop an understanding of information assurance as practiced in computer operating systems, distributed systems, networks and representative applications.
2. Gain familiarity with prevalent network and distributed system attacks, defenses against them, and forensics to investigate the aftermath.
3. Develop an understanding of security policies (such as authentication, integrity and confidentiality), as well as protocols to implement such policies in the form of message exchanges.
4. Understand the legal aspects of forensics
5. Recognize the state of the practice and the gaps in technology, policy, and legal issues.

Unit	Description	Total Instructional Hours
	DISK FORENSICS	
I	Computer Forensics - Digital data – digital object – digital event – digital device- Hard disk – types of disc – Disk characteristics – file systems - Headers/Magic Numbers- Registry Forensics - Registry – registry data types –RegEdit - Data hiding.	9
	SOFTWARE FORENSICS	
II	Live Forensics, Volatile Live Vs Offline Forensics, Artifacts - System Information - Linux ~ Windows – System commands - Network information – Network commands - Live Forensics scenarios- Obfuscation – code Obfuscation - data hiding in Images - Software Forensic challenges – Principles of Steganography.	9
	NETWORK FORENSICS	
III	Network forensics - vulnerability analysis - Malware Concepts - Virus components- Function of replicator, concealer and dispatcher- Trigger Mechanisms- Virus families - worms & virus - sandboxing - Key Loggers - Port Scans – SYN flood - Email Forensics - email spoofing – Phishing – mail header analysis - Network forensics- Wireshark – Capture and Display Filters - pcap analysis- DoS – DDoS Attacks – types - Honey Pots - Forensic evidences - log analysis & evidence collection.	9
	CYBER SECURITY INTRODUCTION	
IV	History - Critical Characteristics of Information - NSTISSC Security Model - Components an Information system - Securing the components - Balancing Security and Access - The SDLC - The Security SDLC.	9
	SECURITY INVESTIGATION AND ANALYSIS	
V	Need for Security - Threats - Attacks – Legal - Ethical and Professional Issues. Risk Management: Identifying and assessing - Risk Assessing and Controlling Risk.	9
	Total Instructional Hours	**45**

Chairman BoS
MCA - HiCET

ACADEMIC COUNCIL * HICET * HINDUSTHAN COLLEGE OF ENGG & TECH
Chairman

Dean (Academics)
HiCET

Course Outcome	CO1:Understand and analyze the fundamentals of Disk forensics CO2:Understand and analyze the fundamentals of Software forensics CO3: Understand and analyze the fundamentals of Network forensics CO4:Understand and analyze fundamentals of cyber security and relationship between IT and forensics CO5:Understand and analyze the security investigation

REFERENCE BOOKS:

R1-Albert J Marcella, et al, Cyber forensics, 2nd edition, Auerbach, 2008
R2-Harlon Carvey, Windows Registry forensics, Syngress, 2011
R3-Andrew Hoog, Android forensics, Syngress,2011
R4-Michael E Whitman and Herbert J Mattord, "Principles of information Security", Vikas Publishing House, New Delhi,2003.

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH * Chairman

Dean (Academics)
HiCET

Programme	Course code	Name of the course	L	T	P	C
MCA	16BA4352	ACCOUNTING AND FINANCIAL MANAGEMENT	3	0	0	3

Course Objective

1. To enable the students to study the basic accounting concepts and preparation of financial statements.
2. To enable the students to study the techniques of financial statement analysis
3. To enable the students to study the application of cost accounting technique to ascertain the cost of products or services
4. To enable the students to study the cost volume profit analysis and preparation of various budgets in the modern business
5. To enable the students to study the role of financial management in the modern business enterprise and the appraisal methods on capital assets

Unit	Description	Instructional hours
I	**FINANCIAL ACCOUNTING** Financial Accounting – Meaning and Definition. Accounting Concepts and conventions. Double entry principles of book keeping. Journal entry-Posting in to Ledger-Preparation of Trial Balance- Preparation of Final Accounts.	10
II	**FINANCIAL STATEMENT ANALYSIS** Analysis of financial statements -Techniques of Interpretation of financial statements-Comparative statement-Common size statement-Trend analysis-Ratio Analysis- Funds Flow -Cash Flow Analysis.	10
III	**COST AND MANAGEMENT ACCOUNTING** Definitions Cost Accounting and Management Accounting –Distinction between Financial Accounting with Cost Accounting and Management Accounting. Cost Terminology – functional classification of cost. Cost Centre- Cost Unit. Elements of Cost – Preparation of Cost Sheet	5
IV	**MARGINAL COSTING AND BUDGETARY CONTROL** Marginal costing - Marginal Costing. Equation-Contribution. Break Even Analysis-Breakeven point- applications of marginal costing- Meaning and need of budgetary control.-Different types of budgets- Preparation of budget -Cash budget- flexible budget and other budgets.	10
V	**FINANCIAL MANAGEMENT** Financial Management an overview. Objectives and functions of Financial Management-Concept of Time value of money- Techniques in computation of time value of money. Meaning and nature of Capital Budgeting Decision- Methods of appraisal capital budgeting. Non-discounted cash flow techniques and discounted cash flow techniques.	10
	Total instructional hours	45

Course Outcome

CO1: Students can able to understand the practice of preparation of financial statement in the modern business.
CO2: Students can able to understand the techniques on analysis of financial statement in the modern business
CO3: Students can able to understand the application of cost accounting techniques while computing the cost of products and services
CO4: Students can able to understand the cost volume profit analysis and preparation of various budgets in the modern business
CO5: Students can able to understand the role of financial management in the modern business enterprise and the appraisal methods on capital assets

Note : 50% Theory, 50 % Problems

Chairman - BoS
MCA - HiCET

Chairman
HINDUSTHAN COLLEGE OF ENGG & TECH

Dean (Academics)
HiCET

REFERENCE BOOKS :

R1- M.N. Arora, Accounting for Management, Himalaya Publishing House, New Delhi, 2016
R2- Dr.A.Murthy and Dr.S.Gurusamy, Management Accounting, Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2015.
R3- Dr. V.R. Palanivelu, Financial Management, S. Chand & Company, New Delhi, 2016
R4- R.S.N.Pillai and V.Bagavathi, Financial Accounting, S.Chand publishing, New Delhi 2012.
R5- R.S.N.Pillai and V.Bagavathi, Management Accounting, S.Chand publishing, New Delhi 2012

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH *
Chairman

Dean (Academics)
HiCET

SYLLABUS

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA5201	PHP PROGRAMMING	3	0	0	3

Course Objective

1. To understand the basic concepts of PHP programming.
2. To design HTML web pages, designing web sites using templates and to perform validations.
3. To understand the OOPS concepts and to improve the performance of Web applications through cookies, caching and buffering.
4. To design applications using files and database connectivity in PHP
5. To develop the MVC pattern models

Unit	Description	Instructional Hours
I	**OPEN SOURCE PROGRAMMING LANGUAGES-PHP** Introduction to PHP Hypertext Processor(PHP) – Programming in Web Environment – Variables – Constants – Data Type – Operators – Decision and Loops Statements – Functions – Arrays - String Manipulation and Regular Expression	9
II	**WEB DESIGNING TOOLS** HTML – Tags – Forms and Tables – CSS properties and working with Templates, Java Script – Client side validation – Jquery forms – PHP with AJAX	9
III	**ADVANCED PHP** Object Oriented Programming – Objects – Classes – Polymorphism – Interface – Inheritance and Code Reusability – Exceptional Handling – cookies – caching – buffering	9
IV	**PHP DATABASE CONNECTIVITY** File Handling and Data Storage – PHP and SQL Database – PHP and Lightweight Directory Access Protocol (LDAP) – PHP Hypertext Processor (PHP) Connectivity – Sending and Receiving E–mails – Templates.	9
V	**FRAMEWORK** Understanding the MVC pattern models – Cake PHP – Creating up model for database table – Controller – Creating views – Creating Sessions	9
	Total Instructional Hours	**45**

Course Outcome

CO1: Understand the basic concepts of PHP programming.
CO2: Able to design HTML web pages, Designing web sites using templates and to perform validations.
CO3: Understand the OOPS concepts and to improve the performance of Web applications through cookies, caching and buffering.
CO4: Design applications using files and database connectivity in PHP
CO5:Able to deploy the MVC pattern models

REFERENCE BOOKS :

R1- Kevin Tatroe, Peter MacIntyre, Rasmus Lerdorf , "Programming PHP: Creating Dynamic Web Pages" OREILLY, 2013.
R2- Jessica Minnick ," Web Design with HTML & CSS3: Comprehensive Cengage Learning, 2013
R3- Larry Ullman , PHP Advanced and Object-Oriented Programming: Visual QuickPro Guide, Peachpit Press, 2013
R4- Luke Welling, Laura Thomson ," PHP and MySQL Web Development", Pearson Education ,2017.
R5- Bartosz Porebski, Karol Przystalski, Leszek, Building PHP Applications with Symfony, CakePHP, and Zend Framework, Wiley Publishing, 2011

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH * Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA5202	PYTHON PROGRAMMING	3	0	0	3

Course Objective	1. Develop an understanding on the basic concepts of Python Programming 2. To understand File operations, Classes and Objects and regular Expressions. 3. To design applications using Threads , GUI and web programming 4. To create Client server networking applications 5. To develop web applications using Python

Unit	Description	Instructional Hours
I	**CORE PYTHON** Introduction – Conditional Statements – Looping – Control Statements – String Manipulation – Lists – Tuple – Dictionaries	9
II	**ADVANCED PYTHON - I** Files – Input and Output – Errors and Exceptions – Functions - Modules – Classes and Objects – Regular Expression	9
III	**ADVANCED PYTHON - II** Internet Client Programming – Multithreaded Programming – threads and processes-GUI programming, Advanced CGI – Web Programming	9
IV	**NETWORK PROGRAMING** Introduction to Client – Server Networking, UDP, TCP, Socket names and DNS , HTTP Clients and HTTP Servers	9
V	**WEB DEVELOPMENT** Basic web application structure – Templates – Web Forms – Databases - Email – User Authentication – testing - Deployment	9
	Total Instructional Hours	**45**

Course Outcome	CO1: Understand the basic concepts of Python programming. CO2: Design applications using Files, Modules, Classes and Objects . CO3: Implement applications using multithreading concepts and development of GUI applications CO4: Design applications using Client Server Networking using TCP, UDP CO5:Able to deploy web Development applications under Flask

REFERENCE BOOKS :

R1- Kent D. Lee, " Python Programming Fundamentals", Springer, 2014

R2- Wesley J Chun,"Core Python Programming:, prentice Hall, 2006

R3- Brandon Rhodes, John Goerzen," Foundations of Python Network Programming"Aprèss, 2014

R4- Miguel Grinberg," Flask Web Development: Developing Web Applications with Python", OReilly, 2014.

Chairman - BoS
MCA - HiCET

Chairman
HINDUSTHAN COLLEGE OF ENGG & TECH ACADEMIC COUNCIL

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA5001	PHP LABORATORY	0	0	4	2

Course Objective

1. To develop Simple programs using arrays, functions and strings
2. To understand threading concepts to develop web application.
3. To understand networking concepts to implement TCP and UDP.
4. To Design and host a user friendly website with authentication features
5. To understand the basics of PHP programming and create GUI applications, database connectivity.

Expt. No.	Description of the Experiments
	PHP
1	Demonstrate Simple programs using looping, arrays, strings manipulations, classes, objects concepts.
2	Develop PHP program using controls and function.
3	Implement an application to perform message passing mechanism between pages.
4	Develop a PHP program using String function and Arrays.
5	Develop a PHP program and check File System functions, Network functions, Date and time functions.
6	Develop a PHP program to display student information using MYSQL table.
7	Develop a PHP program using parsing functions (use Tokenizing).
8	Develop a PHP program and check Regular Expression, HTML functions, Hashing functions.
9	Develop a PHP program using cookie and session.
10	Develop an online application to illustrate the concept of threads.
11	Implement Client Server networking applications using TCP and UDP.
12	Create a simple web application with necessary authentication features and testing strategies and deploy it in the web.

Total Practical Hours 45

Course Outcome

CO1: Develop Simple to illustrate arrays, functions and strings
CO2: Able to apply the threading concepts to develop web application.
CO3: Design networking concepts to implement TCP and UDP.
CO4:Design, develop and host a user friendly website with authentication features
CO5: Understand the basics of PHP programming and create GUI applications , database connectivity programs and web applications in PHP

Chairman - BoS
MCA - HiCET

HINDUSTHAN COLLEGE OF ENGG & TECH ACADEMIC COUNCIL Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA5002	PYTHON PROGRAMMING LABORATORY	0	0	4	2

Course Objective

1. To understand basics of Python Programming Language
2. To develop data structures concepts, exceptional Handling and to create and run functions and regular expressions using python.
3. To design object-oriented programs with Python classes and threading concepts
4. To Implement Networking Concepts using Python.
5. To develop Web applications using database connectivity

Expt. No.	Description of the Experiments
1.	Develop programs to understand the control structures of python
2.	Develop programs to learn different types of structures (list, dictionary, tuples) in python
3.	Develop programs to learn concept of functions scoping, recursion and list mutability.
4.	Develop programs to understand working of exception handling and assertions.
5.	Develop programs for data structure algorithms using python searching, sorting and hash tables.
6.	Develop programs to learn regular expressions using python.
7.	Develop application using multithreading and classes
8.	Implement Client Server Programming using TCP
9.	Implement Client Server Programming using UDP
10.	Develop applications using web application using database connectivity
	Total Practical Hours **45**

Course Outcome

CO1:Design and develop applications using basic concepts of Python
CO2:Implement programs using functions, recursion, mutability exception handling, assertion and Data Structures Algorithm
CO3: Design and Implement applications using classes, objects and Multithreading.
CO4:Design Client / Server applications using Python Programming
CO5:Develop Web Applications using database connectivity

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HICET * HINDUSTHAN COLLEGE OF Engg & Tech
Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA5801	MINI PROJECT	0	0	8	4

Team Project with a maximum of four in a team

Sl. No.	Description of the Experiments
1.	Students shall develop creative or innovative project.
2.	Need to submit a report, presentation with demo.
3.	User Based Testing and feedback from the benefited society required.

Total Practical Hours **45**

Course Outcome

CO1: Develop skill to create practical solutions to identified problem.
CO2: Use software lifecycle model and other artifacts appropriate for problem.
CO3: Identify and master tools required for the project.
CO4: Plan and work systematically towards completion of a project work.
CO5: Develop the ability to explain and defend their work in front of an evaluation panel.

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HICET * COLLEGE OF ENGG & TECH
Chairman

Dean (Academics)
HiCET

ELECTIVE – III

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA5301	BIG DATA ANALYTICS	3	0	0	3

Course Objective	1. To explore the fundamental concepts of big data analytics 2. To learn to use various techniques for mining data stream. 3. Learn to build and maintain reliable, scalable, distributed systems with Apache Hadoop. 4. To understand the various search methods and visualization techniques. 5. To understand the applications using Map Reduce Concepts.

Unit	Description	Instructional Hours
I	**INTRODUCTION TO BIG DATA** Introduction to BigData Platform – Challenges of Conventional Systems - Intelligent data analysis – Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools	9
II	**MINING DATA STREAMS** Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.	9
III	**HADOOP** History of Hadoop- The Hadoop Distributed File System – Components of Hadoop- Analyzing the Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFS-Java interfaces to HDFS-Basics-Developing a Map Reduce Application-How Map Reduce Works-Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort – Task execution - Map Reduce Types and Formats- Map Reduce Features	9
IV	**HADOOP ENVIRONMENT** Setting up a Hadoop Cluster - Cluster specification - Cluster Setup and Installation - Hadoop Configuration-Security in Hadoop - Administering Hadoop– HDFS - Monitoring-Maintenance.	9
V	**FRAMEWORKS** Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services – HiveQL – Querying Data in Hive - fundamentals of HBase and ZooKeeper. Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications	9
	Total Instructional Hours	**45**

Course Outcome	CO1: Work with big data platform, Analyze the big data analytic techniques for useful business applications CO2: Design efficient algorithms for mining the data from large volumes. CO3: Analyze the HADOOP and Map Reduce technologies associated with big data analytics CO4 : Explore on Big Data applications Using Pig and Hive CO5: Understand the fundamentals of various bigdata analysis techniques

REFERENCE BOOKS :

R1 - Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.

R2 –Tom White " Hadoop: The Definitive Guide" Third Edition, O'reilly Media, 2012.

R3 - Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data", McGrawHill Publishing, 2012

R4 – AnandRajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", Cambridge University Press, 2012.

Chairman - BoS
MCA - HiCET

HINDUSTHAN COLLEGE OF ENGG & TECH ★ ACADEMIC COUNCIL ★ Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA5302	DATA WAREHOUSING AND DATA MINING	3	0	0	3

Course Objective

1. To expose the students to the concepts of Data warehousing Architecture and Implementation
2. To Understand Data mining principles and techniques and Introduce DM as a cutting edge business intelligence
3. To learn to use association rule mining for handling large data
4. To understand the concept of classification for the retrieval purposes
5. To know the clustering techniques in details for better organization and retrieval of data To identify Business applications and Trends of Data mining

Unit	Description	Instructional Hours
I	**DATA WAREHOUSE** Data Warehousing - Operational Database Systems vs. Data Warehouses - Multidimensional Data Model - Schemas for Multidimensional Databases – OLAP Operations – Data Warehouse Architecture– Indexing – OLAP queries & Tools.	8
II	**DATA MINING & DATA PREPROCESSING** Introduction to KDD process – Knowledge Discovery from Databases - Need for Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.	9
III	**ASSOCIATION RULE MINING** Introduction - Data Mining Functionalities - Association Rule Mining - Mining Frequent Itemsets with and without Candidate Generation - Mining Various Kinds of Association Rules - Constraint-Based Association Mining.	8
IV	**CLASSIFICATION & PREDICTION** Classification vs. Prediction – Data preparation for Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Back Propagation Associative Classification – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section.	10
V	**CLUSTERING** Cluster Analysis: - Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid-Based Methods – Model-Based Clustering Methods – Clustering High- Dimensional Data – Constraint-Based Cluster Analysis – Outlier Analysis	10
	Total Instructional Hours	**45**

Course Outcome

CO1: Apply the association rules for mining the data
CO2: Design and deploy appropriate classification techniques
CO3: Cluster the high dimensional data for better organization of the data
CO4: Evolve Multidimensional Intelligent model from typical system
CO5: Evaluate various mining techniques on complex data objects

REFERENCE BOOKs

R1 - Jiawei Han and MichelineKamber, "Data Mining Concepts and Techniques" Second Edition, Elsevier, Reprinted 2012.
R2 - K.P. Soman, ShyamDiwakar and V. Ajay, "Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2012.
R3 - G. K. Gupta, "Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006.
R4 - BERSON, ALEX & SMITH, STEPHEN J, Data Warehousing, Data Mining, and OLAP, TMH Pub. Co. Ltd, New Delhi, 2012
R5 - Pang-Ning Tan, Michael Steinbach and Vipin Kumar, "Introduction to Data Mining", Pearson Education, 2015.

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH *
Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA5303	CLOUD COMPUTING	3	0	0	3

Course Objective

1. Understand the cloud environment and building software systems and components that scale to millions of users in modern internet
2. Understand the key dimensions of the challenge of Cloud Computing
3. Understand the cloud concepts and capabilities across the various cloud service models
4. Develop cloud based software applications on top of cloud platforms.
5. Explain the core issues of cloud computing such as security

Unit	Description	Instructional Hours
I	**CLOUD COMPUTING – ARCHITECTURE** Cloud Computing –History of cloud computing –Cloud Architecture –Cloud Storage –Need for Cloud Computing –Advantages – Architecture of Cloud – Cloud Services.	9
II	**CLOUD VIRTUALIZATION** Basics of Virtualization – Types and Implementation levels - Types of Cloud Service Development – –On Demand Computing –Amazon Ec2 –Virtualization of CPU, Memory, I/O Devices.	9
III	**INFRASTRUCTURE** Architectural Design of Storage Clouds – Design Challenges – Inter Cloud Resource Management – Platform Deployment – Virtualization of Data Centre automation - Hybrid storage networking technologies.	9
IV	**PROGAMMING PARADIGMS** MapReduce, Twister and Iterative MapReduce – Hadoop Library from Apache – Google App Engine – Amazon AWS – Eucalyptus – Open Nebula – Aneka.	9
V	**SECURITY** Security Challenges and Risks – Software as Service Security – Risk Management – Security Monitoring – Identity Management.	9
	Total Instructional Hours	**45**

Course Outcome

CO1: Able to Articulate the basic concepts of cloud and its architecture.
CO2: Able to understand virtualization concepts.
CO3: Understand Cloud storage and its networking technologies.
CO4: Understand the Programming Paradigms.
CO5: Able to describe the prevalent security challenges in the cloud.

REFERENCE BOOKS

R1-Michael Miller, "Cloud Computing", Pearson Education, New Delhi, 2012.
R2-Kai Hwang, Geoffrey C Fox & Jack G Dongarra, "Distributed and Cloud Computing From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.
R3:JohnW.Rittinghouse& James F.Ransome, "Cloud Computing: Implementation Management, and Security", CRC Press, 2010.

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL Chairman COLLEGE OF ENGG & TECH

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA5304	MOBILE COMPUTING	3	0	0	3

Course Objective

1. Understand the basic concepts of mobile computing
2. Be familiar with the network protocol stack
3. Learn the basics of mobile telecommunication
4. system Be exposed to Ad-Hoc networks
5. Gain knowledge about different mobile platforms and application development

Unit	Description	Instructional Hours
I	**INTRODUCTION** Mobile Computing – Mobile Computing Vs wireless Networking – Mobile Computing Applications – Characteristics of Mobile computing – Structure of Mobile Computing Application. MAC Protocols – Wireless MAC Issues – Fixed Assignment Schemes – Random Assignment Schemes – Reservation Based Schemes.	9
II	**MOBILE INTERNET PROTOCOL AND TRANSPORT LAYER** Overview of Mobile IP – Features of Mobile IP – Key Mechanism in Mobile IP – route Optimization. Overview of TCP/IP – Architecture of TCP/IP- Adaptation of TCP Window – Improvement in TCP Performance.	9
III	**MOBILE TELECOMMUNICATION SYSTEM** Global System for Mobile Communication (GSM) – General Packet Radio Service (GPRS) – Universal Mobile Telecommunication System (UMTS).	9
IV	**MOBILE AD-HOC NETWORKS** Ad-Hoc Basic Concepts – Characteristics – Applications – Design Issues – Routing – Essential of Traditional Routing Protocols –Popular Routing Protocols – Vehicular Ad Hoc networks (VANET) – MANET Vs VANET – Security	9
V	**MOBILE PLATFORMS AND APPLICATIONS** Mobile Device Operating Systems – Special Constrains & Requirements – Commercial Mobile Operating Systems – Software Development Kit: iOS, Android, BlackBerry, Windows Phone	9
	Total Instructional Hours	**45**

Course Outcome

CO1: Explain the basics of mobile telecommunication system
CO2: Choose the required functionality at each layer for given application
CO3: Identify solution for each functionality at each layer.
CO4: Understand the basics of Ad hoc networks
CO5: Identify the different types of mobile platform

REFERENCE BOOKS:

1. Prasant Kumar Pattnaik, Rajib Mall, "Fundamentals of Mobile Computing", PHI Learning Pvt. Ltd, New Delhi – 2012.
2. Jochen H. Schller, "Mobile Communications", Second Edition, Pearson Education, New Delhi, 2007.
3. William.C.Y.Lee,"Mobile Cellular Telecommunications-Analog and Digital Systems", Second Edition,Tata Mc Graw Hill Edition ,2006.
4. C.K.Toh, "AdHoc Mobile Wireless Networks", First Edition, Pearson Education, 2002.

WEB SOURCES:

1. Android Developers : http://developer.android.com/index.html
2. Apple Developer : https://developer.apple.com/
3. Windows Phone Dev Center :http://developer.windowsphone.com
4. BlackBerry Developer :http://developer.blackberry.com/

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL Chairman COLLEGE OF ENGG & TECH

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA5305	SEMANTIC WEB SERVICES	3	0	0	3

Course Objective

1. Categories of ontologies and need and architecture of semantic web.
2. Languages for representing semantic web.
3. Ontology algorithm and evaluation.
4. Constructing ontology using different tools.
5. Potential applications of ontologies in web services

Unit	Description	Instructional Hours
I	**INTRODUCTION** Components – Types – Ontological Commitments – Ontological Categories –Philosophical Background - Knowledge Representation Ontologies – Top Level Ontologies – Linguistic Ontologies – Domain Ontologies – Semantic Web – Need – Foundation – Layers – Architecture.	9
II	**LANGUAGES FOR SEMANTIC WEB AND ONTOLOGIES** Web Documents in XML – RDF - Schema – Web Resource Description using RDF- RDF Properties – Topic Maps and RDF – Overview – Syntax Structure – Semantics – Pragmatics - Traditional Ontology Languages – LOOM- OKBC – OCML – Flogic Ontology Markup Languages – SHOE – OIL - DAML + OIL- OWL	9
III	**ONTOLOGY LEARNING FOR SEMANTIC WEB** Taxonomy for Ontology Learning – Layered Approach – Phases of Ontology Learning – Importing and Processing Ontologies and Documents – Ontology Learning Algorithms – Evaluation	9
IV	**ONTOLOGY MANAGEMENT AND TOOLS** Overview – need for management – development process – target ontology – ontology mapping – skills management system – ontological class – constraints – issues. Evolution – Development of Tools and Tool Suites – Ontology Merge Tools – Ontology based Annotation Tools.	9
V	**APPLICATIONS** Web Services – Semantic Web Services - Case Study for specific domain – Security issues – current trends.	9
	Total Instructional Hours	**45**

Course Outcome

CO1:Develop integrated, ontology-based or ontology-mediated, applications based on knowledge level.
CO2:Investigate foundational modeling aspects
CO3:Develop tools for ontology development.
CO4:Identify ontology-based data access and integration, combining rules with ontology and computational linguistics.
CO5:Apply fundamental concepts like importing and processing Ontology of the semantic web.

REFERENCE BOOKS

R1 - Asuncion Gomez-Perez, Oscar Corcho, Mariano Fernandez-Lopez, "Ontological Engineering: with examples from the areasof Knowledge Management, e-Commerce and the Semantic Web" Springer, 2010 .(Covering Units I, II, III)
R2 - Grigoris Antoniou, Frank van Harmelen, "A Semantic Web Primer (Cooperative Information Systems)", The MIT Press, 2012 . (Covering Units IV, V)
R3 - Dieter Fensel, James Hendler, Henry Lieberman and Wolfgang Wahlster, Spinning the Semantic Web: Bringing the world wide web to its fullpotential. New Delhi: The MIT Press, 2005. (Covering Unit I)
R4 - Shelley Powers, Practical RDF.1stEdition ,Mumbai: O'reilly publishers, 2003. (Covering Units II)

Chairman - BoS
MCA - HiCET

Chairman
ACADEMIC COUNCIL
HINDUSTHAN COLLEGE OF ENGG & TECH

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA5306	SECURITY IN COMPUTING	3	0	0	3

Course Objective

1. To understand the basics of cryptography
2. Learn to find the vulnerabilities in programs and to overcome them,
3. know the different kinds of security threats in networks and its solution
4. know the different kinds of security threats in databases and solutions available
5. learn about the models and standards for security.

Unit	Description	Instructional Hours
	ELEMENTARY CRYPTOGRAPHY	
I	Terminology and Background – Substitution Ciphers – Transpositions – Making Good Encryption Algorithms- Data Encryption Standard- AES Encryption Algorithm – Public Key Encryption – Cryptographic Hash Functions – Key Exchange – Digital Signatures – Certificates	9
	PROGRAM SECURITY	
II	Secure programs – Non-malicious Program Errors – Viruses – Targeted Malicious code – Controls Against Program Threat – Control of Access to General Objects – User Authentication – Good Coding Practices – Open Web Application Security Project Flaws – Common Weakness numeration Most Dangerous Software Errors.	9
	SECURITY IN NETWORKS	
III	Threats in networks – Encryption – Virtual Private Networks – PKI – SSH – SSL – IPSec – Content Integrity – Access Controls – Wireless Security – Honeypots – Traffic Flow Security – Firewalls – Intrusion Detection Systems – Secure e-mail.	9
	SECURITY IN DATABASES	
IV	Security requirements of database systems – Reliability and Integrity in databases –Redundancy – Recovery – Concurrency/ Consistency – Monitors – Sensitive Data – Types of disclosures – Inference-finding and confirming sql injection.	9
	SECURITY MODELS AND STANDARDS	
V	Secure SDLC – Secure Application Testing – Security architecture models – Trusted Computing Base– Bell-LaPadula Confidentiality Model – Biba Integrity Model – Graham-Denning Access Control Model – Harrison-Ruzzo-Ulman Model – Secure Frameworks – COSO – CobiT – Compliances – PCIDSS – Security Standards - ISO 27000 family of standards – NIST	9
	Total Instructional Hours	**45**

Course Outcome

CO1: Apply cryptographic algorithms for encrypting and decryption for secure data transmission
CO2: Understand the importance of Digital signature for secure e-documents exchange
CO3: Understand the program threats and apply good programming practice
CO4: Get the knowledge about the security services available for internet and web applications
CO5: Understand data vulnerability and sql injection

REFERENCE BOOKS:

R1 - Charles P. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Fifth Edition, Pearson Education, 2015.
R2 - Michael Whitman, Herbert J. Mattord, "Management of Information Security", Third Edition, Course Technology, 2010.
R3 - William Stallings, "Cryptography and Network Security : Principles and Practices", Fifth Edition, Prentice Hall, 2010.

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH * Chairman

Dean (Academics)
HiCET

ELECTIVE-IV & V

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA5307	WEB GRAPHICS	3	0	0	3

Course Objective

1. To understand the introductory concepts of HTML
2. Designing Images with various features using Raster Image Editing Software
3. Creating Special Effects and Animation using Action Scripts.
4. Incorporating Multimedia and sound effects in a web Page
5. Creating an Interactive web site with all utilities

Unit	Description	Instructional Hours
I	**INTRODUCTION** HTML coding - Basic web graphics - Web page design and site building - Image maps - Adding multimedia to the web- Vector and Raster graphics.	9
II	**RASTER IMAGE EDITING SOFTWARE** Introduction - Image Basics - File Formats - GIF - JPEG - Color Palette – Color models Layers - Creating new Images - Brushes – Grids and Guides- Gradients - Scaling Images - Moving and Merging Layers - Tool Palette - Dialogs - Masking – Filters – Adding text to images – Designing icons and background images.	9
III	**VECTOR IMAGE HANDLING** Introduction – Creating Simple Vector graphics – Creating banners -Images - Working with layers – Tweening - Motion guide – Masking – Frame by Frame animation – Onion Skin Effect – Creating special effects - Text effects and animation – Action scripts.	9
IV	**MULTIMEDIA** Creating clippings - Animations with sound effects - Adding audio or Video - Windows Media Player ActiveX Control - Agent control - Embedding VRML in a web page - Real Player ActiveX control.	9
V	**APPLICATIONS** Creating web site with a particular theme using all the utilities - Graphics - Animations and Interaction.	9
	Total Instructional Hours	**45**

Course Outcome

CO1: Understand the Concepts of HTML and simple web site creation using HTML
CO2: Designing web pages using image editing software and its tools
CO3: Creating Flash web site
CO4: Correctly explain a variety of terms relating to web design, HTML, CSS, and Flash.
CO5: Design, create, and upload an original website.

REFERENCE BOOKS :

R1 - Jon Duckett, HTML & CSS design and Build Web Sites John Wiley & Sons, 2011.
R2 -Andrew Rapo, Alex Michael,"Understanding Macromedia Flash 8 ActionScript 2: Basic Techniques for Creatives"Focal press Taylorand Francis group, 2013
R3 - Andrew Faulkner, Conrad ChavezAdobe Photoshop CC Classroom in a Book (2017 release)

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH * Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA5308	MIDDLEWARE TECHNOLOGY	3	0	0	3

Course Objective

1. Understand different types of client server computing models and also Benefits of client server computing, pitfalls of client server programming
2. Establish communication between client and server through java RMI and JDBC
3. Understand Middleware Interoperability.
4. Carry out client server communication using heterogeneous programming languages using CORBA.
5. Learn java bean component model EJBS and CORBA

Unit	Description	Instructional Hours
I	**INTRODUCTION** Introduction to client server computing: Evolution of corporate computing models from centralized to distributed computing, client server models, Benefits of client server computing, pitfalls of client server programming. CORBA with Java: Review of Java concept like RMI, RMI API, JDBC. Client/Server CORBA-style	9
II	**CORBA WITH JAVA** Review of Java concept like RMI, RMI API, JDBC. Client/Server CORBA-style, The object web: CORBA with Java. Core CORBA / Java: The object web: CORBA with Java. Two types of Client/ Server invocations-static, dynamic, static CORBA, first CORBA program, ORBlets with Applets	9
III	**DYNAMIC CORBA** Dynamic CORBA- Portable count Existential CORBA : CORBA initialization protocol, CORBA activation services, CORBAIDL mapping CORBA java- to- IDL mapping, The introspective CORBA/Java object.	9
IV	**JAVA BEAN MODEL** Java Bean Component Model : Events, properties, persistency, Intrespection of beans, CORBA Beans, Implementation of beans.	9
V	**EJBS AND CORBA** Object transaction monitors CORBA OTM's, EJB and CORBA OTM's, EJB container frame work, Session and Entity Beans, The EJB client/server development Process, EJB design Guidelines..	9
	Total Instructional Hours	**45**

Course Outcome

CO1: Know client server computing models and can establish communication between them
CO2: Design a dynamic remote application with RMI and JDBC Connectivity
CO3: Learn how to use Middleware to Build Distributed Applications using Beans.
CO4: Differentiate homogeneous and heterogeneous language communications.
CO5: Develop real time projects by combining CORBA and database interfacing

REFERENCE BOOKS:

R1 - Client/Server programming with Java and CORBA Robert Orfali and Dan Harkey, John Wiley & Sons, SPD 2nd Edition
R2 – Java programming with CORBA 3rd Edition, G.Brose, A Vogel and K.Duddy, Wiley-dreamtech, India John wiley and sons
R3 - Distributed Computing, Principles and applications, M.L.Liu, Pearson Education
R4 – Client/Server Survival Guide 3rd edition Robert Orfali Dan Harkey& Jeri Edwards, John Wiley & Sons

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH * Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA5309	MANAGEMENT INFORMATION SYSTEMS	3	0	0	3

Course Objective

1. Understand the basic concepts and technologies used in the field of management information systems.
2. Create the processes of developing and implementing information systems.
3. Know the role of information systems in organizations, the strategic management processes, and the implications for the management.
4. Able to understand the usage of Information Systems in management.
5. Understand the activities that are undertaken in acquiring an Information System in an organization.

Unit	Description	Total Instructional Hours
	SYSTEM CONCEPTS	
I	Definition – Computer Based User Machine System – Integrated System – Need for a Database –Utilization of Models – Evolution – Subsystems – Organizational Subsystems – Activities Subsystems.	7
	ORGANIZATIONAL MODEL AND ORGANISATION STRUCTURE	
II	Basic Model – Hierarchical – Specialization – Formalization – Centralization - Modifications of Basic Organizational Structure – Project Organization – Lateral Relations – Matrix Organization – Organizational Culture and Power Organizational Change.	9
	STRUCTURE OF MIS	
III	Operating Elements – Physical Components – Processing Functions – Outputs – MIS support for Decision Making – Structured Programmable Decisions – Unstructured Non–Programmable Decisions – MIS Structure Based on Management Activity and Organizational Functions – Synthesis of MIS Structure.	10
	SYSTEM SUPPORT	
IV	Data Representation – Communication Network – Distributed Systems – Logical Data Concepts –Physical Storage Devices – File Organizations – Database Organization – Transaction Processing	10
	DEVELOPMENT AND MANAGEMENT	
V	A Contingency Approach to Choosing an Application – Developing Strategy – Life Cycle Definition Stage – Life & cycle Development Stage – Life & cycle Installation and Operation Stage – Project Management .	9
	Total Instructional Hours	**45**

Course Outcome

CO1: Understand the basic concepts and technologies used in the field of management information systems
CO2: Understand the processes of developing and implementing information systems
CO3: Understand the role of information systems in organizations, the strategic management processes, and the implications for the management
CO4: Develop an understanding of how various information systems work together to accomplish the information objectives of an organization
CO5: Understand about the importance of managing organizational change associated with information systems implementation

Chairman - BoS
MCA - HiCET

Chairman

Dean (Academics)
HiCET

REFERENCE BOOKS:

R1- E.Wainright Martin, Carol V. Brown, Danial W. DeHayes, Jeffrey A. Hoffer & William C.Perkins, "Managing Information Technology", 7th Edition, International 2014.

R2- Kenneth C. Laudon, Jane P. Laudon, & Mary E. Brabston "Management Information Systems – Managing the Digital Firm", Fourth Edition, Kenneth C. Laudon, Jane P. Laudon, & Mary E. Brabston Pearson Prentice Hall, 2008.

R3-Kenneth, Laudon and Jane Laudon, MIS: Managing the Digital Firm. Pearson Education. 14th edition 2015.

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL
Chairman
HINDUSTHAN COLLEGE OF ENGG & TECH

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA5310	E-COMMERCE	3	0	0	3

Course Objective

1. To understand the concepts of e-commerce
2. Provide an overview of the Network Infrastructure and acquire knowledge about ecommerce models.
3. To know and understand the e-advertising and marketing strategies.
4. How companies use ecommerce to gain competitive advantage
5. To understand the electronic data exchange and e-security

Unit	Description	Instructional Hours
I	**INTRODUCTION** Framework, Architecture, Benefits and Impact of e-Commerce, The Anatomy of e-Commerce applications, e-Commerce Consumer applications, e-Commerce Organisation Applications, ecommerce in India, Prospects of e-commerce.	9
II	**NETWORK INFRASTRUCTURE & E-COMMERCE MODELS** Intranet, Extranet, & Internet, Internet Backbone in India, ISP and services in India, OSI Model, Standards & Overview of TCP/IP, Internet Security, ecommerce & Internet. E-commerce Models: Business-to-Business-Hubs, Market Places, Business-to Business Exchange, Business-to-Consumer, Consumer-to-consumer, Business-to-Government, Government-to-Government.	9
III	**E-ADVERTISING & MARKETING** The new age of information-based Marketing, Emergence of internet as a competitive advertising media, Market Research, Weakness in Internet Advertising, eAdvertising& Marketing in India.	9
IV	**ELECTRONIC PAYMENT SYSTEMS** Introduction to Payment Systems, On-Line Payment Systems, Pre-Paid e-Payment System, Post-Paid e-Payment System, Requirements Metrics of a Payment System.	9
V	**ELECTRONIC DATA EXCHANGE & E-SECURITY** EDI- Definitions & Applications, Standardisation and EDI, EDI, Legal Security and Privacy Issues, E-Security: Securing the Business on Internet- Security Policy, Procedures and Practices, Transaction Security, Cryptology, Digital Signatures, Security Protocols for Web Commerce.	9
	Total Instructional Hours	**45**

Course Outcome

CO1: Understand the Ecommerce Anatomy and Framework
CO2: Analyze the impact of Ecommerce on business models
CO3: Impact of E-advertising and Marketing in ECommerce
CO4: Access of Electronic Payment Systems in ECommerce
CO5: Recognize and discuss legal and privacy issues and procedures and practices of ESecurity

REFERENCE BOOKS:

R1 - Zheng Qin "Introduction to E-commerce", Springer, 2010
R2 - David Whiteley: E-Commerce- Strategy technologies and Applications, Tata Mc-Graw Hill, New Delhi, 2009. E-Commerce- Strategy technologies and Applications
R3 - P.T. JOSEPH, E-COMMERCE, Fifth Edition: AN INDIAN PERSPECTIVE, PHI Learning 2015

Chairman - BoS
MCA - HiCET

Chairman
ACADEMIC COUNCIL
HICET COLLEGE OF ENGG & TECH

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CA5311	PROFESSIONAL ETHICS	3	0	0	3

Course Objective

1. To understand the concepts of computer ethics in work environment.
2. To understand the threats in computing environment
3. To understand the intricacies of accessibility issues
4. To Understand what morality is and how it connects to professional ethics
5. To ensure safe exits when designing the software projects

Unit	Description	Instructional Hours
I	**COMPUTER ETHICS INTRODCUTION AND COMPUTER HACKING** A general Introduction – Computer ethics: an overview – Identifying an ethical issue – Ethics and law– Ethical theories - Professional Code of conduct – An ethical dilemma – A framework for ethical decision making - Computer hacking – Introduction – definition of hacking – Destructive programs – hacker ethics - Professional constraints – BCS code of conduct – To hack or not to hack? – Ethical positions on hacking.	9
II	**ASPECTS OF COMPUTER CRIME AND INTELLECTUAL PROPERTY RIGHTS** Aspects of computer crime - Introduction - What is computer crime – computer security measures – Professional duties and obligations - Intellectual Property Rights – The nature of Intellectual property– Intellectual Property – Patents, Trademarks, Trade Secrets, Software Issues, Copyright - The extent and nature of software piracy – Ethical and professional issues – free software and open source code. .	9
III	**REGULATING INTERNET CONTENT, TECHNOLOGY AND SAFETY** Introduction – In defence of freedom expression – censorship – laws upholding free speech – Free speech and the Internet - Ethical and professional issues - Internet technologies and privacy – Safety and risk – assessment of safety and risk – risk benefit analysis – reducing risk.	9
IV	**COMPUTER TECHNOLOGIES ACCESSIBILITY ISSUES** Introduction – Principle of equal access – Obstacles to access for individuals – professional responsibility - Empowering computers in the workplace – Introduction – computers and employment–quality of work – computerized monitoring in the work place – telecommuting – social, legal and professional issues - Use of Software, Computers and Internet-based Tools - Liability for Software errors - Documentation Authentication and Control – Software engineering code of ethics and practices – IEEE-CS – ACM Joint task force.	9
V	**SOFTWARE DEVELOPMENT AND SOCIAL NETWORKING** Software Development – strategies for engineering quality standards – Quality management standards – Social Networking – Company owned social network web site – the use of social networks in the hiring process – Social Networking ethical issues – Cyber bullying – cyber stalking – Online virtual world – Crime in virtual world - digital rights management - Online defamation – Piracy – Fraud.	9
	Total Instructional Hours	**45**

Course Outcome

CO1: Helps to examine situations and to internalize the need for applying ethical principles, values to tackle with various situations.
CO2: Develop a responsible attitude towards the use of computer as well as the technology.
CO3: Able to envision the societal impact on the products/ projects they develop in their career
CO4: Understanding the code of ethics and standards of computer professionals.
CO5: Analyze the professional responsibility and empowering access to information in the work place.

REFERENCE BOOKS:

R1 - Penny Duquenoy, Simon Jones and Barry G Blundell, "Ethical , legal and professional issues in computing", Middlesex University Press, 2008
R2 - George Reynolds, "Ethics in Information Technology", Cengage Learning, 2011
R3 - Caroline Whitback," Ethics in Engineering Practice and Research ", Cambridge University Press, 2011
R4 - Richard Spinello, "Case Studies in Information and Computer Ethics", Prentice Hall, 2007.
R5 - John Weckert and Douglas Adeney, Computer and Information Ethics, Greenwood Press, 2007.
R6 - Sara Baase, "A Gift of Fire: Social, Legal, and Ethical Issues for Computing and the Internet",3rdEdition,Prentice Hall, 2008

URL

1 - http://www.infosectoday.com/Articles/Intro_Computer_Ethics.htm

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH * Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16BA5353	HUMAN RESOURCE MANAGEMENT	3	0	0	3

Course Objective

1. To understand the importance of human resources.
2. To describe the steps involved in the human resource planning process
3. To understand the stages of employee socialization and training needs.
4. To know about the purposes of performance management systems and appraisal.
5. To know the list of occupational safety and health administration enforcement priorities.

Unit	Description	Instructional Hours
I	**PERSPECTIVES IN HUMAN RESOURCE MANAGEMENT** Evolution of Human Resource Management – the Importance Of The Human Factor – Objectives Of Human Resource Management – Role Of Human Resource Manager – Human Resource Policies – Computer Applications In Human Resource Management.	9
II	**THE CONCEPT OF BEST FIT EMPLOYEE** Importance of Human Resource Planning – Forecasting Human Resource Requirement – Internal and External Sources. Selection Process-Screening – Tests - Validation – Interview - Medical Examination – Recruitment Introduction – Importance – Practices – Socialization Benefits.	9
III	**TRAINING AND EXECUTIVE DEVELOPMENT** Types of Training, Methods, Purpose, Benefits And Resistance. Executive Development Programmes – Common Practices - Benefits – Self Development – Knowledge Management.	9
IV	**SUSTAINING EMPLOYEE INTEREST** Compensation Plan – Reward – Motivation – Theories of Motivation – Career Management – Development, Mentor – Protégé Relationships.	9
V	**PERFORMANCE EVALUATION AND CONTROL PROCESS** Method of Performance Evaluation – Feedback – Industry Practices. Promotion, Demotion, Transfer And Separation – Implication Of Job Change. The Control Process – Importance – Methods – Requirement Of Effective Control Systems Grievances – Causes – Implications – Redressal Methods.	9
	Total Instructional Hours	**45**

Course Outcome

CO1: Explain the importance of human resources and their effective management in organizations
CO2:Demonstrate a basic understanding of different tools used in forecasting and planning human resource needs
CO3: Describe the meanings of terminology and tools used in managing employees effectively
CO4: Understand governmental regulations affecting employees and employers
CO5:Analyze the key issues related to administering the human elements such as motivation, compensation, appraisal, career planning, diversity, ethics, and training

REFERENCE BOOKS :

R1- David A Decenzo, Stephen P. Robbins (Author), Susan L. Verhulst "Fundamentals of Human Resource Management" Wiley Publications, 11th Edition , 2013
R2-Biswajeet Pattanayak, Human Resource Management, Prentice Hall of India, 2014
R3-Robert L. Mathis, John H. Jackson, Human Resource Management, 2015, 15th edition
R4- Gary Dessler Human Resource Management, Pearson Education Limited, 2014.
R5-Ivancevich, Human Resource Management, McGraw Hill 11th edition 2010

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGINEERING * HICET
Chairman

Dean (Academics)
HiCET

OPEN ELECTIVES

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CAX4XX	NETWORK SECURITY	3	0	0	3

Course Objective

1. Understand security concepts, Understand security threats.
2. Comprehend and apply relevant cryptographic techniques.
3. Comprehend and apply authentication services and mechanisms.
4. Comprehend and apply email security services and mechanisms.
5. Comprehend and apply web security services and mechanisms.

Unit	Description	Instructional Hours
I	**SECURITY SERVICES** Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services and Mechanisms - A model for Internetwork security - Buffer overflow & format string vulnerabilities - TCP session hijacking - route table modification, man-in-the-middle attacks.	9
II	**ALGORITHMS AND HASHING** Encryption Principles - Encryption algorithms - cipher block modes of operation - key distribution Approaches of Message Authentication - Secure Hash Functions and HMAC.	9
III	**KEY MANAGEMENT** Public key cryptography principles - algorithms, digital signatures - digital Certificates - Certificate Authority and key management Kerberos - X.509 Directory Authentication Service.	9
IV	**IP SECURITY** Email privacy: Pretty Good Privacy (PGP) and S/MIME. IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associationsand Key Management.	9
V	**IDS** Viruses and related threats, Intruders, Firewall Design principles, Trusted Systems. Intrusion DetectionSystems.	9
	Total Instructional Hours	**45**

Course Outcome

CO1: Understand security attacks and services.
CO2: Explain different cryptographic algorithms
CO3: Gain knowledge about digital signatures and key management.
CO4: To state IP security and mail privacy.
CO5: Explain issues related to the security of web services.

REFERENCE BOOKS:

R1 - Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
R2 - Hack Proofing your network by Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn IdoDubrawsky, Steve W.Manzuik and Ryan Permeh, Wiley Dreamtech
R3- Cryptography and network Security, Third edition, Stallings, PHI/Pearson

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HINDUSTHAN COLLEGE OF ENGG & TECH * Chairman

Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
MCA	16CAX4XX	FUNDAMENTALS OF CLOUD COMPUTING	3	0	0	3

Course Objective

1. Understand the components of cloud computing.
2. Evaluate information storage managementdesign in a cloud environment
3. Discuss data centre networking technologies and protocols.
4. Assess the security of virtual systems.
5. Discuss and evaluate the management of complex virtual environments.

Unit	Description	Instructional Hours
I	**CLOUD COMPUTING FUNDAMENTALS** Cloud Computing definition - private, public and hybrid cloud - Cloud types - IaaS, PaaS, SaaS - Benefits and challenges of cloud computing - public vs private clouds - role of virtualization in enabling the cloud - Benefits and challenges to Cloud architecture - security and disaster recovery.	9
II	**CLOUD STORAGE INFRASTRUCTURES** Architecture of storage, analysis and planning - Storage network design considerations - NAS and FC SANs - hybrid storage networking technologies - design for storage virtualization in cloud computing.	9
III	**EVOLUTION OF DATA CENTRE DESIGN** Design for flexibility – scalability - environmental control - electrical power – flooring - fire protection – security - network infrastructure - Energy use and greenhouse gas emissions - Requirements for modern data centers - high availability and Service Orientated Infrastructures (SOI).	9
IV	**MULTI-TENANCY ISSUES-** Isolation of users/VMs from each other - Virtualization System Security Issues ESX file system security - storage considerations - backup and recovery - Virtualization System Vulnerabilities - Management server vulnerabilities - hypervisor vulnerabilities - configuration issues - malware (botnets etc).	9
V	**PERFORMANCE MANAGEMENT IN A VIRTUAL ENVIRONMENT** Management techniques - methodology and key performance metrics usedto identifying CPU, memory, network - virtual machine and application performance bottlenecks in a virtualized environment.	9
	Total Instructional Hours	**45**

Course Outcome

CO1: Understand cloud computing fundamentals.
CO2: Explain different storage network designs.
CO3: State network centre designs.
CO4: Describe virtualization vulnerabilities.
CO5: Explain virtual machine performance and its bottlenecks.

REFERENCE BOOKS:

R1 - Toby Velte, Anthony Velte, Robert Elsenpeter, Cloud Computing, A Practical Approach, Lambert Academic Publishing, 2012
R2 - Greg Schulz, Cloud and Virtual Data Storage Networking, Auerbach Publications, 2011
R3 - Tim Mather,SubraKumaraswamy, ShahedLatif, Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, 2009.

Chairman - BoS
MCA - HiCET

ACADEMIC COUNCIL * HICET * MEMBER * Chairman

Dean (Academics)
HiCET