GOVT. HOLKAR (MODEL, AUTONOMOUS)

SCIENCE COLLEGE INDORE

(CENTER FOR EXCELLENCE)

Academic Year: 2023-2024

Affiliated to Devi Ahilya Vishwavidyalaya, Indore

Syllabus for B.C.A. I Semester

Computer Applications

(Faculty of Computer Applications)

DEPARTMENT OF COMPUTER SCIENCE

Government Holkar (Model, Autonomous) Science College, Indore (M.P.)

Computer Science Department
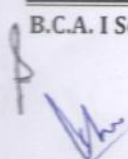
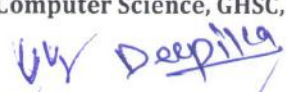| Part A - Introduction				
Programme – B.C.A. (Computer Applications - Major)	Class – B.C.A. I Semester		Year- 2023	Session- 2023-24
Course Type (Computer Applications) – Major				
1	Course Code	S1-BCA1T		
2	Course Title	Computer Fundamental, Organization and Architecture		
3	Pre – requisite (if any)	To study this course, a student must have basic knowledge of Computers.		
4	Course Learning Outcomes (CLO)	After the completion of this course, a successful student will be able to: 1. Recall fundamental concepts of digital electronics, including data types, binary codes, and error detection codes. 2. Explain the organization of basic computer components, such as registers, instructions, and memory, as well as logic gates and their applications. 3. Apply Boolean algebra to simplify logic circuits and solve basic circuit design problems. 4. Analyze computer architecture principles, including micro operations, control units, and pipelining, to identify data and control hazards. 5. Synthesize knowledge of memory hierarchy, parallel computing concepts, and Indian contributions to computer science to assess their significance in the field.		
5	Credit Value	4 Credits		
6	Total Marks	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks **Total 40+60= 100 Marks**	Minimum Pass Marks – 35	

## Part A - Introduction

Programme – B.C.A. (Computer Applications - Major)	Class – B.C.A. I Semester	Year- 2023	Session- 2023-24
Course Type (Computer Applications) – Major			
Course Code	S1-BCA1T		
Course Title	Computer Fundamental, Organization and Architecture		

Part – B Content of the Course

Total no. of lectures – As per UGC rules (1 Credit = 15 Lectures)

S. No.	Topics	No. of Lectures
I	Fundamentals of computers: Definition, Characteristics, capabilities and limitations. Types of Computers: Analog, Digital, Micro, Mini, Mainframe & SuperComputers, Work Station, Server computers. Generations of Computers. Smart Systems: definition, characteristics and applications Definition of Embedded system, GIS, GPS, Cloud Computing, Uses of computers in e-governance and various public domains and services. Block diagrams of computer and its functional units. Concept of hardware, software and firmware. Types of software. Input devices: keyboard, scanner, mouse, light pen, bar code reader, OMR, OCR, MICR, track hall, joystick, touch screen camera, mice etc. Output devices: monitors classification of monitors based on technology -CRT & flat panel, LCD, LED monitors, speakers, printers: dot matrix printer, ink jet printer, laser printer, 3D Printers, Wi-Fi enabled printers, plots and their types, LCD/LED projectors. Computer memory and its types, Storage devices Magnetic tapes. Floppy Disks, Hard Disks, Compact Disc CD-ROM, CD-RW, VCD, DVD, DVD-RW, USB drives, Blue Ray Disc, SD/MMC Memory cards.	18
II	Fundamentals of Digital Electronics: Data Types, Complements, Fixed-Point Representation. Floating-Point Representation, Binary and other Codes, Error Detection Codes. Logic Gates, Boolean Algebra, Map Simplification,	10

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	Combinational Circuits, Sequential Circuits, simple combinational circuit design problems. Combinational Circuits- Adder, Subtractor, Multiplexer. De-multiplexer, Decoders, Encoders. Sequential Circuits-Flip-Flops, Registers, Counters.	
III	Basic Computer Organization: Instruction codes, Computer Registers, Computer Instructions, Timing & Control, Instruction Cycle, Memory Reference Instruction, and Input Output & Interrupts. Instruction formats, Addressing modes, Instruction codes, Machine language, Assembly language. Register Transfer and Micro operations: Register Transfer Language Register Transfer, Bus & Memory Transfer, Arithmetic Micro Operations, Logic Micro-operations. Shift Micro-operations.	10
IV	Processor and Control Unit: Hardwired vs. Micro programmed Control Unit, General Register Organization, Stack Organization, and Instruction Format. Data Transfer & Manipulation, Program Control, Introductory concept of RISC, CISC, advantages and disadvantages of both. Pipelining: Concept of pipelining, introduction to Pipelined data path and control-Handling Data hazards & Control hazards.	10
V	Memory and I/O Systems: Peripheral Devices, I/O Interface, Data Transfer Schemes-Program Control, Interrupt, DMA Transfer, I/O Processor. Memory Hierarchy, Processor vs. Memory Speed, High Speed Memories, Main memory & its types. Auxiliary memory, Cache Memory, Associative Memory, Interleaving, concept of Viral Memory. Hardware support for Memory Management. Indian contribution to the field-Contributions of reputed scientists of Indian origin- like Dr. VinodDham Father of Intel Pentium Processor, Dr. Ajay Bhat-Co-Inventor of USB Technology, Dr. VinodKliosa-an-founder of Sun Microsystems, Dr. Vijay P Bhaskar- architect of India's national inhiative in supercomputing, and many others, Parallel Computing projects of India PARAM, ANUPAM, FLOSOLVER CHIPPS etc. Other relevant contributors and contributions.	12

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Part A - Introduction

Programme – B.C.A. (Computer Applications - Major)	Class – B.C.A. I Semester	Year- 2023	Session- 2023-24
Course Type (Computer Applications) – Major			
Course Code	S1-BCA1T		
Course Title	Computer Fundamental, Organization and Architecture		

Part – C Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

Text Books:

1. M. Morris Mano, Digital Design, 3.ed. Prentice Hall of India Pvt. Ltd.,
2. Heuring Jordan, "Computer System Design & Architecture" (A.W.L.)
3. Books published by M.P. Hindi Granth Academy, Bhopal.

Reference Books:

1. William Stalling, "Computer Organization & Architecture", Pearson Education Asia.
2. V. Carl Hamacher, "Computer Organization", TMH
3. Tannenbaum, "Structured Computer Organization", PHI.

Suggested Digital Platforms Web Links:

1. https://www.youtube.com/watch?v=4TzMyXmzL8M
2. https://nptel.ac.in/courses/106/106/106106166/
3. https://nptel.ac.in/courses/106/106/106106134/

Suggested Equivalent Online Courses:

1. https://nptel.ac.in/courses/106/105/106105163/

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Part A - Introduction

Programme – B.C.A. (Computer Applications - Major)	Class – B.C.A. I Semester	Year- 2023	Session- 2023-24
Course Type (Computer Applications) – Major			
Course Code	S1-BCA1T		
Course Title	Computer Fundamental, Organization and Architecture		

Part – D Assessment and Evaluation

Internal Assessment: Continuous Comprehensive Evaluation (CCE)/ Formative Assessment: 40 Marks			External Evaluation (Summative Assessment): End Semester Exam:60 Marks Time: 03 hours	
Formative Assessment shall be based on – Quiz, Seminar, Presentation, Written test, Case Study, Project, Assignment etc. The division of marks is as follows:				
Test I	20 Marks	Best two test Marks = (20 + 20)	Section (A): 5 Objective Questions (1 mark each)	5 x 1= 5
Test II	20 Marks		Section (B): 5 Short Questions out of eight questions (200 words each) (7 Marks each)	5 x 7 = 35
Test III	20 Marks		Section (C): Two long questions out of four questions (500 Words each) (10 Marks each)	2 x 10 = 20
Total Internal Assessment (CCE) Marks		40 Marks	Total External Evaluation (Theory) Marks (A+B+ C)	60 Marks
Note:	1.	For Major, Minor, Open Elective, Foundation and Vocational Courses, Part D will be as per the scheme of marks given.		
	2.	The student should secure 35% marks in Internal Assessment (CCE) and External Evaluation (theory) combined.		

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Computer Science Department

Part A- Introduction (Practical)			
Programme – B.C.A. (Computer Applications - Major)	Class – B.C.A. I Semester	Year- 2023	Session- 2023-24
Course Type (Computer Applications) – Major			

1.	Course Code	S1-BCA1TP
2.	Course Title	Computer Fundamental and Digital Computer Lab
3.	Pre-requisite (if any)	Open for All
4.	Course Learning Outcomes (CLO)	**On completion of this course, learners will be able to:** 1. Demonstrate the ability to recall and identify various computer components and CPU parts through physical examination. 2. Exhibit an understanding of I/O devices and the interpretation of truth tables for different logic gates. 3. Apply acquired knowledge to operate and verify the functions of various logic circuits, such as adders, subtractors, and gates. 4. Analyze and assess the practical applications of logic gates and flip-flops, including their functions and truth tables. 5. Create and construct logic circuits, such as multiplexers, demultiplexers, and conversion processes, using logical components.
5.	Credit Value	2 Credits
6	Total Marks	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks **Total 40+60= 100 Marks** **Minimum Pass Marks – 35**

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Part B- Content of the Course	
Total no. of lectures – As per UGC rules	
Suggestive List of Practicals	
1.	Identify various parts of the computer by physical examination.
2.	Identify various parts inside the CPU like motherboard, SMPS, ports, buses, IC chips, Processor, HDD, and RAM etc.
3.	Identify various I/O devices available in the lab physically.
4.	Verification and interpretation of truth table for AND, OR, NOT gates
5.	Verification and interpretation of truth table for NAND, NOR gates
6.	Verification and interpretation of truth table for Ex-OR, Ex-NOR gates
7.	Study of half adder using XOR and NAND gates and verification of its operation.
8.	Study of full adder using XOR and NAND gates and verification of its operation.
9.	Study of half subtractor and verification of its operation.
10.	Study of full subtractor and verification of its operation
11.	Realization of logic functions with the help of NAND –Universal Gates.
12.	Realization of logic functions with the help of NOR
13.	Verify the truth table of RSflip
14.	Verify the truth table of JKflip
15.	Verify the truth table of T and D flip
16.	Implementation of 4x1 multiplexer using logic gates.
17.	Implementation of 1x4 demultiplexer using logic gates.
18.	Verify Gray to Binary conversion using NAND gates only.
19.	Verify Gray to Binary conversion using NAND gates only.

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Part – C Learning Resources
Text Books, Reference Books, Other Resources

Suggested Readings:

Text Books:

1. M. Morris Mano, Digital Design, 3.ed. Prentice Hall of India Pvt. Ltd.,
2. Heuring Jordan, "Computer System Design & Architecture" (A.W.L.)
3. Books published by M.P. Hindi Granth Academy, Bhopal.

Reference Books:

1. William Stalling, "Computer Organization & Architecture", Pearson Education Asia.
2. V. Carl Hamacher, "Computer Organization", TMH
3. Tannenbaum, "Structured Computer Organization", PHI.

Suggested Digital Platforms Web Links:

1. https://www.youtube.com/watch?v=4TzMyXmzL8M
2. https://nptel.ac.in/courses/106/106/106106166/
3. https://nptel.ac.in/courses/106/106/106106134/

Suggested Equivalent Online Courses:

1. https://nptel.ac.in/courses/106/105/106105163/

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Part D- Assessment and Evaluation	
Suggested Continuous Evaluation methods:	
Internal Assessment/Formative Examination(A):	**40 Marks**
Lab Record	15 Marks
Attendance in the Lab	05 Marks
Assignments (It can be in different modes)	20 Marks
End Semester External Evaluation (B):	**60 Marks**
Viva Voce on Practical	10 Marks
Practical Record File	10 Marks
Experiments	40 Marks
Total Marks (A+B)	**(40 + 60 =100 Marks)**

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Part A - Introduction			
Programme – B.C.A. (Computer Applications - Minor)	**Class** – B.C.A. I Semester	**Year-** 2023	**Session-** 2023-24

Course Type (Computer Applications) – Minor		
1	**Course Code**	S1-BCA2T
2	**Course Title**	Programming & Problem solving through C
3	**Pre – requisite (if any)**	To study this course, a student must have had the subject Physics/ Mathematics in 12th class.
4	**Course Learning Outcomes (CLO)**	**On completion of this course, learners will be able to:** 1. Recall the basic concepts of C programming, including language features, program structure, and algorithm development. 2. Understand decision-making and looping constructs in C programming, as well as the manipulation of arrays and strings. 3. Apply programming knowledge to implement functions, pointers, structures, and unions in practical coding scenarios. 4. Analyze the role of preprocessor directives and the differences between various types of functions in C programming. 5. Synthesize programming skills to manage files, including creating, opening, reading, writing, and deleting files, while also choosing appropriate programming techniques and data structures for problem-solving.
5	**Credit Value**	4 Credits
6	**Total Marks**	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks **Total 40+60= 100 Marks** **Minimum Pass Marks – 35**

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Part A - Introduction			
Programme – B.C.A. (Computer Applications - Minor)	**Class** – B.C.A. I Semester	**Year**- 2023	**Session**- 2023-24
Course Type (Computer Applications) – Minor			
Course Code	S1-BCA2T		
Course Title	Programming & Problem solving through C		

Part – B Content of the Course		
Total no. of lectures – As per UGC rules (1 Credit = 15 Lectures)		
S. No.	**Topics**	**No. of Lectures**
I	Programming Fundamentals : Program Concept, C language introduction, history of C, Over view of procedural programming and object oriented programming, structure of C program, Algorithms Flow Charts - Symbols, Rules for making Flow chart, Types of flowchart. Techniques of problem solving : Programming Techniques — Top down, Bottom up, Modular, Structured - Features, Merits & Demerits, Programming Logics- Simple Branching, Looping Recursion, Cohesion & Coupling, Programming. Testing & Debugging & their Tools. How to compile and run a C program- steps and detailed procedure.	12
II	Programming in C: Including features of 'C', C tokens, Variables Expressions, Identifiers, Keywords, Data Types, Constants, Operator Arithmetic, Logical, Relational, Conditional and Bit wise Operators Precedence and Associatively of Operators, evaluations oi expressions, Type conversions in expressions, Basic input/output and library functions: Single character input/output i.e. getch(), getchar(), getche(), puts(), putch() and putchar(), Formatted input output i.e. printf() and scanf().	12
III	Decision Making branching: if-else, switch, conditional operator &goto statements If statement, If.....Else statement, Nesting or If...Else Statement, else if ladder, conditional operator, goto statement, Switch statement, Compound statement. Looping: Introduction, while statement, do statement, for statement, Break and Continue, do- while loops.	12
IV	Arrays: what is array, declaring, initializing, and accessing individual elements in an array, manipulating array elements using loops, 2D and 3D array. String: declaration, string functions — strcat(), strcpy(), strcmp(), strlen(), strstr(). Pointers: Overview of Pointers.	12

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	Structures : Structure definition, declaring and initializing Structure variables, the structure tag, period operator , accessing Structure members, Copying & Comparison of structures, the concept or structure of structure , array of structure; arrow operator and nesting of structure, Unions : initialization and use of it in a program. Preprocessor, #define, defining functions like macros #error,#include, conditional compilation directives i.e. #if, #else, #elseif and #ifdef&undef.	
V	Functions: Utility of functions, Call by value & call by reference categories of functions (i) Introduction (ii) User defined function and library functions, Categories of User defined functions , Return values and their types, Calling a function, void functions, Differentiating between declaration and definition of function argument/parameters in functions, Functions with variable number of arguments, recursion, Function arguments, Return values and nesting of function, Recursion, Calling of functions, Scope and life of variables - local and global variable, Storage class - auto, extern static, register. File Management: Creating or opening a file, types of file, Modes, writing data to the file, reading data from file, deleting a file.	12

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Part A - Introduction			
Programme – B.C.A. (Computer Applications - Minor)	Class – B.C.A. I Semester	Year- 2023	Session- 2023-24
Course Type (Computer Applications) – Minor			
Course Code	S1-BCA2T		
Course Title	Programming & Problem solving through C		

Part – C Learning Resources
Text Books, Reference Books, Other Resources

Suggested Readings:

Text Books:

1. Programming in ANSI-C : E. Balagurusami, TMH Publication

2. Let us C : Kanetkar Y

3. Books published by M.P. Hindi Granth Academy, Bhopal.

Reference Books:

1. The C Programming Language : B.W. Kernighan & D.M Ritchie

2. The Sprit of C : Cooper, Mullish

3. Programming in C : Schaum Outline, McGraw-Hill

4. An introduction to C programming — AmitSaxena, Anamaya Publishers, New Delhi.

Suggested Digital Platforms Web Links:

1. https://www.programiz.com/c-programming/c-if-else-statement

2. https://javatutoring.com/control-statements-in-c/

3. https://www.programiz.com/c-programming/c-arrays

4. https://www.tutorialspoint.com/cprogramming/c_structures.ht

5. https://beginnersbook.com/2014/01/c-functions-examples/

6. https://www.javatpoint.com/data-types-in-c

7. http://www.mphindigranthacademy.org/

Suggested Equivalent Online Courses:

1. https://nptel.ac.in/courses/106/105/106105151/
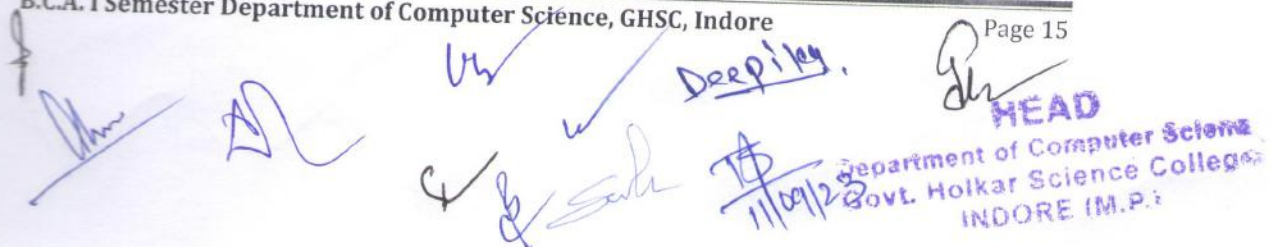
2. https://nptel.ac.in/courses/106/106/106106133/

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Part A - Introduction

Programme – B.C.A. (Computer Applications - Minor)	Class – B.C.A. I Semester	Year- 2023	Session- 2023-24
Course Type (Computer Applications) – Minor			
Course Code	S1-BCA2T		
Course Title	Programming & Problem solving through C		

Part – D Assessment and Evaluation

Internal Assessment: Continuous Comprehensive Evaluation (CCE)/ Formative Assessment: 40 Marks

Formative Assessment shall be based on – Quiz, Seminar, Presentation, Written test, Case Study, Project, Assignment etc.

The division of marks is as follows:

External Evaluation (Summative Assessment):
End Semester Exam:60 Marks
Time: 03 hours

Test I	20 Marks		**Section (A):** 5 Objective Questions (1 mark each)	5 x 1= 5
Test II	20 Marks	Best two test Marks = (20 + 20)	**Section (B):** 5 Short Questions out of eight questions (200 words each) (7 Marks each)	5 x 7 = 35
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Total Internal Assessment (CCE) Marks	**40 Marks**		Total External Evaluation (Theory) Marks (A+B+ C)	**60 Marks**
Note:	1.	For Major, Minor, Open Elective, Foundation and Vocational Courses, Part D will be as per the scheme of marks given.		
	2.	The student should secure 35% marks in Internal Assessment (CCE) and External Evaluation (theory) combined.		

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Computer Science Department

Part A- Introduction (Practical)			
Programme – B.C.A. (Computer Applications - Minor)	**Class** – B.C.A. I Semester	**Year-** 2023	**Session-** 2023-24
Course Type (Computer Applications) – Minor			
1.	Course Code	S1-BCA2TP	
2.	Course Title	Programming Lab	
3.	Pre-requisite (if any)	To study this course, a student must have had the subject Physics/ Mathematics in 12th class.	
4.	Course Learning Outcomes (CLO)	**On completion of this course, learners will be able to:** 1. Demonstrate proficiency in developing functional and well-structured C programs, utilizing loops, branches, and decision-making constructs effectively. 2. Display mastery in manipulating data structures, including arrays, strings, and functions in C, applying this knowledge in program development. 3. Implement file management techniques in C, encompassing file creation, reading, writing, and deletion, while maintaining data integrity. 4. Analyze and diagnose errors in C programs, enhancing debugging skills to identify and rectify issues efficiently. Conduct testing for program correctness. 5. Synthesize programming knowledge to address real-world problems, selecting appropriate data structures, algorithms, and coding techniques to devise innovative and effective solutions.	
5.	Credit Value	2 Credits	
6	**Total Marks**	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks **Total 40+60= 100 Marks**	**Minimum Pass Marks – 35**

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	Part B- Content of the Course
	Total no. of lectures – As per UGC rules
	Suggestive List of Practical
1.	Write a Program to print different data types in 'C' and their ranges.
2.	Write an Algorithm & Flowchart to convert temperature from Celsius to Fahrenheit.
3.	Write an algorithm & flowchart to find the smallest and largest number of among the three numbers.
4.	Write a program to calculate simple and compound interest.
5.	Write a C program to find the roots of a quadratic equation.
6.	Write a C program to make a simple calculator using switch...case.
7.	Write a C program to print natural numbers from 1 to n.
8.	Write a C program to find the factorial of a given number.
9.	Write a program in C to check a given number is even or odd using the function.
10.	Write a C program to access elements of an array using pointers.
11.	Write a C program to calculate the average of array elements.
12.	Write a C program to store information of 10 students using structures.
13.	Add two complex numbers by passing structures to a function.
14.	Write a C program to find the length of a string.
15.	Write a C program to reverse a string using recursion.
16.	Write a C Program to find largest element in an array.
17.	Write a C program to add two matrices using multi-dimensional arrays.
18.	Write a C program to store information of students using structure.
19.	Write a C program to Print Pyramid.
20.	Write a C program to Print Patterns.

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Part – C Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

Text Books:

1. Programming in ANSI-C : E. Balagurusami, TMH Publication
2. Let us C : Kanetkar Y
3. Books published by M.P. Hindi Granth Academy, Bhopal.

Reference Books:

1. The C Programming Language : B.W. Kernighan & D.M Ritchie
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1. https://www.programiz.com/c-programming/c-if-else-statement
2. https://javatutoring.com/control-statements-in-c/
3. https://www.programiz.com/c-programming/c-arrays
4. https://www.tutorialspoint.com/cprogramming/c_structures.ht
5. https://beginnersbook.com/2014/01/c-functions-examples/
6. https://www.javatpoint.com/data-types-in-c
7. http://www.mphindigranthacademy.org/

Suggested Equivalent Online Courses:

1. https://nptel.ac.in/courses/106/105/106105151/
2. https://nptel.ac.in/courses/106/106/106106133/

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Part D- Assessment and Evaluation	
Suggested Continuous Evaluation methods:	
Internal Assessment/Formative Examination(A):	**40 Marks**
Lab Record	15 Marks
Attendance in the Lab	05 Marks
Assignments (It can be in different modes)	20 Marks
End Semester External Evaluation (B):	**60 Marks**
Viva Voce on Practical	10 Marks
Practical Record File	10 Marks
Experiments	40 Marks
Total Marks (A+B)	**(40 + 60 =100 Marks)**

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