

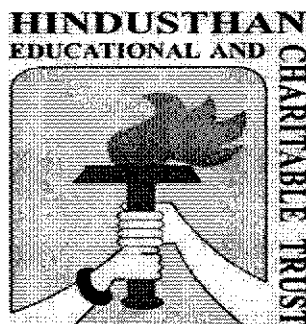
**LEARNING OUTCOMES–BASED CURRICULUM  
FRAMEWORK (LOCF)**

in the

**UNDER GRADUATE PROGRAMME**

**BACHELOR OF SCIENCE IN  
INFORMATION TECHNOLOGY**

**FOR THE STUDENTS ADMITTED FROM THE  
ACADEMIC YEAR 2022 - 2023 AND ONWARDS**



**HICAS**

**HINDUSTHAN COLLEGE OF ARTS & SCIENCE (AUTONOMOUS)**

**(Affiliated to Bharathiar University and Accredited by NAAC)**

**COIMBATORE-641028**

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## **PREAMBLE**

Learning Outcome Based Curriculum Framework for Undergraduate education in Bachelor of Science in Information Technology

The intent of this programme is to produce graduates who are able to have higher-level thinking and creativity through Information and Communication Technology.

## **VISION**

To become a globally recognized centre of excellence in the field of Information Technology and providing technology excellence that advances learning, teaching, research to produce budding IT professionals, researchers, innovators and entrepreneurs.

## **MISSION**

To provide quality and competency-based education and research activities through necessary infrastructure.

To enable the students to be competitive in the field of Information technology and update the younger generation to congregate the challenges ahead with confidence.

## **PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

**Under Graduates of B.Sc. Information Technology program will,**

**PEO1** - Apply the knowledge of mathematics, science and computing in the core Information Technology.

**PEO2** - Initiate life-long learning to acquire new technologies and adapt to the changing needs of IT industry.

**PEO3** - Enable students to develop communication, teamwork and leadership skills necessary to build their career.

**PEO4**- Able to adapt innovative practices and contribute towards research and technological development in the field of Information Technology through Total Quality Education

**PEO5** - Exhibit professional excellence, ethics, soft skills, leadership qualities as a responsible citizen with societal interest.

## **PROGRAM OUTCOMES (PO)**

- PO1** - Apply the knowledge of mathematics, science and electronic hardware to provide solutions for all kinds of problems in the respective domain.
- PO2** - Identify and analyze the complex and real world problems based on the knowledge acquired in the core field.
- PO3** - Design an innovative interface method to bring the complete solutions using statistical methods and visualize the results for decision making.
- PO4** - Apply the modern tools and technologies to formulate, design, implement and demonstrate a self-designed solution.
- PO5** - Apply the scientific knowledge and to provide innovative ideas to shape our society in a better way.
- PO6** - Identify and develop solutions to environmental related problems and to enhance the people's quality of life.
- PO7** - Understand the societal and ethical responsibilities of the professionals in their respective discipline.

## **PROGRAMME SPECIFIC OUTCOME (PSO)**

- PSO1:** Apply the knowledge of computing and mathematics appropriate to the discipline.
- PSO2:** Apply current techniques, skills, and tools necessary for computing practice and to integrate IT-based solutions into the user environment effectively.
- PSO3:** Use design and development principles in the construction of software systems of varying complexity.
- PSO4:** An ability to use knowledge in various domains to identify real world problems and hence to provide solution to new ideas and innovations.
- PSO5:** Design, document and develop robust applications by considering human, financial and environmental factors using cutting edge technologies to address individual and organizational needs.

**HINDUSTHAN COLLEGE OF ARTS & SCIENCE (AUTONOMOUS),**

**COIMBATORE-641028**

**SCHEME OF EXAMINATIONS - CBCS & LOCF PATTERN**

*(For the Students admitted from the Academic year 2022-2023 and Onwards)*

**UG PROGRAMME**

**Programme: B.Sc.**

**Branch: INFORMATION TECHNOLOGY**

Part	Course Code	Course Type	Course Title	Credit points	Lecture Hours/ Week		Exam Duration (hours)	MAX. MARKS		
					Theory	Practical		I.E.	E.E	Total
<b>Semester - I</b>										
I	22LAT01/ 22LAH01/ 22LAM01/ 22LAF01	MIL	Tamil-I/ Hindi-I/ Malayalam – I/ French-I	4	6		3	50	50	100
II	22ENG01	AECC	English – I	4	6		3	50	50	100
III	22ITU01	DSC	<b>Core-I- Programming with C</b>	4	4		3	50	50	100
III	22ITU02	DSC	<b>Core –II - Digital Fundamentals and Architecture</b>	4	4		3	50	50	100
III	22ITU03	DSC	<b>Core –III - Practical – I : Programming Using C</b>	2		4	3	50	50	100
III	22ITU04	GE	<b>Allied-I Mathematics for Computing</b>	4	5		3	50	50	100
IV	22ITUE01	AEE	Open Elective – I	2	3		3	100	-	100
IV	22GSU01	AECC	<b>Skill Based Subject Environmental Studies</b>	1	2		2	50		50
IV	22ITUV01	SEC	VAC – I / Life Skills-I @ / Communicative English	1*	2		2	50	-	50**
IV	-	SEC	<b>SDR – Student Development Report</b>	Assessment will be in the Fifth Semester						
V	-	AECC	Extension Activities NSS/NCC/SPORTS/YRC/SIS/SA	Assessment will be in the Fourth Semester						
<b>Total</b>				<b>25</b>	<b>32</b>	<b>4</b>		<b>450</b>	<b>300</b>	<b>750</b>
<b>Semester - II</b>										
I	22LAT02/ 22LAH02/ 22LAM02/ 22LAF02	MIL	Tamil-II/ Hindi-II/ Malayalam-II/ French-II	4	6		3	50	50	100
II	22ENG02	AECC	English – II	4	6		3	50	50	100
III	22ITU05	DSC	<b>Core –IV - Programming with PYTHON</b>	4	4		3	50	50	100
III	22ITU06	DSC	<b>Core -V - Data Structures and Algorithms</b>	4	4		3	50	50	100

III	22ITU07	DSC	Core -VI – Software Engineering	3	3		3	50	50	100
III	22ITU08	DSC	Core -VII - Practical – II : Data Structures using PYTHON	2		4	3	50	50	100
III	22ITU09	GE	Allied-II Numerical Methods	4	5		3	50	50	100
III	22ITU10	SEC	Internship / Industrial Visit / Mini Project	1	-	-		100		100
IV	22ITUV02	SEC	VAC – II/ Life Skills-II @ / Language	1*	2		2	50	-	50**
IV	22ITUJ01	SEC	Aptitude / Placement Training	Grade*	2		2	50		50**
<b>Total</b>				<b>26</b>	<b>32</b>	<b>4</b>		<b>450</b>	<b>350</b>	<b>800</b>
<b>Semester – III</b>										
III	22ITU11	DSC	Core -VIII - Programming with JAVA	5	5		3	50	50	100
III	22ITU12	DSC	Core – IX - Operating System in Practice	5	5		3	50	50	100
III	22ITU13	DSC	Core – X – PC Architecture	3	3		3	50	50	100
III	22ITU14	DSC	Core-XI - Practical – III: Programming using JAVA	3		5	3	50	50	100
III	22ITU15	DSC	Core -XII - Practical – IV : Mobile Application Development	3		5	3	50	50	100
III	22ITU16	GE	Allied-III Operation Research	4	5		3	50	50	100
IV	22ITUE02	AEE	Open Elective-II	2	3		3	100		100
IV	22GSU02	AECC	<u>Skill Based Subject</u> Human Rights	1	2		2	50		50
IV	22ITUJ02	SEC	Aptitude / Placement Training	Grade*	2		2	50		50**
IV	22ITUJ03	SEC	Online Course	-	1			-	-	C/NC <sup>†</sup>
<b>Total</b>				<b>26</b>	<b>26</b>	<b>10</b>		<b>450</b>	<b>300</b>	<b>750</b>
<b>Semester – IV</b>										
III	22ITU17	DSC	Core –XIII - Relational Database Management System	5	5		3	50	50	100
III	22ITU18	DSC	Core-XIV - Network Security and Cryptography)	4	4		3	50	50	100
III	22ITU19T	DSC	Core -XV - Web Based Office Applications ##	2	2		3	25	25	50
	Theory									100
	22ITU19P		Practical –V: Web Based Office Applications	2		3		50	-	50
III	22ITU20	DSC	Core-XVI - Practical –VI - RDBMS Applications	2		4	3	50	50	100

III	22ITU21	DSC	<b>Core -XVII - Practical – VII - Network Security and Cryptography</b>	2		3	3	50	50	100
III	22ITU22	GE	<b>Allied-IV Business Accounting</b>	4	5		3	50	50	100
III	22ITU23	DSE	<b>Electives / DSE-I</b>	3	3		3	50	50	100
III	22ITU24	SEC	<b>Internship / Institutional Training / Mini-Project</b>	1	-		-	100	-	100
IV	22ITUV03	ACC	<b>VAC-III</b>	1*	2		2	50	-	50**
IV	22ITUJ04	SEC	<b>Aptitude / Placement Training</b>	Grade*	2		2	50		50**
IV	22ITUJ05	SEC	<b>Online Course</b>		1		-	-	-	C/NC <sup>‡</sup>
IV	22GSU03	AECC	<b>Skill Based Subject Internet Security</b>	1	2		2	50	-	50
V	22GSU04	AECC	<b>Extension Activities NSS/NCC/SPORTS/YRC/SIS/SA#</b>	2	-		-		-	C/NC <sup>‡</sup>
<b>Total</b>				<b>28</b>	<b>26</b>	<b>10</b>		<b>500</b>	<b>350</b>	<b>850</b>
<b>Semester V</b>										
III	22ITU25	DSC	<b>Core-XVIII - .NET Programming</b>	5	5		3	50	50	100
III	22ITU26	DSC	<b>Core –XIX - Computer Vision and Image Processing – Fundamentals and Applications</b>	4	4		3	50	50	100
III	22ITU27T	DSC	<b>Core -XX - Internet of Things ##</b>	2	2		3	25	25	50
	<b>Theory</b>									
	22ITU27P		<b>Practical VIII: Internet of Things ##</b>	3			3	50	-	50
III	22ITU28	DSC	<b>Core -XXI - Practical IX : Programming using .NET</b>	3			5	3	50	50
III	22ITU29	DSC	<b>Core –XXII - Practical – X : Computer Vision with OpenCV and PYTHON</b>	3			5	3	50	50
III	22ITU30	DSE	<b>Electives / DSE-II</b>	3	3		3	50	50	100
IV	22ITUE03	AEE	<b>Open Elective-III</b>	2	3		3	100	-	100
IV	22GSU05	AECC	<b>Skill Based Subject General Awareness</b>	1	1		2	50	-	50
IV	21GSU06	AECC	<b>Skill Based Subject Law of Ethics</b>	1	-		2	50	-	50
IV	22ITUV04	ACC	<b>VAC-IV</b>	1*	2		2	50	-	50**
IV	22ITUJ06	SEC	<b>Aptitude / Placement Training</b>	Grade*	2		2	50	-	50**
IV	22ITUJ07	SEC	<b>Online Course</b>	-	1		-	-	-	C/NC <sup>‡</sup>
IV	22ITUJ08	SEC	<b>SDR- Student Development Report</b>	2*	-		-	-	-	-
<b>Total</b>				<b>27</b>	<b>23</b>	<b>13</b>		<b>500</b>	<b>300</b>	<b>800</b>

Semester III										
III	22ITU31	DSE	Electives / DSE-III	4	5		3	50	50	100
III	22ITU32	DSE	Electives/DSE-IV	4	5		3	50	50	100
III	22ITU33	DSC	Core-XXIII Self-Study Course	3	-	-	3	50	50	100
III	22ITU34	SEC	Project Work /Student Research / Paper	5	5			50	50	100
<b>Total</b>				<b>16</b>	<b>15</b>			<b>200</b>	<b>200</b>	<b>400</b>
<b>Grand Total</b>										

- \*denotes Extra credits which are not added with total credits.
- \*\*denotes Extra marks which are not added with total marks.
- VAC-Value Added Course(Extra Credit Courses)
- \*Grades depends on the marks obtained
- † C-Completed/ NC- Not Completed

Range of Marks	Equivalent remarks
80 and above	Exemplary
70-79	Very good
60-69	Good
50-59	Fair
40-49	Satisfactory
Below 40	Not Satisfactory=Not completed

- Part IV& V not included in total marks and CGPA calculation.
- I.E-Internal Exam
- E.E-External Exam
- J-Job Oriented Course
- E- Open Elective Papers

## ABSTRACT FOR SCHEME OF EXAMINATION

(For the candidates admitted during the academic year 2021 - 2022 and onwards)

Part	Course	Papers	Credit	Total Credits	Marks	Total Marks
Part I	Languages/ (MIL)	2	4	8	100	200
Part II	English/AECC-I	2	4	8	100	200
Part III	Core /DSC	23	2/3/4/5	82	100	2300
	Allied /GE	4	4	16	100	400
	Electives/DSE	4	3/4	14	100	400
	Project SEC	1	5	5	100	100
	Internship/Institutional Training/Mini-Project (Summer Courses #)	2	1	2	100	200
Part IV	Open Electives /AEE	3	2	6	100	300
	AECC –EVS/ HR/IS/GA/LE	5	1	5	50	250
	Job Oriented Course / Value Added Course	2	1	2*	50	100**
	Skill Based/ Placement/Aptitude SEC	4	Grade	Grade	50	200**
	Online courses / SEC	3	C/NC	C/NC	-	-
	Life Skills / SEC	2	1	2*	50	100**
	SDR- Student Development Report	1	2	2*	-	-
Part V	Extension Activities NSS / NCC/Sports/YRC / SIS / SA - AECC	1	C/NC	2	-	-
	<b>Total</b>			<b>148+6*</b> <b>(* Extra Credits)</b>		<b>4350 +</b> <b>(400**)</b>



List of Elective Papers/ DSE (Can choose any one of the paper as electives)		
	Course Code	Title
Electives/ DSE-I	22ITU23A	Elective – I :Compiler Design
	22ITU23B	Elective – I :Distributed Computing
Electives/ DSE-II	22ITU30A	Elective – II :Business Intelligence
	22ITU30B	Elective – II :Mobile Computing
Electives/ DSE-III	22ITU31A	Elective – III :Big Data Analytics
	22ITU31B	Elective – III :M- Commerce
	22ITU31C	Elective – III :Social Media Mining
Electives/ DSE-IV	22ITU32A	Elective – IV :Cloud Computing
	22ITU32B	Elective – IV :Multimedia Techniques
	22ITU32C	Elective – IV :Principles of Geographic Information System

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### List of Papers

<b>Open Electives</b>	<p>Yoga for Human Excellence  Human Health &amp; Hygiene Indian  Culture and Heritage  Indian Constitution and Political System  Consumer Awareness and Protection  Professional Ethics and Human Values  Human Rights, Women's Rights &amp; Gender Equality  Disaster Management  Green Farming  Corporate Relations  start a Business?  Research Methodology and IPR  General Studies for Competitive Examinations  IIT JAM Examination (for Science only)  CUCET Examination</p>
<b>VAC Papers</b>	-
<b>Courses offered by the Departments to other Programmes</b>	<p>a) Digital Marketing  b) Network Reconnaissance  c) VM Ware  d) Animation and its Technique  e) Multimedia and its Applications  f) Network Administration and Trouble shooting  g) Project Management  h) Mongo DB  i) Block Chain Technology  j) E-Learning</p>

Regulations :

**UG - Scheme of Evaluation (Internal & External Components)**

(For the students admitted during the academic year 2022-2023 and onwards)

**1. Internal Marks for all UG**

Components	Marks
Test I	10
Test II	10
Model Exam	10
Assignment	5
Attendance*	5
Internal Assessment components **	10
<b>TOTAL</b>	<b>50</b>

**\*Split-up of Attendance Marks**

- \* 75-79 - 1 marks
- \* 80-84 - 2 marks
- \* 85-89 - 3 marks
- \* 90-94 - 4 marks
- \* 95-100 - 5 marks

**\*\* List of components for Internal Assessment (MCQ Compulsory)**

S.No	Components
1	Multiple choice questions
2	Club activities
3	Assignment
4	Seminar

(Any two components from the above list with five marks each will be calculated  
2x5=10 marks)

**2. a) Components for Practical I.E.**

Components	Marks
Test -I	15
Test -II	15
Observation	10
Application*	10
<b>Total</b>	<b>50</b>

**b) Components for Practical E.E.**

Components	Marks
Experiments/Exercise	40
Record	5
Viva	5
<b>Total</b>	<b>50</b>

**3. Institutional/ Industrial Training, Mini Project and Major Project Work**

Institutional /Industrial Training (I.E)		Mini Project (I.E)	Major Project Work		
Component	Marks	Marks	Component	Marks	Total Marks
Work diary	25	-	I.E: a)Attendance	20	50
Report	50	50	b)Review/Work diary*	30	
Viva-voce	25	50			
<b>Total</b>	<b>100</b>	<b>100</b>	E.E** a) Evaluation	30	50
			b)Viva-voce	20	
			<b>Total</b>	<b>100</b>	

\*Review is for Individual Project and Work Diary is for Group Projects  
(group consisting of minimum 3 and maximum 5)

\*\*Evaluation of report and conduct of viva voce will be done jointly by Internal and External Examiners

**4. Guidelines for Internet Security/Human Rights/ Law of Ethics/ Environmental Studies (Part IV)**

Components	Marks
Two Tests (each 2 hours) of 20 marks each [4 out of 7 descriptive type questions 4 x 5 = 20 Marks]	40
Two assignments (2 x 5)	10
<b>Total</b>	<b>50</b>

**5. Guidelines for General Awareness (Part IV)**

Components	Marks
Two Tests (each 2 hours) of 25 marks each [50 objective type questions 50 x 1/2 = 25 Marks]	50

**6. Guidelines for open Elective (Part IV)**

Components	Marks
Two Tests (each 2 hours) of 50 marks each [5 out of 8 descriptive type questions 5 x 10 = 50 Marks]	100

**7. Value Added Courses and Aptitude/Placement courses:**

Components	Marks
Two Test (each 1 hour) of 25 marks each QP is objective pattern (25x1=25)	50
<b>Total</b>	<b>50</b>

**Guidelines:**

1. The passing minimum for these items should be 40%
2. If the candidate fails to secure 40% passing minimum, he / she may have to reappear for the same in the subsequent Semesters
3. Item No's 4,5,6 and 7 are to be treated as 100% Internal papers.
4. For item No.7, Tests conducted through online modules (Google Form/any other)
5. Item No.2: \* - Application should be from the relevant practical subject other than the Listed programmes. It must be enclosed in the practical record.

**UG PATTERN**

**QUESTION PAPER PATTERN FOR CIA I and CIA II EXAM**

Reg.No: \_\_\_\_\_ Q.P.CODE: \_\_\_\_\_

**HINDUSTHAN COLLEGE OF ARTS & SCIENCE (AUTONOMOUS)**

**DEGREE CIA-I/CIA-II EXAMINATIONS -----20-----**

**(----- SEMESTER)**

**BRANCH: -----**

**SUBJECT NAME: -----**

**Time: Two Hours**

**Maximum:50 Marks**

**SECTION - A (6 x 1 = 6 Marks)**

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(Q.No: 1 to 6: Multiple choice/Fill up the blanks /True or False questions)

**SECTION - B (4x 6 = 24 marks)**

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(Q.No: 7 to 10 Either Or type)

**SECTION - C (2x10 = 20 marks)**

Answer any TWO Questions out of THREE Questions

ALL Questions Carry EQUAL Marks

(Q.No: 11 to 13)

**QUESTION PAPER PATTERN FOR MODEL/END SEMESTER EXAMINATION**

Reg.No: \_\_\_\_\_

Q.P.CODE: \_\_\_\_\_

**HINDUSTHAN COLLEGE OF ARTS & SCIENCE (AUTONOMOUS)**

**DEGREE MODEL EXAMINATIONS -----20-----**

**(-----SEMESTER)**

**BRANCH : -----**

**SUBJECT NAME:-----**

**Duration: Three Hours**

**Maximum: 70 Marks**

**SECTION - A (10x1=10 Marks)**

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(Q.No 1 to 10 Multiple choice/Fill up the blanks /True or False questions)

(Two questions from each unit)

**SECTION - B (5x6=30 Marks)**

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(Q.No 11 to 15 Either or type)

(One question from each Unit)

**SECTION- C (3x10=30 Marks)**

Answer any THREE Questions out of FIVE Questions

ALL Questions carry EQUAL Marks

(Q.No 16 to 20) (One question from each Unit)

## Blue Print of Question Paper for all UG Programmes

(For the academic year 2021-22, 2022-23)

### FOR CIA I CIA II - QUESTION PATTERN

Max. Marks: 50

Sec	Question No	Type	No of Question	Questions to be answered	Mark per question	K-level
A	1 to 6	MCQ/ True or False/ Fill up	6	6	1 (6x1=6)	All Questions will be K1
B	7 to 10	Either or Type (a or b)	8	4	6 (4x6=24)	4 Questions will be in K2 4 Questions will be in K3
C	11 to 13	Open choice	3	2	10 (2x10=20)	1 Question will be in K3 2 Question will be in K4

### FOR MODEL/ESE - QUESTION PATTERN

Max. Marks:70

Sec	Question No	Type	No of Question	Questions to be answered	Mark per question	K-level
A	1 to 10	MCQ/ True or False/ Fill up	10	10	1 (10x1=10)	All Questions will be K1
B	11 to 15	Either or Type (a or b)	10	5	6 (5x6=30)	6 Questions will be in K2 4 Questions will be in K3
C	16 to 20	Open choice	5	3	10 (3x10=30)	2 Question will be in K3 3 Question will be in K4

(For the academic year 2020-21)

### FOR CIA I CIA II - QUESTION PATTERN

Max. Marks:50

Sec	Question No	Type	No of Question	Questions to be answered	Mark per question	K-level
A	1 to 6	MCQ/ True or False/ Fill up	6	6	1 (6x1=6)	All Questions will be K1
B	7 to 10	Either or Type (a or b)	8	4	5 (4x5=20)	4 Questions will be in K2 4 Questions will be in K3
C	11 to 13	Either or Type (a or b)	6	3	8 (3x8=24)	3 Question will be in K3 3 Question will be in K4

### FOR MODEL/ESE - QUESTION PATTERN

Max. Marks:70

Sec	Question No	Type	No of Question	Questions to be answered	Mark per question	K-level
A	1 to 10	MCQ/ True or False/ Fill up	10	10	1 (10x1=10)	All Questions will be K1
B	11 to 15	Either or Type (a or b)	10	5	4 (5x4=20)	6 Questions will be in K2 4 Questions will be in K3
C	16 to 20	Either or Type (a or b)	10	5	8 (5x8=40)	5 Question will be in K3 5 Question will be in K4

**UG Programme Regulations for the academic year 2022-2023**

1. Internal marks components for the candidates admitted from the academic year 2022-2023 and onwards is as follows.

**For Theory courses**

Components	Marks
Test I	10
Test II	10
Model Exam	10
Assignment	5
Attendance	5
Internal Assessment components	10
<b>TOTAL</b>	<b>50</b>

**For Practical courses**

Components	Marks
Test -I	15
Test - II	15
Observation/Exercise	10
Application*	10
<b>TOTAL</b>	<b>50</b>

2. The pattern of the question paper for External Examination will be maximum of 70 marks for theory courses, the marks obtained will be converted into 50 as per the scheme.
3. Passing minimum for all UG programme is 40% in Internal and 40 % in External and the composition of total 40 marks out of 100 marks.
4. Internship / Institutional Training / Mini-Project is related to the discipline. The students can be permitted to complete the Internship / Institutional Training / Mini-Project before the end of First year (end of II semester) and before the end of the second year (end of IV semester) and submit a report.

Internship / Institutional Training	Duration: Not more than seven days
Mini project	During the course of study for not more than seven days.

5. Project work is considered as a special course involving application of knowledge in problem solving/analyzing/exploring a real-life situation. A Project work may be given in lieu of a discipline specific elective paper. Distribution of marks for major project for all UG programme will be 50:50 pattern for both Internal and External in total of 100/200 marks.
6. Two tests for fully internal subjects should be conducted during CIA-I and CIA -II by the department.
7. Retest for the failure candidates in CIA I or CIA II or Part IV or Part V or Extra credit courses should be conducted during the model examination after getting approval from the COE office. The candidates who are not able to complete the minimum pass mark in internal components even getting chance of reappearance, will be treated as arrear candidates.
8. For the Theory cum Practical blended courses, 50:50 Internal and External pattern will be followed for theory examination and Fully internal pattern will be followed for Practical examination. For theory part, External examination will be conducted as regular pattern (max of 70 marks) and it will be converted into 25 marks.

Course	Internal Marks		External marks		Total marks (Max. marks 50)	
	Min.	Max.	Min.	Max.	Min.	Max.
Theory	10	25	10	25	20	50
Practical	20	50	-		20	50

For Practical components for Theory cum Practical courses (Fully Internal)

Components	Marks
Test I	10
Test II	10
Experiment/Excercise	20
Record	5
Viva	5
Total	50

The Internal mark 50 will be converted into 25.

9. For the candidates admitted under the Fast Track System (FTS) must register their names to their concerned department heads and get approval from the COE office at the beginning of the III semester.
10. Students who are not willing to select the Project/Research work in Semester VI, can chose the theory papers offered by their departments as per the prescribed theory pattern.
11. Self Study will be a Core Paper of the department for which the examination pattern will be as like part III courses is followed.
12. NSS /NCC/Sports/YRC / SIS / SA is mandatory for all students as per New Education Policy and the students must attend the allocated hours within two years and complete the programme. They will be evaluated during the end of second year (Fourth Semester) and also a certificate will be issued.
13. SDR – Student Development Report to be received by the department from the students till end of the fifth semester. (Evidences of Curricular activities and Co-curricular activities)
14. For online courses minimum of 2 certificates in any of the online platform is mandatory.
15. Open elective courses:

Departments can offer list of subjects which teaches moral ethics to the young community for the better future. The topics relevant to Indian ethics, Culture, Women rights, Yoga, Green farming, Indian constitution etc., as an open elective courses. These courses can be offered by the department or other department as inter department courses. Marks earned for this courses will not be included for CGPA calculations.

#### Extension Activities

NSS – National Service Scheme, as enrolled member with the College Unit.

NCC – National Credit Corps, as enrolled member with the College Unit.

SPORTS – Sports & Games Participation with College Team

YRC/RRC–Youth Red Cross / Red Ribbon Club, as enrolled member with the College Unit.

Rotaract Club - Rotaract Club, as enrolled member with the College Unit.

SIS – Special Interest Subjects, as approved by the Academic Council

SA – Social Activity for not less than 50 hours with NGGO like Aram Foundation / Shanhi Social Service /Siruthuli /Kulangal Pathukappu Amaipu /Old age Home / Nature Foundation / etc.



### Regulations of Fast Track System (FTS)

- From the academic year 2021-22, our college is offering Fast Track System (FTS) for all UG and PG programmes. In this system, we are offering two courses under the course type of Discipline Specific Elective (DSE) in the sixth semester for all UG programmes and fourth semester for all PG programmes, which are equivalent and related with National Programme on Technology Enhanced Learning/Study Webs of Active-Learning for Young Aspiring Minds (NPTEL/SWAYAM) courses.
- The students have the option of taking two subjects of the sixth semester of their programme through NPTEL/SWAYAM portal from the list given by NPTEL and can complete the online course before fifth semester and submit the received original certificates to the COE office for getting approval. If the student completes these courses before the beginning of the sixth semester (UG)/fourth semester (PG), the candidate can be considered and exempted to write the examination from the assigned DSE courses in the sixth semester/fourth semester. They should complete only the self study course and project work during the VI/IV semester as assigned in the scheme. The candidate who completes the online courses and submits the successful course completion credentials, the credit transfer will be considered as per our Scheme of Examination for qualifying the degree. The minimum duration of the registered online course must be 12 weeks. Course duration of less than 12 weeks will not be considered.
- For all PG programmes, the candidates who were admitted during the academic year 2021-2022 under the Fast track system, for the self study course, the internal mark component will be as follows. For others regular internal pattern follows.

TEST	Max. Marks	Mode
CIA I	50 (50x1=50)	Online objective type
Model Exam.	50 (50x1=50)	Online objective type

Out of these two tests, the total marks will be converted into 40 marks as Internal.

- For all UG programmes, the candidates who were admitted during the academic year 2021-2022 under the Fast track system, for the self study course, the internal mark component will be as follows. For others regular internal pattern follows.

TEST	Max. Marks	Mode
CIA I	50 (50x1=50)	Online objective type
CIA II	50 (50x1=50)	Online objective type
Model Exam.	50 (50x1=50)	Online objective type

Out of three tests, the total mark will be converted into 30 marks as Internal.

- For the students admitted in Fast Track System, must enroll their names to the concerned department heads and get approval from the COE office at the beginning of III semester for all UG Programmes and at the beginning of II semester for all PG programmes.
- The students who cleared and got certified for online courses under the fast track system, the grade obtained will be converted into average marks of range. The received certificates must be submitted to the COE office for approval of the Controller and the Principal. The FTS courses will be treated as fully external.

DEPARTMENT OF INFORMATION TECHNOLOGY				CLASS: I B.Sc IT				
Sem	Course Type	Course Code	Course Title	Credits	Contact Hours / Week	CIA	Ext	Total
I	DSC	22ITU01	Programming with C	4	4	50	50	100

Nature of Course		
Knowledge and Skill Oriented	Employability Oriented	
	Entrepreneurship Oriented	
	Skill Development	✓

Course Objectives
<ul style="list-style-type: none"> <li>• The course is oriented to those who want to advance structured and procedural programming</li> <li>• Understanding and improving C programming skills.</li> <li>• The major objective is to provide students with an understanding of code organization and functional hierarchical decomposition by using complex data types.</li> <li>• Students will be able to develop logics that will help them to create programs, and applications in C.</li> <li>• To practice the fundamental programming methodology via lab program experiences.</li> </ul>

Unit	Course Contents	Hours	K Level
I	Overview of C: History of C – Importance of C – Basic Structure of C – Programming style. Introduction to C: Introduction –Writing the first C Program –File used in C Program –Compiling and Executing C Programs –Using Comments –Keywords –Identifiers – Data Types –Variables – Constants –I/O operations –Operators and Expressions - Programming Examples.	10	Up to K4
II	Decision Control and Looping Statements: Introduction to Decision Control Statements –Conditional Branching Statements –Looping Statements –Nested Loops –Jumps in loops – Goto Statement. Functions: Introduction –using functions –Function declaration –Function definition –Function call –Return statement –Categories of Functions–Recursive function-String function.	10	Up to K4
III	Arrays: Introduction –One dimensional- Declaration of Arrays –Two dimensional –Multi dimensional –Dynamic arrays – Character arrays and Strings. Pointers: Understanding pointers– Declaring Pointer Variables –Initialization of pointer variables - Accessing a variable through its pointer - Pointer Expressions – Pointers and Arrays- Array of Pointers-Pointers to Functions.	10	Up to K4
IV	Structure and Union: Introduction- Defining a Structures- Declaring Structure Variables-Accessing Structure members- Initialization-Array of structures- Arrays within structures- Structure within structures-Unions. Files: Introduction to Files – Defining and opening a file-Closing a file-I/O operation on files- Random access to files-Command line arguments.	9	Up to K4

V	Dynamic Memory Allocation and Linked List: Introduction-Allocating a block of memory-Multiple blocks of memory-Altering the size of block-Concept of linked list-Advantage-Types-Pointers revisited-Creating linked list-Inserting-Deleting-Application of linked list.	9	Up to K4
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**Note: The Questions should be asked in the ratio of 20% Program and 80 % for Theory**

**Book for Study**

E.Balagurusamy, "Computing Fundamentals and C Programming", TMH 7th reprint 2011

**Books for Reference**

1. E.Balaguruswami, " Programming in ANSI C", TMH 21st reprint 1998
2. Y.Kanetkar, "Let us C", BPB Publications, 15th Edition 2017 revised.
3. Brian W Kwenighan, Dennis M.Ritchie, "The C Programming Language", Prentice-Hall Software Series 2nd Edition
4. K N King, " C Programming A modern Approach", Second Edition.
5. Ashok N. Kamathane, "Computer Programming", IITL Education Solutions Limited

**Web Resources**

1. <https://www.tutorialspoint.com/cprogramming/index.html>
2. <https://www.geeksforgeeks.org/c-language-set-1-introduction/>

**Pedagogy:** Chalk & Talk, Exercise, Assignments & PPTs.

The rationale for Nature of the Course: Can be professionals in programming and logical solving skills.

**Activities to be given**

1. Logical thinking for complex problems.
2. Prepare concept-wise programs to develop programming skills.
3. Preparing the students for technical Exercises and programs to attend and clear interview rounds.

**Course Learning Outcomes**

CLOs	On Completion of the Course, the students should be able to	K - Level
CLO1	Illustrate and Experiment the fundamental concept of C	Up to K4
CLO2	Select the suitable loops and decision making statements to solve problems	Up to K4
CLO3	Analyze the concepts of arrays and string handling function	Up to K4
CLO4	Differentiate structures and unions	Up to K4
CLO5	Explain the concepts of Pointers and Files	Up to K4

**Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)**

CLOs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7
CLO 1	3	2	2	2	3	3	3
CLO 2	3	2	2	2	3	3	2
CLO 3	3	2	2	2	3	3	3
CLO 4	3	2	2	2	3	3	3
CLO 5	3	2	2	2	3	3	2

3 – Advance Application    2 – Intermediate Level    1 – Basic Level

Course Designed by	Verified by HOD	Approved by CDC Co-coordinator
Mr.Karthi M	Dr.V.Saravanan	

DEPARTMENT OF INFORMATION TECHNOLOGY				CLASS: I BSC IT				
Sem	Course Type	Course Code	Course Title	Credits	Contact Hours / Week	CIA	Ext	Total
I	DSC	22ITU02	Digital Fundamentals And Architecture	4	4	50	50	100

Nature of Course		
Knowledge and Skill Oriented	Employability Oriented	
	Entrepreneurship Oriented	
	Skill Development	✓

Course Objectives			
<ol style="list-style-type: none"> <li>To inculcate knowledge on different number systems and codes.</li> <li>To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.</li> <li>To understand, analyze and design various combinational and sequential circuits.</li> <li>To learn the different ways of Communication with I/O devices.</li> <li>To explain the function of each element of a memory hierarchy.</li> </ol>			
Unit	Course Contents	Hours	K Level
I	<b>Number System and codes:</b> Introduction - Number System - Floating Point Representation of Numbers - Arithmetic Operation - 1's and 2's Complements: 1's Complement Subtraction - 2's Complement Subtraction. 9's Complement - 10's Complement - BCD.	9	Up to K4
II	<b>Boolean algebra, Minimization Techniques and Logic Gates:</b> Introduction - Boolean Logic Operations -Basic Law of Boolean algebra – Demorgan's Theorems - Sum of Products and Product of Sums - Karnaugh Map. Logic Gates: OR Gate - AND Gate - NOT Gate - NAND Gate - NOR Gate.	10	Up to K4
III	<b>Arithmetic Circuits and Flip Flops:</b> Introduction - Half Adder - Full Adder, Half Subtractor - Full Subtractor - Multiplexers - Demultiplexers - Decoders. Flip Flops: Types of Flip Flops - S-R Flip Flop - JK Flip Flop - T Flip Flop. Registers: Shift registers.	10	Up to K4
IV	<b>Input -Output Organization:</b> Input-Output Interface - Asynchronous Data Transfer - Priority Interrupt: Daisy-Chaining Priority, Parallel Priority Interrupt. Direct Memory Access - Input - Output Processor: CPU-IOP Communication.	10	Up to K4
V	<b>Memory Organization:</b> Memory Hierarchy-Main Memory - Associative Memory - Cache Memory - Virtual Memory: Address Space and Memory Space- Address mapping using Pages- Associative memory- Page Table. <b>Self-Study :</b> Intel 8086 Microprocessor	9	Up to K4

**Note: The Questions should be asked in the ratio of 10% Problem and 90 % for Theory**

**Book for Study**

1. Salivahanan S and Arivazhagan S, "Digital Circuits and Design", Vikas Publishing House Pvt Ltd, Third Edition. (UNIT - I, II, III)
2. Morris Mano M, "Computer System Architecture", PHI.(UNIT - IV,V) Third Edition

**Books for Reference**

1. BadriRam, "Advanced Microprocessors and Interfacing", TMH.2012
2. M. Carter, "Computer Architecture", Schaum's outline series, TMH. Special Indian Edition.
3. V K Puri, "Digital Electronics: circuits and systems", Tata McGraw Hill
4. V Rajaraman, T Radhakrishnan, "An Introduction to Digital Computer Design", Prentice Hall, Fourth Edition
5. M Morris Mano, "Digital Logic & Computer Design" Pearson Education, 2012

**Web Resources**

1. <https://www.javatpoint.com/computer-organization-and-architecture-tutorial>
2. [https://www.tutorialspoint.com/computer\\_logical\\_organization/index.htm](https://www.tutorialspoint.com/computer_logical_organization/index.htm)

**Pedagogy :** Chalk & Talk, Exercise, Assignments & PPTs.

**Rationale for Nature of the Course:** Used for the transmission of power to an electronic device and also to perform different operations based on the input which is given to the electronic circuit

**Activities to be given**

1. Prepare simple circuit for software development activities
2. Assignment on innovative design models using logic gates
3. Case study is given to develop a small electronic model related to real time applications

**Course Learning Outcomes**

<b>CLOs</b>	<b>On Completion of the Course, the students should be able to</b>	<b>K - Level</b>
CLO1	Analyze and apply different number systems and codes.	Up to K4
CLO2	Explain the logic circuits and basic computer organization.	Up to K4
CLO3	Infer, analyze and design various combinational and sequential circuits	Up to K4
CLO4	Identify and analyze the various Functional units, CPU, Input/ Output and Memory organization and explain their components.	Up to K4
CLO5	Distinguish the organization of various parts of a system memory hierarchy.	Up to K4

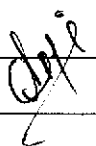
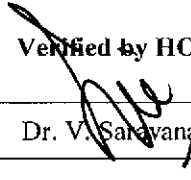
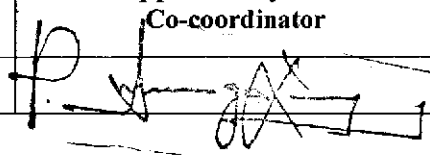
### Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

CLOs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7
CLO 1	1	3	2	3	2	3	3
CLO 2	3	2	3	2	3	3	3
CLO 3	1	2	2	2	2	3	2
CLO 4	2	3	3	3	3	3	1
CLO 5	3	1	2	1	2	3	3

3 – Advance Application

2 – Intermediate Level

1 – Basic Level

<b>Course Designed by</b>	<b>Verified by HOD</b>	<b>Approved by CDC Co-coordinator</b>
Ms. Arulmozhi S 	Dr. V. Saravanan 	

  
 Faculty of Science,  
 Department of Science,  
 ...

DEPARTMENT OF INFORMATION TECHNOLOGY				CLASS: I B.Sc IT				
Sem	Course Type	Course Code	Course Title	Credits	Contact Hours / Week	CIA	Ext	Total
I	DSC	22ITU03	<b>Practical I : Programming Using C</b>	2	4	50	50	100

Nature of Course		
Knowledge and Skill Oriented	Employability Oriented	
	Entrepreneurship Oriented	
	Skill Development	✓

Course Objectives
<ul style="list-style-type: none"> <li>• The course is oriented to those who want to advance structured and procedural programming</li> <li>• Understanding and improving C programming skills.</li> <li>• The major objective is to provide students with an understanding of code organization and functional hierarchical decomposition by using complex data types</li> <li>• Students will be able to develop logics that will help them to create programs and applications in C.</li> <li>• To practice the fundamental programming methodology via lab program experiences.</li> </ul>

22ITU03	PRACTICAL I: Programming Using C	Hours	K-Level
1	Program to develop a Simple Calculator using a switch case.	4	K4
2	Program for Nested loop.	4	K4
3	Program to sort numbers in ascending and descending order using Arrays.	4	K4
4	Program to accept two numbers from user and swap the values using call by reference method	4	K4
5	Program to find the Prime numbers between two integers using functions	4	K4
6	Program to Multiply two Matrices by Passing Matrix to a Function	4	K4
7	Program to generating Fibonacci Numbers using recursive functions	4	K4
8	Program for String manipulations without using string functions (string length, string comparison, string copy) (Using function pointers).	4	K4
9	Program using Function Pointers.	4	K4
10	Program to Find Largest Number Using Dynamic Memory Allocation	4	K4
11	Program to read and write a file line by line.	4	K4
12	Program to know the working of linked list.	4	K4



Note: The Questions should be asked in the ratio of 100% Program

Activities to be given

1. Logical thinking for complex programs
2. Prepare concept-wise programs to develop programming skills.
3. Preparing the students for technical Exercises and programs to attend and clear interview rounds.
4. To create and understand the programming concepts and methods used to develop a program.

Course Learning Outcomes

CLOs	On Completion of the Course, the students should be able to	K - Level
CLO1	Illustrate the fundamentals of C programming	K4
CLO2	Select the suitable loops and decision making statements to solve problems	K4
CLO3	Analyze the concepts of arrays and string handling function	K4
CLO4	Differentiate structures and unions	K4
CLO5	Experiment the concepts of Pointers, Files, command line, and linked list	K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

CLOs	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO7
CLO 1	3	3	2	2	3	3	3
CLO 2	3	3	2	2	3	3	2
CLO 3	3	3	2	2	3	3	3
CLO 4	3	3	2	2	3	3	3
CLO 5	3	3	2	2	3	3	2

3 – Advance Application

2 – Intermediate Level

1 – Basic Level

Course Designed by	Verified by HQD	Approved by CDC Co-coordinator
Mr.Karthi M	Dr. V. Saravanan	

Curriculum Development Cell  
Arts & Sciences  
COE/BAV/2011/028

DEPARTMENT OF  
INFORMATION TECHNOLOGY

CLASS: I B.SC IT

Sem	Course Type	Course Code	Course Title	Credits	Contact Hours / Week	CIA	Ext	Total
II	DSC	22ITU05	Programming with PYTHON	4	4	50	50	100

Nature of Course

Knowledge and Skill Oriented	Employability Oriented	✓
	Entrepreneurship Oriented	
	Skill Development	✓

Course Objectives

- To describe the core syntax and semantics of Python programming language.
- To discover the need for working with the strings and functions.
- To illustrate the process of structuring the data using lists, dictionaries, tuples and sets.
- To indicate the use of regular expressions and built-in functions to navigate the file system.
- To understand how to load data from CSV files and identify the data frame shape.

Unit	Course Contents	Hours	K Level
I	<b>Introduction to Python:</b> Python overview– Comments – Python identifiers – Reserved keywords – Variables – Standard data types – Operators –Statements and Expressions. Control Statements: The for loop – While statement – if elif else statement – Input from keyboard.	9	Up to K4
II	<b>Functions and Strings:</b> Functions: Introduction – Built-in functions – Type conversion – Type coercion – Date and time – dir() function – help() function – User defined functions – Parameters & arguments – Function calls – The return statement –Python recursive function. Strings: Compound data type – len() function – String slices – String traversal – Escape characters – String formatting operator – String formatting functions.	10	Up to K4
III	<b>Lists, Tuples and Dictionaries:</b> Lists – Values and accessing elements – Traversing a list – Deleting elements from list – Built-in list operators – Built-in list methods. Tuples – Creating tuples – Accessing values in tuples – Tuple assignment –Tuples as return values – Basic tuple operations – Built-in tuple functions. Dictionaries – Creating a dictionary – Accessing, Updating, Deleting elements from dictionary – Operations in dictionary – Built-in dictionary methods.	10	Up to K4
IV	<b>The NumPy Library:</b> NumPy : A Little History - The NumPy Installation - Ndarray: The Heart of the Library - Basic Operations - Indexing, Slicing and Iterating - Conditions and Boolean Arrays - Shape Manipulation - Array Manipulation - Structured Arrays - Reading and Writing Array Data on Files.	9	Up to K4
V	<b>Pandas:</b> The Python Data Analysis Library: Installation- Getting Started with pandas - Pandas Data Structures - Other Functionalities on Indexes - Operations between Data Structures - Function Application and Mapping - Sorting and Ranking - "Not a Number" Data.Pandas: Reading and Writing Data: CSV and Textual Files - Reading Data in CSV or Text Files - Reading and Writing HTML Files.	10	Up to K4

**Note: The Questions should be asked in the ratio of 20% Program and 80 % for Theory**

**Book for Study**

1. E. Balagurusamy, Introduction to Computing and Problem Solving Using Python, McGrawHill publication, 2016,. UNIT 1,2 and 3
2. Fabio Nelli , Python Data Analytics , Apress, 1st Edition, 2015. UNIT 4 and 5

**Books for Reference**

1. Guido van Rossum and Fred L. Drake Jr, —An Introduction to Python – Revised and updated for Python  
Network Theory Ltd., 2011.
2. Zed A. Shaw, Learn Python 3 the Hard Way: A Very Simple Introduction to the Terrifyingly Beautiful World of Computers and Code, Zed Shaw's Hard Way Series, Pearson Addison - Wesley
3. John M Zelle - Python Programming: An Introduction to Computer Science- Franklin Beedle, Third Edition
4. Python: The Complete Reference, Martin C. Brown, Mc-GrawHill Education Publications, 2018, 3rd Edition
5. Python programming : A Modular Approach, SheetalTaneja& Naveen Kumar, Pearson Publication, 1st Edition, 2017.

**Web Resources**

1. <https://greenteapress.com/thinkpython2/thinkpython2.pdf>
2. <https://www.softwaretestinghelp.com/python/>
3. <https://docs.python.org/3/tutorial/>

**Pedagogy :**Chalk& Talk, Exercise, Assignments & PPTs.

**Rationale for Nature of the Course:**

- Can be professionals in solving advanced problems to pursue higher studies.

**Activities to be given:**

- Preparing the students to appear professional courses by giving Advanced Exercise and workout on relevant topics.
- Assignments on developing UI based applications.

**Course Learning Outcomes**

CLOs	On Completion of the Course, the students should be able to	K - Level
CLO1	Explain the fundamental Python syntax and semantics and be fluent in the use of Python	Up to K4
CLO2	Distinguish the proficiency in the handling of arrays, strings and functions.	Up to K4
CLO3	Illustrate and experiment the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.	Up to K4
CLO4	Experiment to Read and write data from/to files in Python Programs	Up to K4
CLO5	Understand and experiment a multitude of data operations in Python's popular library	Up to K4

### Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

CLOs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7
CLO 1	3	2	2	1	2	1	3
CLO 2	2	2	1	2	1	2	2
CLO 3	3	2	3	3	3	1	3
CLO 4	3	3	2	3	2	2	3
CLO 5	3	3	3	2	3	3	2

3 – Advance Application

2 – Intermediate Level

1 – Basic Level

Course Designed by	Verified by HOD	Approved by CDC Co-coordinator
Ms. Suganya R	Dr. V. Saravanan	

Co-ordinator  
Curriculum Development Cell  
Hindusthan College of Arts & Science,  
Coimbatore-641 021.

DEPARTMENT OF INFORMATION TECHNOLOGY				CLASS: I B.Sc IT				
Sem	Course Type	Course Code	Course Title	Credits	Contact Hours / Week	CIA	Ext	Total
II	DSC	22ITU06	Data Structures and Algorithms	4	4	50	50	100

Nature of Course		
Knowledge and Skill Oriented	Employability Oriented	
	Entrepreneurship Oriented	
	Skill Development	✓

### Course Objectives

- To impart the basic concepts of data structures and algorithms.
- To understand and remember algorithms and its analysis procedure.
- To inculcate knowledge on stacks, queues, lists, trees and graphs
- To learn concepts of searching and sorting techniques.
- To provide the knowledge hashing techniques

Unit	Course Contents	Hours	K Level
I	<b>Introduction to Algorithms:</b> What is an algorithm –Why the analysis of algorithm-Goal of the analysis of algorithm – How to compare algorithm- Algorithms Design Techniques: Classification-Classification by Implementation and design method.	10	Upto K4
II	Arrays - Stacks and Queues - Fundamentals. <b>Linked List:-</b> Singly Linked List - Doubly linked list –Circular Linked List- Polynomial addition.	10	Upto K4
III	<b>Trees:</b> Binary tree representations – Binary Tree Traversal – Threaded Binary Trees –Binary search trees. <b>Graphs:</b> - Applications of Graphs- Traversals, Connected Components.	10	Upto K4
IV	<b>Searching and Sorting:</b> Searching: Linear search, Binary search and Hashing. Algorithms and data structures for sorting: Insertion Sort, Bubble sort, Selection Sort, Merge sort, Quick Sort, Heap Sort, Shell Sort, Tree Sort-Radix Sort- Topological Sort-External Sorting.	10	Upto K4
V	<b>Hashing:</b> Components of Hashing-Hash tables -Hashing Functions- Collision Resolution Techniques.	8	Upto K4

**Note: The Questions should be asked in the ratio of 100 % Theory**

### Book for Study

1. Narasimha Karumanchi "Data Structures and algorithms made easy", 5<sup>th</sup> Edition, CareerMonk Publications, 2017

**Books for Reference**

1. Mark Allen Weiss, "Data Structure and Algorithm analysis", Pearson Education, Second Edition, Sixteenth Impression 2014.
2. Alfred V. Aho, John E. Hopcroft and Jeffry D. Ullman, Data Structures and Algorithms, Pearson Education, New Delhi, 2006.
3. E. Balagurusamy, "Data Structures Using C", Tata McGraw Hill, 2013.
4. Samanta.D, Classic Data Structure Prentice Hall of India Pvt Ltd 2007, 9th Edition
5. Seymour Lipchitz, Data Structures McGraw Hill Publications, 2014, 1st Edition

**Web Resources**

1. [https://www.tutorialspoint.com/data\\_structures\\_algorithms/index.html](https://www.tutorialspoint.com/data_structures_algorithms/index.html)
2. <https://www.javatpoint.com/data-structure-introduction>
3. <https://www.geeksforgeeks.org/data-structures/>

**Pedagogy:** Chalk & Talk, Exercise, Assignments & PPTs.

**Rationale for Nature of the Course:** Can be professionals in solving advanced problems to pursue higher studies.

**Activities to be given**

1. Seminar on Threaded Binary Trees
2. Seminar on Algorithms and data structures of sorting using PPT.

**Course Learning Outcomes**

CLOs	On Completion of the Course, the students should be able to	K – Level
CLO1	Examine Data Structures and Algorithms appropriately to solve a variety of computational problems.	Up to K4
CLO2	List the Linear and Non-Linear data structures like Stacks, Queues and, Linked List.	Up to K4
CLO3	Categorize Trees and Graph concepts.	Up to K4
CLO4	Classify the concept of searching and sorting techniques.	Up to K4
CLO5	Analyze the knowledge of Hashing and its techniques.	Up to K4


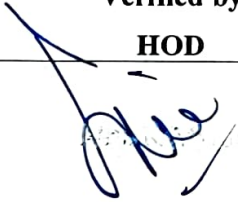
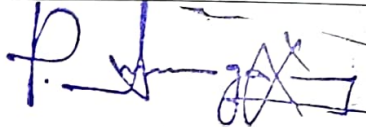
### Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

CLOs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CLO 1	3	2	2	2	2	1	1
CLO 2	2	1	1	1	2	2	2
CLO 3	2	1	2	2	2	1	3
CLO 4	2	1	2	1	2	1	1
CLO 5	1	2	2	3	3	1	3

3 – Advance Application

2 – Intermediate Level

1 – Basic Level

Course Designed by	Verified by HOD	Approved by CDC Co-ordinator
 Dr. T. Kavipriya		

Co-ordinator  
 Curriculum Development Cell  
 Hindusthan College of Arts & Sciences  
 Coimbatore-641 028.

DEPARTMENT OF INFORMATION TECHNOLOGY				CLASS: I BSC IT				
Sem	Course Type	Course Code	Course Title	Credits	Contact Hours / Week	CIA	Ext	Total
II	DSC	22ITU07	Software Engineering	3	3	50	50	100

Nature of Course		
Knowledge and Skill Oriented	Employability Oriented	✓
	Entrepreneurship Oriented	
	Skill Development	✓

- Course Objectives**
1. To inculcate in students different concepts of software engineering principles
  2. Understand the importance of software life cycle.
  3. Understand the various process models.
  4. Design and develop software by applying the software engineering principles.
  5. Implement developed software efficiently and effectively.

Unit	Course Contents	Hours	K Level
I	<b>INTRODUCTION AND AGILE DEVELOPMENT</b> Software Engineering-Software Process- Generic process model- Prescriptive process model-specialized, unified process- Agile Development-Agile Process- Extreme Programming- Other agile Process Models.	7	Up to K4
II	<b>REQUIREMENTS MODELING</b> Requirements Analysis-Scenario Based Modeling, UML Models-Data Modeling Concepts, Class Based Modeling, Requirements Modeling Strategies, Flow Oriented Modeling, Creating a Behavioral Model, Pattern for Requirement Modeling.	7	Up to K4
III	<b>SOFTWARE DESIGN CONCEPTS</b> Design Process, Design Concepts, Design Model, Architectural Design: Software Architecture, Component Level Design: Designing Class Based Components, Component Based Development, User Interface Design: The Golden Rules, Interface Analysis, Pattern Based Design: Design Patterns, Pattern Based Software Design, Design Process, Design Concepts, The Design Model, Architectural Design: Software Architecture, Component Level Design: Designing Class Based Components, Component- Based Development, User Interface Design: The Golden Rules, Interface Analysis, MobileAppDesign: Developing Mobile Apps, MobileApp Design, The Cloud.	8	Up to K4
IV	<b>QUALITY CONCEPTS AND TESTING</b> Software Quality-Testing: Strategic Approach to software Testing- Strategic Issues- Software Testing Strategies- Testing Conventional Applications-Software Quality- Achieving Software quality, Software Testing Strategies-A strategic Approach to Software Testing, System Testing, Testing Conventional Applications-White- Box Testing, Basis Path Testing, Black-Box Testing, Testing Mobile Apps-Testing	7	Up to K4



	Strategies.		
V	<b>RISK MANAGEMENT, MAINTENANCE AND REENGINEERING</b> Software Risks, Risk Identification, Risk Projection, Risk Refinement, Risk Mitigation, Monitoring, and Management. Maintenance and Reengineering: Software Maintenance- Software Supportability- Reengineering- Business Process Reengineering- Software Reengineering- Reverse Engineering- Restructuring- Forward Engineering- Economics of Reengineering.	7	Up to K4

**Note: The Questions should be asked in the ratio of 100 % Theory**

#### Book for Study

1. Roger S.Pressman," Software Engineering- A Practioner's Approach", EighthEdition,McGraw-Hill International Edition,2011.

#### Books for Reference

1. Ian Sommerville" **Software Engineering**" Pearson Ninth Edition ,2011.
2. Stephan Schach," **Software Engineering**", Tata McGraw Hill 2007.
3. Pfleeger and Lawrence,"**Software Engineering : Theory and Practice**", Pearson Education, Second Edition.
4. Waman S Jawadekar, "**Software Engineering-Principles & Practices**",McGraw-Hill International Edition,2012
5. Richard Fairley,"**Software Engineering Concepts**", McGraw-Hill International Edition,2010

#### Web Resources

1. <https://lecturenotes.in/notes/15479-note-for-software-engineering-se-by-sourav-mishra?reading=true>
2. [https://www.vssut.ac.in/lecture\\_notes/lecture1428551142.pdf](https://www.vssut.ac.in/lecture_notes/lecture1428551142.pdf)

**Pedagogy** :Chalk& Talk, Exercise, Assignments & PPTs.

**Rationale for Nature of the Course:** To develop reliable and efficient softwares. Software engineering is committed to delivering quality software.

#### Activities to be given

1. Prepare prototype models for software development activities
2. Assignmentoninnovative design models and process
3. Case study is given to develop a small model related to real time applications


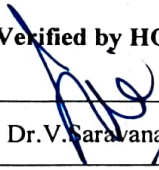
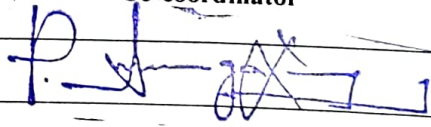
**Course Learning Outcomes**

CLOs	On Completion of the Course, the students should be able to	K - Level
CLO1	Analyze the given project in various phases of a lifecycle	Up to K4
CLO2	Estimate the appropriate process model depending on the user requirements.	Up to K4
CLO3	Correlate the various life cycle activities like Analysis, Design, Implementation, Testing and Maintenance.	Up to K4
CLO4	Organize the various processes used in all the phases of the product	Up to K4
CLO5	Categorize the knowledge, techniques and skills in the development of a software product.	Up to K4

**Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)**

CLOs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7
CLO 1	1	3	2	3	2	3	3
CLO 2	3	3	3	2	3	3	2
CLO 3	3	2	2	2	2	3	3
CLO 4	2	3	3	3	3	3	3
CLO 5	3	1	2	1	2	3	2

3 – Advance Application      2 – Intermediate Level      1 – Basic Level

<b>Course Designed by</b>	<b>Verified by HOD</b>	<b>Approved by CDC - Co-coordinator</b>
Ms.Arulmozhi S 	Dr. V. Saravanan 	

Co-ordinator  
Curriculum Development Cell  
Hindusthan College of Arts & Science,  
Coimbatore-641 028.

DEPARTMENT OF INFORMATION TECHNOLOGY				CLASS:I B.SC IT				
Sem	Course Type	Course Code	Course Title	Credits	Contact Hours / Week	CIA	Ext	Total
II	CORE	22ITU08	Data Structures using PYTHON	2	4	50	50	100

Nature of Course		
Knowledge and Skill Oriented	Employability Oriented	✓
	Entrepreneurship Oriented	
	Skill Development	✓

**Course Objectives(Only 5 objectives )**

- To impart the basic concepts of data structures and algorithms.
- To understand concepts about stacks, queues & lists and searching and sorting techniques
- To aims at introducing you to the various components of GUI programming with Tkinter.
- To acquire knowledge about gene libraries and isolation of genes
- To describe how bioinformatics data is stored and organized

Ex.No	Program List	Hours	K Level
1	Program to create an array of 5 integers and display the array items. Access individual element through indexes.	4	K4
2	Program to implement the queue operations.	4	K4
3	Program to implement stack operations Using a Python List.	4	K4
4	Program to perform Binary Search.	4	K4
5	Program to implement Linear Search.	4	K4
6	Program to perform selection sort.	4	K4
7	Create an application to get the currently selected radio button value using UI with TKinter in python.	6	K4
8	Create an application window has two text input fields and another one to display the result using TKinter in Python.	6	K4
9	Gene Sequence mining using Python.	6	K4
10	Bio computing in Python.	6	K4

**Note: The Questions should be asked in the ratio of 100 % Program**

**Pedagogy:** PowerPoint Projection through LCD, Demonstration

### Rationale for Nature of the Course:

- Can be professionals in solving advanced problems to pursue higher studies.

### Activities to be given:

- Preparing the students to appear professional courses by giving Advanced Exercise and workout on relevant topics.
- Preparing the students to develop UI based applications.

### Course Learning Outcomes

CLOs	On Completion of the Course, the students should be able to	K - Level
CLO1	Classify the concepts of various data structures.	K4
CLO2	Compare and Construct the program for array, stack, queue and linked list operation.	K4
CLO3	Experiment the searching and sorting techniques	K4
CLO4	Explain various concepts on how to build GUI Programming.	K4
CLO5	Distinguish certain types of biological problem like sequence alignment, gene detection, structure prediction, data-mining literature	K4

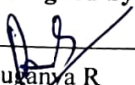
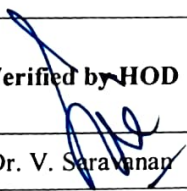
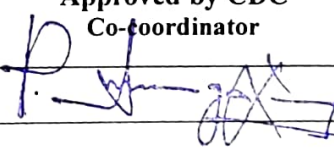
### Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

CLOs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7
CLO 1	3	2	2	1	1	1	3
CLO 2	3	3	3	3	2	3	2
CLO 3	3	3	2	3	2	3	3
CLO 4	3	3	1	2	3	2	3
CLO 5	3	2	3	3	1	2	2

3 – Advance Application

2 – Intermediate Level

1 – Basic Level

<b>Course Designed by</b> 	<b>Verified by HOD</b> 	<b>Approved by CDC Co-coordinator</b> 
Ms. Suganya R	Dr. V. Saravanan	

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