



KONGU ARTS AND SCIENCE COLLEGE

(An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore)

ERODE – 638 107

B.Sc (Computer Technology)



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2018-2019



KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)
ERODE - 638 107
DEPARTMENT OF COMPUTER TECHNOLOGY AND
INFORMATION TECHNOLOGY



B.Sc. (COMPUTER TECHNOLOGY)

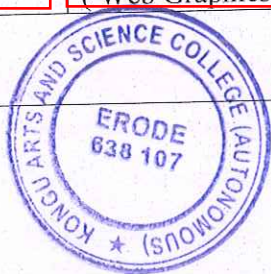
SCHEME OF EXAMINATION - CBCS PATTERN
(For the candidates admitted during the academic year 2017 - 2018 and onwards)

| Part | Course Code | Course Title | Inst. Hrs /Week | T/P | Examination Details | | | | Credits |
|--------------------|---------------------------------------|--|-----------------|-----|---------------------|-----|-----|-------------|-----------|
| | | | | | Duration in Hours | CIA | ESE | Total Marks | |
| SEMESTER I | | | | | | | | | |
| I | 17T01/17H01/ 17F01/17M01/ 17S01 | Language - I | 6 | T | 3 | 25 | 75 | 100 | 4 |
| II | 17E01 | English - I | 6 | T | 3 | 25 | 75 | 100 | 4 |
| III | 17UALCT101 | Core 1: Digital Principles | 4 | T | 3 | 25 | 75 | 100 | 4 |
| III | 17UALCT102 | Core 2: C Programming | 4 | T | 3 | 25 | 75 | 100 | 4 |
| III | 17UALCP103 | Core Lab 1: C Programming Lab | 3 | P | 3 | 40 | 60 | 100 | 3 |
| III | 17UALAT104 | Allied 1: Numerical and Statistical Methods | 5 | T | 3 | 25 | 75 | 100 | 4 |
| IV | 17ES01 | Foundation Course I: Environmental Studies | 2 | T | 3 | - | 50 | 50 | 2 |
| Total | | | 30 | - | - | - | - | 650 | 25 |
| SEMESTER II | | | | | | | | | |
| I | 17T02/17H02/ 17F02/17M02/ 17S02 | Language - II | 6 | T | 3 | 25 | 75 | 100 | 4 |
| II | 17E02 | English - II | 6 | T | 3 | 25 | 75 | 100 | 4 |
| III | 17UALCT201 | Core 3: Data Structures | 4 | T | 3 | 25 | 75 | 100 | 4 |
| III | 17UALCT202 | Core 4: Object Oriented Programming with C++ | 4 | T | 3 | 25 | 75 | 100 | 4 |
| III | 17UALCP203 | Core Lab 2: C++ Programming Lab | 3 | P | 3 | 40 | 60 | 100 | 3 |
| III | 17UALAT204 | Allied 2: Discrete Mathematics | 5 | T | 3 | 25 | 75 | 100 | 4 |
| IV | 17VE01 | Foundation Course II: Value Education | 2 | T | 3 | - | 50 | 50 | 2 |
| Total | | | 30 | - | - | - | - | 650 | 25 |



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| Part | Course Code | Course Title | Inst. Hrs /Week | T/P | Examination Details | | | | Credits |
|---------------------|-----------------------------------|---|-----------------|-----|---------------------|-----|-----|-------------|-----------|
| | | | | | Duration in Hours | CIA | ESE | Total Marks | |
| SEMESTER III | | | | | | | | | |
| III | 17UALCT301 | Core 5: Operating Systems | 6 | T | 3 | 25 | 75 | 100 | 4 |
| III | 17UALCT302 | Core 6: Java Programming | 6 | T | 3 | 25 | 75 | 100 | 4 |
| III | 17UALCP303 | Core Lab 3: Java Programming Lab | 6 | P | 3 | 40 | 60 | 100 | 4 |
| III | 17UALAT304 | Allied 3: Microprocessor and ALP | 6 | T | 3 | 25 | 75 | 100 | 4 |
| IV | 17UALSP305 | Skill Based Course 1(Lab): Linux Programming Lab | 4 | P | 3 | 30 | 45 | 75 | 3 |
| IV | 17BT01/ 17AT01/ 17UALNT306 | Basic Tamil - I * / Advanced Tamil - I # / Non Major Elective - I # (Fundamentals of Programming @) | 2 | T | 3 | | 75 | 75 | 2 |
| Total | | | 30 | - | - | - | - | 550 | 21 |
| SEMESTER IV | | | | | | | | | |
| III | 17UALCT401 | Core 7: Computer Networks | 6 | T | 3 | 25 | 75 | 100 | 4 |
| III | 17UALCT402 | Core 8: Web Technology | 6 | T | 3 | 25 | 75 | 100 | 4 |
| III | 17UALCP403 | Core Lab 4: Web Technology Lab | 6 | P | 3 | 40 | 60 | 100 | 4 |
| III | 17UALAT404 | Allied 4: PC Hardware | 6 | T | 3 | 25 | 75 | 100 | 4 |
| IV | 17UALSP405 | Skill Based Course 2 (Lab): Networks Lab | 4 | P | 3 | 30 | 45 | 75 | 3 |
| IV | 17BT02/ 17AT02 / 17UALNT406 | Basic Tamil - II * / Advanced Tamil - II # / Non Major Elective - II # (Web Graphics @) | 2 | T | 3 | | 75 | 75 | 2 |
| Total | | | 30 | - | - | - | - | 550 | 21 |



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| Part | Course Code | Course Title | Inst. Hrs /Week | T/P | Examination Details | | | | Credits |
|--------------------|--|---|-----------------|----------|---------------------|----------|----------|-------------|------------|
| | | | | | Duration in Hours | CIA | ESE | Total Marks | |
| SEMESTER V | | | | | | | | | |
| III | 17UALCT501 | Core 9: Database Systems | 6 | T | 3 | 25 | 75 | 100 | 4 |
| III | 17UALCT502 | Core 10: Software Engineering | 5 | T | 3 | 25 | 75 | 100 | 4 |
| III | 17UALCT503 | Core 11: Visual Basic .NET Programming | 6 | T | 3 | 25 | 75 | 100 | 4 |
| III | 17UALCP504 | Core Lab 5: VB.NET and RDBMS Lab | 5 | P | 3 | 40 | 60 | 100 | 4 |
| III | 17UALET505/ 17UALET506/ 17UALET507 | Elective - I | 5 | T | 3 | 25 | 75 | 100 | 4 |
| IV | 17UALSP508 | Skill Based Course 3 (Lab): Network Security Lab | 3 | P | 3 | 30 | 45 | 75 | 3 |
| Total | | | 30 | - | - | - | - | 575 | 23 |
| SEMESTER VI | | | | | | | | | |
| III | 17UALCT601 | Core 12: Android Programming | 6 | T | 3 | 25 | 75 | 100 | 5 |
| III | 17UALCP602 | Core Lab 6: Android Programming Lab | 5 | P | 3 | 40 | 60 | 100 | 4 |
| III | 17UALET603/ 17UALET604/ 17UALET605 | Elective - II | 6 | T | 3 | 25 | 75 | 100 | 4 |
| III | 17UALET606/ 17UALET607/ 17UALET608 | Elective - III | 6 | T | 3 | 25 | 75 | 100 | 4 |
| III | 17UALCV609 | Project Work | 4 | P | 3 | 20 | 80 | 100 | 4 |
| IV | 17UALSP610 | Skill Based Course 4 (Lab): Software Engineering and CASE Tools Lab | 3 | P | 3 | 30 | 45 | 75 | 3 |
| V | 17NS01/ 17NC01/ 17PE01/ 17YR01 | Extension Activities | - | - | - | 50 | - | 50 | 1 |
| Total | | | 30 | - | - | - | - | 625 | 25 |
| TOTAL | | | - | - | - | - | - | 3600 | 140 |

CIA - CONTINUOUS INTERNAL ASSESSMENT


ESE - END SEMESTER EXAMINATION

* CIA ONLY

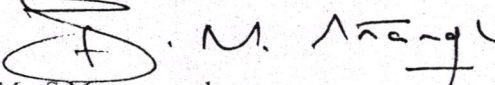
ESE ONLY

@ OFFERED TO OTHER DEPARTMENT STUDENTS




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| LIST OF ALLIED COURSES | | | |
|-----------------------------------|------------|---|---------------------------|
| Allied 1 | 17UALAT104 | Numerical and Statistical Methods | |
| Allied 2 | 17UALAT204 | Discrete Mathematics | |
| Allied 3 | 17UALAT304 | Microprocessor and ALP | |
| Allied 4 | 17UALAT404 | PC Hardware | |
| LIST OF SKILL BASED COURSES | | | |
| Skill Based Course 1 | 17UALSP305 | Linux Programming Lab | |
| Skill Based Course 2 | 17UALSP405 | Networks Lab | |
| Skill Based Course 3 | 17UALSP508 | Network Security Lab | |
| Skill Based Course 4 | 17UALSP610 | Software Engineering and CASE Tools Lab | |
| LIST OF ADVANCED LEARNERS COURSES | | | |
| Advanced Learners Course 1 | 17UALAL407 | A | Windows Programming |
| | 17UALAL408 | B | Embedded Systems |
| Advanced Learners Course 2 | 17UALAL509 | A | Programming in C# |
| | 17UALAL510 | B | Distributed Computing |
| LIST OF ELECTIVE COURSES | | | |
| Elective - I | 17UALET505 | A | Network Security |
| | 17UALET506 | B | System Software |
| | 17UALET507 | C | Client / Server Computing |
| Elective - II | 17UALET603 | A | Computer Graphics |
| | 17UALET604 | B | Multimedia Systems |
| | 17UALET605 | C | 3D Animation |
| Elective - III | 17UALET606 | A | Mobile Computing |
| | 17UALET607 | B | Ethical Hacking |
| | 17UALET608 | C | Cyber Law |




Mr. S. Muruganatham

Chairman

Board of Studies / Computer Technology and Information Technology
Kongu Arts and Science College (Autonomous), Erode




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| Sem | Course Code | Skill Based Course 1 (Lab): Linux Programming Lab | Total Marks: 75 | | Hours Per Week | Credits |
|-----|-------------|---|-----------------|---------|----------------------|---------|
| III | I7UALSP305 | | CIA: 30 | ESE: 45 | 4 | 3 |

OBJECTIVE:

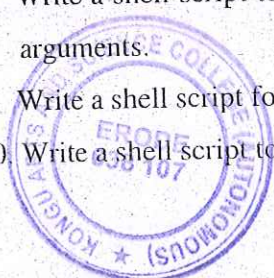
To enable the students to learn about Linux environment and shell scripting.

COURSE OUTCOMES:

At the end of the course, students will be able to

- CO1 Apply the knowledge of basic linux commands.
- CO2 Construct linux commands to create and manage simple file processing operations.
- CO3 Design the shell scripts to monitor system performance and network activities.
- CO4 Make use of the linux directory commands.
- CO5 Implement the shell scripts for various operations.

1. Write shell script to stimulate the following file commands: rm, cp, cat, mv, cmp, wc, split, diff.
2. Write a shell script to show the following system configuration.
 - a. currently logged user and log name.
 - b. current shell, home directory, operating system type, current path setting, current working directory.
 - c. show currently logged number of users, show all available shells.
 - d. show CPU information like processor type, speed.
 - e. show memory information.
3. Write a shell script to implement the following : pipes, redirection and tee commands.
4. Write a shell script for displaying current date, user name, file listing and directories by getting user choice.
5. Write a shell script to implement the filter commands.
6. Write a shell script to remove the files.
7. Write a shell script to find the sum of the individual digits of a given number.
8. Write a shell script to find the greatest among the given set of numbers using command line arguments.
9. Write a shell script for palindrome checking.
10. Write a shell script to print the multiplication table using for loop.



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| Sem | Course Code | Non Major Elective - I : Fundamentals of Programming [®] | Total Marks:75 | | Hours Per Week | Credits |
|-----|-------------|---|----------------|--------|----------------------|---------|
| III | 17UALNT306 | | | CIA: - | ESE: 75 | 2 |

OBJECTIVE:

To enable the students to learn about the basic concepts of solving problems on a computer using flowcharting techniques.

COURSE OUTCOMES:

At the end of the course, students will be able to

- CO1 Demonstrate the basic concepts of computer, data representation and boolean algebra.
- CO2 Illustrate the elementary concepts of flowchart and make simple computations using flowchart.
- CO3 Apply the concepts of subscripted variables in one dimensional array.
- CO4 Implement the multidimensional array concepts for developing programs.
- CO5 Apply the concepts of file structure and file processing in computers.

UNIT - I

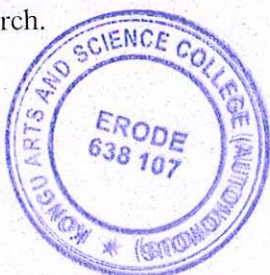
Basics of Computers: Introduction - What is Computer - Historical Developments of Computers - Generations of Computers - Types of Computers - Input and Output Devices - External Storage Devices - Operations in Arithmetic Logic Unit - **Data Representation and Boolean Algebra:** Introduction - The Decimal System - The Binary System - The Octal System - The Hexa-decimal System - Binary Arithmetic - Binary Coded Decimal - 6-Bit and 8-Bit Alphanumeric Codes - Check bits or Parity Bits - Boolean Algebra.

UNIT - II

Flowcharts: Introduction - Kinds of Flowcharts - Symbols used in Flowcharts - Advantages of Flowcharts - Constants and Variables - Flowcharting Simple Computations.

UNIT - III

Subscripted Variables: Introduction - Basic Concept of Subscripted Variables - One-dimensional Arrays - Average of an Array - Addition of Two Arrays - Sorting - Linear Search.



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UNIT - IV

Multidimensional Arrays: Introduction - Definitions - Matrix Operations - Sum of the Entries of a Matrix - Transpose of a Matrix - Addition of Matrices - Student's Grade - Payroll - Beyond two dimensions.

UNIT - V

File Structure: Introduction - Concept of Data Files - Types of Data Files - File Organization Methods - File Processing Activities - Telephone Bills - Data Retrieval - Advertisement Policy - Random Access.

TEXTBOOK:

Raj K. Jain, Fundamentals of Programming, S.Chand & Company Ltd., Reprint, 2001.

BOOKS FOR REFERENCE:

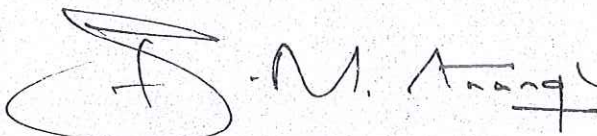
1. Pankaj Agarwal, Fundamentals of computer and programming, Vayu Education of India, First Edition, 2001.
2. Peter Norton, Introduction to Computers, Tata McGraw- Hill Publishing Company Limited, Sixth Edition, 2007.
3. Ashok N.Kamthane, Computer Programming, Pearson Education, Second Edition, 2008.
4. Pradeep K.Sinha, Priti Sinha, Foundations of Computing, BPB Publications, First Edition, 2010.
5. V.K Puri, Digital Electronics Circuits and Systems, Tata McGraw-Hill Publishing Company Limited, 2007.

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| QUESTION PAPER PATTERN |
| SECTION - A |
| 5 x 15 = 75 Marks (Either or choice) Two questions from each unit |

@ Offered to other department students.



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| Sem | Course Code | Allied 4: PC Hardware | Total Marks: 100 | | Hours Per Week | Credits |
|-----|-------------|-----------------------|------------------|---------|----------------|---------|
| IV | 17UALAT404 | | CIA: 25 | ESE: 75 | 6 | 4 |

OBJECTIVE:

To enable the students to learn the basics of computer hardware components.

COURSE OUTCOMES:

At the end of the course, students will be able to

CO1 Demonstrate the understanding of the fundamentals of PC technology and microprocessor.

CO2 Identify the components of motherboard.

CO3 Classify the types of memory, magnetic storage devices and optical storage devices.

CO4 Describe keyboards, pointing devices, video subsystems and printers.

CO5 Apply the trouble shooting tools and techniques, basic data recovery and disaster recovery.

UNIT - I

Fundamentals of PC Technology: Fundamental Building Blocks of the PC - Principles of CPU Operation: Basic PC Signaling Principles - Buses - **The Microprocessor:** CPU Operation - Troubleshooting the CPU.

UNIT - II

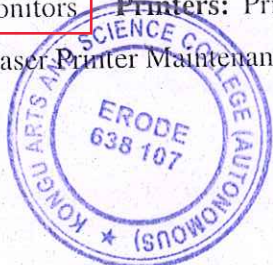
Motherboards: Motherboard Controllers and System Resources - The I/O System Bus - Onboard I/O Devices - Chipsets - ROM BIOS - ROM POST - CMOS Setup - Motherboard Physical Form Factors.

UNIT - III

Memory: How Memory Works - Memory Chips and Modules - Module Sizes and Banks of Memory - Parity Checking and ECC - DRAM Timing and Memory Types - Troubleshooting Memory - Advanced Memory Technologies - **Magnetic Storage Devices:** Magnetic Storage - Hard Disk Drives - Floppy Disk Drives - Cartridge Drives - **Optical Storage Devices:** Optical Storage Media - CD-ROM Drives - DVD-ROM Drives - Recordable Drives.

UNIT - IV

Keyboards and Pointing Devices: Keyboards - Pointing Devices - **The Video Subsystem:** Monitors **Printers:** Printer Types: Laser Printer - Dot Matrix Printer - Printer Maintenance: Laser Printer Maintenance - Dot Matrix Printer Maintenance.



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UNIT - V

Trouble Shooting Tools and Techniques: Tools of the Trade - Basic PC Handling Techniques -
Basic Data Recovery and Disaster Recovery: Disk Structure and Data Recovery - Disaster
Recovery.

TEXTBOOK:

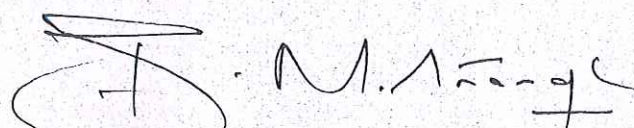
Craig Zacker, John Rourke, PC Hardware: The Complete Reference, Tata McGraw-Hill,
24th Reprint, 2013.


BOOKS FOR REFERENCE:

1. Scott Muller, Upgrading and Repairing PCs, 13th Edition, Pearson Education, 2007.
2. K.L. James, Computer Hardware Installation, Interfacing, Troubleshooting and
Maintenance, PHI Learning Private Limited, Delhi, 2013.
3. B.Govindarajulu, IBM PC and Clones Hardware, Troubleshooting and Maintenance,
Second Edition, Tata McGraw-Hill, 2002.
4. Hans Peter Messemer, The Indispensable PC Hardware Book, 4th Edition, Addison - Wesley,
2001.
5. N.Mathivanan, Microprocessors, PC Hardware and Interfacing, Prentice-Hall of India,
Fourth Reprint, 2006.

| QUESTION PAPER PATTERN | | |
|---|---|---|
| SECTION - A | SECTION - B | SECTION - C |
| 10 x 1 = 10 Marks (Multiple choice, Four options) Two questions from each unit | 5 x 7 = 35 Marks (Either or choice) Two questions from each unit | 3 x 10 = 30 Marks (Answer any three questions) One question from each unit |




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| Sem | Course Code | Skill Based Course 2 (Lab): Networks Lab | Total Marks: 75 | | Hours Per Week | Credits |
|-----|-------------|---|-----------------|---------|----------------------|---------|
| | | | CIA: 30 | ESE: 45 | | |
| IV | 17UALSP405 | | | | 4 | 3 |

OBJECTIVE:

To enable the students to implement the error correcting codes, detecting codes and protocols of different layers.

COURSE OUTCOMES:

At the end of the course, students will be able to

- CO1 Identify the address, connection number and domain name of the computer system.
- CO2 Develop an algorithm to compute parity bit and detect errors.
- CO3 Implement the behaviour of stop-and-wait and sliding window protocol.
- CO4 Create a shortest path using Dijkstra algorithm and demonstrate the Remote Procedure Call.
- CO5 Implement the File Transfer Protocol and chatting in client/server environment.

1. Write a program to identify the address of the node, connection number and network domain name.
2. Write a program to compute odd parity and even parity for a given number.
3. Write a program to generate Hamming Code for a given number.
4. Write a program to detect errors using CRC.
5. Write a program to implement Stop and Wait protocol.
6. Write a program to implement Sliding Window protocol.
7. Write a program to implement the Shortest Path Routing using Dijkstra algorithm.
8. Write a program to implement Remote Procedure Call under Client / Server environment.
9. Write a program to implement File Transfer Protocol.
10. Write a program to implement chatting.



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| Sem | Course Code | Non Major Elective - II : Web Graphics [®] | Total Marks:75 | | Hours Per Week | Credits |
|-----|-------------|--|----------------|---------|----------------------|---------|
| IV | 17UALNT406 | | CIA: - | ESE: 75 | 2 | 2 |

OBJECTIVE:

To enable the students to learn about the issues and techniques relating to Web graphics.

COURSE OUTCOMES:

At the end of the course, students will be able to

- CO1 Outline the HTML coding and basic web graphics.
- CO2 Demonstrate the components of Photoshop, image basics and file formats.
- CO3 Apply the concepts of layers and color palette for animation.
- CO4 Illustrate the usage of image editing techniques.
- CO5 Apply the multimedia concepts of creating clippings and animations with sound effects.

UNIT - I

Introduction: HTML Coding - Introduction to WWW - Links, images and frames - HTML Extensions - Basic Web Graphics - Overview - Types of graphics - Handling graphics - Obtaining graphics - Basic web graphics - case study.

UNIT - II

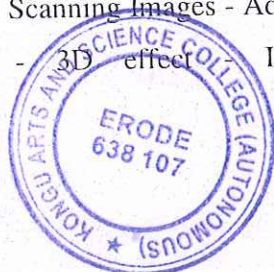
Photoshop: Introduction - Working with Photoshop - Basic Components of Photoshop - Image Basics - Classification of images - Properties of images - File Formats - GIF, JPEG, PNG, PSD - Classification of compression - File format Guidelines - Brushes - Grids and Guides - Scaling and Positioning Images.

UNIT - III

Palette and Layers: Color Palette - Working with palette - Color palette - Style palette - Color swatches palette - Layers - Creating New Images - Moving layers - Rearranging layers order - Dragging layers - Merging and flattening layers - Tool Palette - Classification and types of palettes - Screen Capturing - Grey Styling - Using Style Palette Animation.

UNIT - IV

Image Handling: Scanning Images - Adding Text to the Images - Sizing up the text - Giving the text dimension - 3D effect - Illustration - motion text - Designing Icons -



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Considerations in designing an icon - Conclude the icon by designing and creating icon - illustration - Creating Background Images.

UNIT - V

Multimedia: Creating Clippings - Cropping Images - 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.

TEXTBOOK:

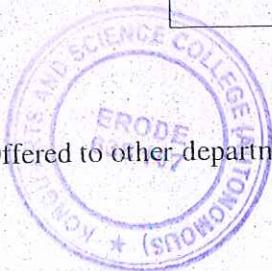
G.M. Meenakshi, Web Graphics, Scitech Publications (India) Pvt. Ltd., Reprint, September 2015.

BOOKS FOR REFERENCE:

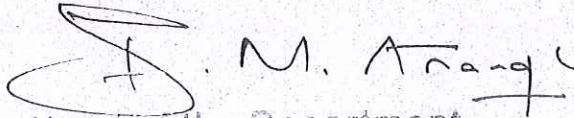
1. Vikas Gupta, Multimedia and Web Design, Dreamtech Press, New Delhi, Reprint Edition, 2008.
2. Ze-Nian Li, Mark S.Drew, Fundamentals of Multimedia, Pearson Education, Third Edition, 2008.
3. Ken milburn, Gene Hirsh, The Complete Reference Photoshop Elements 2, Tata McGraw-Hill Publishing Company Limited, First Edition, 2002.
4. Wendy Willard, HTML, A Beginner's Guide, Tata McGraw-Hill Education Private Limited, Fourth Edition, 2009.
5. Ken Milburn, Photoshop and Virtual Classroom Training Kit, Dreamtech Press, First Edition, 2002.

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|---|
| QUESTION PAPER PATTERN |
| SECTION - A |
| 5 x 15 = 75 Marks (Either or choice) Two questions from each unit |

@ Offered to other department students.



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| Sem | Course Code | Advanced Learners Course 1 - A: Windows Programming | Total Marks: 100 | | Hours Per Week | Credits |
|-----|-------------|---|------------------|--------|----------------------|---------|
| IV | 17UALAL407 | | | CIA: - | ESE: 100 | - |

OBJECTIVE:

To enable the students to practice the basic windows programming concepts.

COURSE OUTCOMES:

At the end of the course, students will be able to

CO1 Identify the basic windows programming environment and unicode character set.

CO2 Illustrate the use of windows and messages.

CO3 Apply the basic drawing methods in windows environment.

CO4 Illustrate the concepts of keyboard and its messages.

CO5 Implement the concepts of mouse messages in windows programming.

UNIT - I

Introduction: The Windows Environment - Windows Programming Options - Structure of Windows Program - **An Introduction to Unicode:** A Brief History of Character Sets - Wide Character and C - Wide Characters and Windows.

UNIT - II

Windows and Messages: A Window of One's Own - The Windows Programming Hurdles - Painting and Repainting: An Introduction to GDI - Scroll Bars - Building A Better Scroll.

UNIT - III

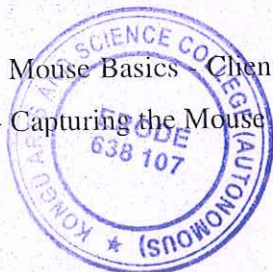
Basic Drawing: The Structure of GDI - The Device Context - Drawing Dots and Lines - Drawing Filled Areas - The GDI Mapping Mode - Rectangles, Regions and Clipping.

UNIT - IV

The Keyboard: Keyboard Basics - Keystroke Messages - Character Messages - Keyboard Messages and Character sets - The Caret.

UNIT - V

The Mouse: Mouse Basics - Client-Area Mouse Messages - Non client-Area Mouse Messages - Hit-Testing - Capturing the Mouse - The Mouse Wheel.



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TEXT BOOK:

Charles Petzold, Programming Windows, Fifth Edition, Microsoft Press, Nineteenth Indian Reprint, 2007.

BOOKS FOR REFERENCE:

1. Margaret Levine Young, John Levine, The Complete Reference - Windows Vista, Tata McGraw-Hill Edition, 2007.
2. Joan Preppernau, Joyce Cox, Step by Step Windows Vista Prentice Hall, India, 2007.
3. Michael Meskers, Windows Vista, Wiley India Pvt. Ltd, Reprint, 2007.
4. Alan Simpsom, World Perfect 5.1 for Windows Macro Handbook, Tech Publications PTE Ltd, 2002.
5. Tom Swam, Windows Programming Using Win Scope, Pustak Mahal Publications, IDG Books, 2006.

| QUESTION PAPER PATTERN | | |
|---|---|---|
| SECTION - A | SECTION - B | SECTION - C |
| 10 x 2 = 20 Marks Two questions out of 12 | 5 x 7 = 35 Marks (Either or choice) Two questions from each unit | 3 x 15 = 45 Marks (Answer any three questions) One question from each unit |



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| Sem | Course Code | Advanced Learners Course 1 - B: Embedded Systems | Total Marks: 100 | | Hours Per Week | Credits |
|-----|-------------|--|------------------|--------|----------------------|---------|
| IV | 17UALAL408 | | | CIA: - | ESE: 100 | - |

OBJECTIVE:

To provide a clear understanding on architecture, programming tools, hardware platforms and concepts of Real-Time Operating Systems.

COURSE OUTCOMES:

At the end of the course, students will be able to

- CO1 Demonstrate an understanding of concepts and architecture of embedded systems.
- CO2 Develop a program for embedded systems using C, C++ and Java.
- CO3 Identify the hardware platforms and communication interface required for developing embedded systems.
- CO4 Implement the concepts of real-time operating systems.
- CO5 Illustrate the process of creating a target image and development of navigation system.

UNIT - I

Introduction to Embedded Systems: What is an Embedded System? - Application Areas - Categories of Embedded Systems - Overview of Embedded System Architecture - Specialties of Embedded Systems - Recent Trends in Embedded Systems - **Architecture of Embedded Systems:** Hardware Architecture - Software Architecture - Application Software - Communication Software - Process of Generating Executable Image - Development/Testing Tools.

UNIT - II

Programming for Embedded Systems: Overview of ANSI C - GNU Development Tools - Bit Manipulation using C - Memory Management - Timing of Programs - Device Drivers - Productivity Tools - Code Optimization - C Coding Guidelines - Java 2 Micro Edition (J2ME) - Server-Side Programming - Java Development Tools.

UNIT - III

Hardware Platforms: Types of Hardware Platforms - 89C51 Micro-controller Development Board - AVR Micro-controller Development Board - **Communication Interfaces:** Need for Communication Interfaces - RS232/UART - RS422/RS485 - US - Infrared - IEEE 1394 Firewire - Ethernet - IEEE 802.11 Bluetooth



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UNIT - IV

Real-Time Operating System Concepts: Architecture of the Kernel - Tasks and Task Scheduler - Interrupt Service Routines - Semaphores - Mutex - Mailboxes - Message Queues - Event Registers - Pipes - Signals - Timers - Memory Management - Priority Inversion Problem - **Overview of Real-Time Operating Systems:** Off-the-shelf Operating Systems - Embedded Operating Systems - Real-Time Operating Systems - Handheld Operating Systems.

UNIT - V

Target Image Correction - Operating System Software - Target Image Creation for Windows XP Embedded - Porting RTOS on a Micro-controller Development Board - **Representative Embedded Systems:** Digital Thermometer - Handheld Computer - Navigation System - IP Phone - Software-defined Radio - Smart Cards - RF Tags - **Development of Navigation System:** Project Overview - Development Environment - GPS Receiver Packet Format - Implementation - Executing the Program.

TEXTBOOK:

Dr. K.V.K.K. Prasad, Real-Time Systems: Concepts, Design & Programming Black Book, Dreamtech Press, India, Reprint Edition 2011.

BOOKS FOR REFERENCE:

1. Steve Heath, Embedded Systems Design, 2nd Edition, Elsevier, 2005.
2. David E. Simon, An Embedded Software Primer, 2nd Edition, Pearson Education, 2008.
3. Raj Kamal, Embedded Systems: Architecture, Programming and Design, 2nd Edition, Tata McGraw-Hill publishing company Limited, 2008.
4. Wayne Wolf, Computers As Components: Principles of Embedded Computer System Design, Elsevier, 2006.
5. James K. Peckol, Embedded Systems: A Contemporary Design Tool, 1st Edition, Wiley India Pvt. Limited, 2009.

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