

NALLAMUTHU GOUNDER MAHALINGAM COLLEGE (AUTONOMOUS)-POLLACHI

398	B.Sc Computer Science	Core Elective II:MongoDB	21UCS6E6	2021
399	B.Sc Computer Science	Core Elective III:Information retrieval	21UCS6E7	2021
400	B.Sc Computer Science	Core Elective III:HTML,JAVA Script and JQuery for	21UCS6E8	2021
401	B.Sc Computer Science	Core Elective III:Angular NodeJS	21UCS6E9	2021
402	B.Sc.IT	Visual Programming	21UIT414	2021
403	B.Sc.IT	Visual Programming Lab	21UIT416	2021
404	B.Sc.IT	Skill Based Major Elective - Lab. I WebProgramming(ASP.NET)	21UIT5S12	2021
405	B.Sc.IT	Artificial Intelligence	21UIT5E12	2021
406	B.Sc.IT	Core-XIV:Skill Enhanced Course: Python Programming	21UIT621	2021
407	B.Sc.IT	Core Lab - IX: Python Programming Lab	21UIT622	2021
408	B.Sc.IT	Core Elective-II: Internet of Things	21UIT6E22	2021
409	B.Sc.IT	Core Elective-II: Block Chain Technology	21UIT6E23	2021
410	B.Sc.IT	Core Elective-II: R Programming	21UIT6E21	2021
411	B.Sc.IT	Project Planning and Management	21UIT623	2021
412	B.Sc. CT	Core IX: Linux And Shell Programming	21UCT413	2021
413	B.Sc. CT	Core VI: Database Management System	21UCT308	2021
414	B.Sc. CT	Lab - VI : Linux And Shell Programming Lab	21UCT416	2021
415	B.Sc. CT	Core Elective - I : Management Information System	21UCT5E3	2021
416	B.Sc. CT	Core Elective - II : Software Project Management	21UCT 6E2	2021
417	B.Sc. CT	Core Elective - II : Grid Computing	21UCT 6E3	2021
418	B.Sc. CT	Core Elective - III : Digital Image Processing	21UCT 6E6	2021
419	B.Sc. CT	Software Testing	21UCT5AL	2021
420	B.Sc. CT	Data Analytics	21UCT6AL	2021
421	BCA	Programming in C++	21UBC206	2021
422	BCA	Web Designing Lab	21UBC418	2021
423	BCA	Software Testing	21 UBC520	2021

BOS
HIGHLIGHTED

Metric : 1.2.1



New Course Introduced

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424	BCA	Software Testing Lab		
425	BCA	Desktop Publishing Lab	21UBC522	2021
426	BCA	Current Trends and Technologies	21UBC5S13	2021
427	BCA	Cloud Computing	21UBC6E22	2021
428	BBA	Core Elective -I :XVII-Visual basic theory	21UBC6E32	2021
429	BBA	Core Elective -I :XVII-Customer Relationship Management -Theory	21UBM5E12	2021
430	BBA	Visual Basic Practical	21UBM5E13	2021
431	BBA	Business Correspondence Practical	21UBM5E12B	2021
432	BBA	Advanced Learner Course I	21UBM5E13C	2021
433	BBA	Programming in C Practical	21UBM5AL1	2021
434	BBA	Oracle Practical	21UBM6E32	2021
435	BBA	Advanced Learner Course II Stress Management	21UBM6E33	2021
436	B.Com	Financial Services	21UBM6AL2	2021
437	B.Com	Financial Management	21UCO4E11	2021
438	B.Com	Introduction to Foreign Trade	21UCO5E21	2021
439	B.Com	Fiancial Markets	21UCO5AL1	2021
440	B.Com	Export Trade Procedures	21UCO6E31	2021
441	B.Com	Introduction to Research	21UCO6AL2	2021
442	B.Com (E-Commerce)	Allied - III: Statistics for Business	21UCO6S22	2021
443	B.Com (E-Commerce)	Allied - IV: Business Mathematics	21UEC3A3	2021
444	B.Com (E-Commerce)	Information Security and E Commerce	21UEC4A4	2021
445	B.Com (E-Commerce)	Core Elective - I : Advertising and Sales Promotion	21UEC516	2021
446	B.Com (E-Commerce)	Core Elective-I : Retail Business Management	21UEC5E1	2021
447	B.Com (E-Commerce)	Core Elective-I: Services Marketing	21UEC5E2	2021
448	B.Com (E-Commerce)	Advanced Learner Course - I : Organizational Behavior	21UEC5E3	2021
449	B.Com (E-Commerce)	Core Elective-II: Human Resource Management	21UEC5AL1	2021
			21UEC6E2	2021

Metric : 1.2.1



New Course Introduced

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DEPARTMENT OF BCA

**NALLAMUTHU GOUNDER MAHALINGAM COLLEGE
POLLACHI - 642001**

**21st Board of Studies Meeting in the Department of
BCA**

Date & Time: 22.5.2021 & 2.00 P.M

Agenda

BoS / BCA16.1	:	Welcome address and Opening Remarks by Chairman, Board of studies in BCA
BoS / BCA16.2	:	Confirmation of the Minutes of the 21 st / Previous meeting of Board of studies in BCA held on 22.5.2021 and Action taken report of 21 st meeting of Board of studies
BoS / BCA16.3	:	16.3.1 Syllabus of I BCA under Regulation 2021- 2022
		16.3.2 Syllabus of II BCA under Regulation 2022 - 2023
		16.3.3 Syllabus of III BCA under Regulation 2023- 2024
		Any other Discussions if any
BoS / BCA16.4	:	Suggestion given by BOS Members
BoS / BCA16.5	:	Any other items


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UG DEPARTMENT OF COMPUTER APPLICATIONS

MINUTES OF BOS MEETING

The 21st Meeting of the Board of studies of the BCA Department was held on 22.5.2021 at 2.00 P.M through Online Mode – Google Meet Platform.

1. The following members were present:

Dr.K.Haridas Head & Associate Professor, BCA Department	Chairman
Dr.S.Hemalatha Associate Professor, BCA	Internal Members
Ms.J.Umamaheswari Assistant Professor, BCA	
Dr.R.Malathi Ravindran Associate Professor, BCA	
Ms.N.Shyamala Assistant Professor, BCA	
Mr.S.DilipKumar Assistant Professor, BCA	
Ms.N.Divya Assistant Professor, BCA	
Mr.D.Poobathy Assistant Professor, BCA	
Mr.AMuruganandham Assistant Professor, BCA	
Ms.M.Kirthika Assistant Professor, BCA	
Dr.E.Chandra Professor and Head Department of Computer Science BharathiarUniversity,Coimbatore. Chandra.e@buc.edu.in	University Nominee
Dr.S.Britto Ramesh Kumar Associate professor, Department of Computer Science St.Joseph's College Tiruchirapalli. brittor@gmail.com	Academic Expert

	Dr.T.Revathi Head, Department of Computer Science(SF) PSG College of Arts and Science Coimbatore. revathi@psgcas.ac.in	Subject Expert
	Mr.E.Nivek Senior Analyst HCL Technologies,Bangalore nivek031996@gmail.com	Industry Expert
	Ms.J.Sangamithra Programmer Cognizant, Coimbatore sakthisangamithra53@gmail.com	Alumnus nominated by Principal / HoD
	Mr.E.Rajesh Kumar (18BC78) D3-BCA 'B' (2018- 2021) rajesheswaran27599@gmail.com	Student Member



HoD

CDC Co-ordinator

COE



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BoS/BCA12.1 WELCOME ADDRESS AND OPENING REMARKS BY CHAIRMAN,
BOARD OF STUDIES IN THE BCA DEPARTMENT

The Chairman, BoS of the BCA Department welcomed and introduced the members of 16th Board of Studies and thanked each one of them for sparing their valuable time to attend the meeting.

BoS/BCA 12.2 TO CONFIRM THE MINUTES OF 20th BOS MEETING HELD ON 22.2.2020. The minutes of the 20th Board of Studies meeting held on 22.2.2020 were communicated to the members. The comments received have been incorporated and placed for confirmation. The same was approved by 20th Academic council.

~ Action Taken Report (Enclosed in Annexure 1)

1. Based on the feedback of University Nominee, the Fundamentals of Digital Computer is renamed as Digital Computer Fundamentals in Semester I.
2. RDBMS and Visual Programming both theory and lab, replaced as RDBMS due to the recommendation of Subject Expert in Semester III.
3. Based on the feedback of Subject Expert, DTP lab is replaced by Graphics Lab in Semester III.
4. Based on the recommendation of Industry Expert, Web Development is renamed as Web Technology which consists of 3 units from ASP.NET and 2 units from PHP Programming in Semester IV.
5. Based on the feedback of University Nominee, all the five phases should be included in the Software Engineering in Semester IV.
6. Based on the recommendation of Academic Auditor, Web Development is replaced by ASP.NET lab in Semester IV.
7. Based on the recommendation of Subject Expert, Scripting & HTML is renamed as Web Designing lab and Open source software lab is renamed as Photo Effects lab in semester IV and 2-D Animation lab is renamed as Animation lab.

BoS/BCA 12.3

BoS/BCA 12.3.1

I BCA (I & II SEMESTER)


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I SEMESTER

- ✓ 21UBC101 - Core - I : Programming In C
- ✓ 21UBC102 - Core – II : Digital Computer Fundamentals
- ✓ 21UBC1A1 - Allied - I :Mathematics I - Computer Oriented Numerical And Statistical Methods
- ✓ 21UBC103 - Core Lab -I : Programming In C

II SEMESTER

- ✓ 21UBC204 - Core - III : Object Oriented Programming With C++
- ✓ 21UBC205 - Core - IV : Data Structures
- ✓ 21UBC2A2 - Allied - II : Mathematics II –Mathematical Foundations Of Computer Applications
- ✓ 21UBC206 - Core Lab - II : Programming In C++

The presented syllabus was accepted by the experts and a few suggestions were given as follows:

- As suggested by our Subject Expert Dr.T.Revathi the edition of the text book and the reference books have been updated in C& C++ Programming.
- As suggested by our Subject Expert Dr.T.Revathi and the Alumni, theProgramming list has been updated in C++ Programming.
- As suggested by our Academic Auditor Dr.S.Britto Ramesh Kumar,Map Simplification topic have been included in the Second unit of the course Digital Computer Fundamentals.

The following papers from BCA were accepted by the experts fully without further suggestions:

- 21UBC1A1 - Allied - I:Mathematics I - Computer Oriented Numerical And Statistical Methods
- 21UBC103 - Core Lab -I: Programming In C
- 21UBC205 – Data Structures


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- 21UBC2A2 - Allied - II: Mathematics II –Mathematical Foundations Of Computer Applications

The following courses were revised with major / minor modifications

- 21UBC101 – PROGRAMMING IN C
- 21UBC102 - Digital Computer Fundamentals
- 21UBC204 - OBJECT ORIENTED PROGRAMMING WITH C++
- 21UBC206 LAB –II: PROGRAMMING IN C++

New Course Added: -NIL

BoS/BCA 12.3.2

<<II BCA (III & IV SEMESTER)>>

III SEMESTER

- ✓ 21UBC307 –Core - V :Relational Database Management System And Oracle
- ✓ 21UBC308 - Core - VI :Operating Systems
- ✓ 21UBC309 - Core - VII :Organizational Behaviour
- ✓ 21UBC3A3 - Allied - III :Accountancy For Decision Making
- ✓ 21UBC310 - Core Lab - III : Relational Database Management System And Oracle
- ✓ 21UBC311 - Core Lab - IV : Operating Systems
- ✓ 21UBC312 - Core Lab - V : Graphics
- ✓ 21UBC3N11 - Non Major Elective - I : Web Designing Lab /
- ✓ 21UBC3N12 - Non Major Elective - I : Desktop Publishing Lab

IV SEMESTER

- ✓ 21UBC413 - Core - VIII :Web Technology
- ✓ 21UBC414 - Core - IX :Computer System Architecture
- ✓ 21UBC415 - Core - X :Software Engineering
- ✓ 21UBC4A4 - Allied - IV :Mathematics III - Computer Based Optimization Techniques
- ✓ 21UBC416 - Core Lab - VI: ASP.NET
- ✓ 21UBC417 - Core Lab - VII : PHP Programming
- ✓ 21UBC418 - Core Lab - VIII: Web Designing

- ✓ 21UBC4N21 - Non Major Elective - II : Photo Effects Lab/
- ✓ 21UBC4N22 - Non Major Elective – II: Animation Lab

The presented syllabus was accepted by the experts and a few suggestions were given as follows:

- As suggested by our University Nominee Dr.E.Chandra the paper titled 'Relational Database Management System and Oracle' has been changed as 'Relational Database Management System' (both theory and lab papers).
- As suggested by our University Nominee Dr.E.Chandra Real Time Applications have been included in the List of programs of Relational Database Management System and Oracle' Lab.
- As suggested by our Academic Auditor Dr. S. Britto Ramesh Kumar in the BOS meeting, the latest edition of text books have been updated in Organizational Behaviour.
- As suggested by our Subject Expert Dr.T.Revathi in the BOS meeting new textbook has been included in the course Web technology.
- As suggested by our Academic Auditor Dr.S.Britto Ramesh Kumar, in Software Engineering course
 - The number of Text Books has been reduced from 4 to 3 numbers.
 - The Reference Book has been changed as "Software Engineering Concepts" by Richard Fairley, McGraw Hill Publications, 2001.
- As suggested by our Academic Auditor Dr. S. Britto Ramesh Kumar & Subject Expert Dr.T.Revathi, the Programming list have been updated in Web Designing Lab.

The following papers from BCA were accepted by the experts fully without further suggestions:

- 21UBC308 - Core - VI : Operating Systems
- 21UBC3A3 - Allied - III : Accountancy For Decision Making
- 21UBC311 - Core Lab - IV : Operating Systems
- 21UBC312 - Core Lab - V : Graphics
- 21UBC3N11 - Non Major Elective - I : Web Designing Lab /


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- 21UBC3N12 - Non Major Elective - I : Desktop Publishing Lab
- 21UBC414 - Core - IX :Computer System Architecture
- 21UBC4A4 - Allied - IV :Mathematics III - Computer Based Optimization Techniques
- 21UBC416 - Core Lab - VI: ASP.NET
- 21UBC417 - Core Lab - VII : PHP Programming
- 21UBC4N21 - Non Major Elective - II : Photo Effects Lab/
- 21UBC4N22 - Non Major Elective – II: Animation Lab

The following courses were revised with major / minor modifications.

- 21UBC307 – Core - V :Relational Database Management System And Oracle
- 21UBC309 - Core - VII :Organizational Behaviour
- 21UBC310 - Core Lab - III : Relational Database Management System And Oracle
- 21UBC413 - Core - VIII :Web Technology
- 21UBC415 - Core - X :Software Engineering
- 21UBC418 - Core Lab - VIII: Web Designing

New Course Added: NIL

BoS/BCA12.3.3

<<III BCA (V&VI SEMESTER)>>

V SEMESTER

- ✓ 21UBC519 - Core - XI: Java Programming
- ✓ 21UBC520 - Core - XII: Skill Enhanced Course Software Testing
- ✓ 21UBC5E11 / - Networks
- ✓ 21UBC5E12 / - Grid Computing
- ✓ 21UBC5E13 - Data Science
- ✓ 21UBC521 - Core Lab - IX: Java Programming
- ✓ 21UBC522 - Core Lab - X : Software Testing
- ✓ 21UBC523 - Project
- ✓ 21UBC5S11 – Mobile Phone Services/

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- ✓ 21UBC5S12 - Internet of Things/
- ✓ 21UBC5S13 - Desktop Publishing Lab

VI SEMESTER

- ✓ 21UBC624 - Core - XIII :Python Programming
- ✓ 21UBC625 - Core - XIV : Mobile Application Development
- ✓ 21UBC6E21 - Storage Management
- ✓ 21UBC6E22 - Current Trends And Technologies
- ✓ 21UBC6E23 - Information Security
- ✓ 21UBC6E31 - Data Mining And Warehousing
- ✓ 21UBC6E32 - Cloud Computing
- ✓ 21UBC6E33 - Nano Computing
- ✓ 21UBC626 - Core Lab - XI : Python Programming
- ✓ 21UBC627 - Core Lab - XII : Mobile Application Development
- ✓ 21UBC6S21 - Corporate Systems
- ✓ 21UBC6S22 - Multimedia And Animation
- ✓ 21UBC6S23 - Personality Development Skills

The presented syllabus was accepted by the experts and a few suggestions were given as follows:

- As suggested by our Alumni Ms.J.Sangamithra the topics related with Win runner tool is replaced with Selenium in the fifth unit of the course Software Testing.
- As suggested by our Alumni Ms.J.Sangamithra the list of programs related with Win runner tool is replaced with the list of programs of Selenium tool.
- As suggested by our Academic Auditor Dr. S. Britto Ramesh Kumar, Subject Expert Dr.T.Revathi and the Alumni Ms.J.Sangamithra, the Program list have been updated in Desktop Publishing Lab.
- As suggested by our University Nominee Dr.E.Chandra and Subject Expert Dr.T.Revathi Unit -4 has been changed from Data Science topics to topics related with Machine Learning in the course Current Trends and Technologies.



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- As suggested by our Academic Auditor Dr. S. Britto Ramesh Kumar, in Unit 5, the contents has been added and case studies in “Research Topics in the field of Cloud Computing” is also included in the course Cloud Computing.
- As suggested by our Subject Expert Dr.T.Revathi, the latest edition of text books and reference books have been updated in Information Security.

The following papers from BCA were accepted by the experts fully without further suggestions:

- 21UBC519 - Core - XI: Java Programming
- 21UBC5E11 / - Networks
- 21UBC5E12 / - Grid Computing
- 21UBC521 - Core Lab - IX: Java Programming
- 21UBC523 - Project
- 21UBC5S11 – Mobile Phone Services/
- 21UBC5S12 - Internet of Things/
- 21UBC624 - Core - XIII :Python Programming
- 21UBC625 - Core - XIV : Mobile Application Development
- 21UBC6E21 - Storage Management
- 21UBC6E31-Data Mining And Warehousing
- 21UBC626 - Core Lab - XI : Python Programming
- 21UBC627 - Core Lab - XII : Mobile Application Development
- 21UBC6S21 - Corporate Systems
- 21UBC6S22 - Multimedia And Animation
- 21UBC6S23-Personality Development Skills

The following courses were revised with major / minor modifications.

- 21UBC520 - Core - XII: Skill Enhanced Course Software Testing
- 21UBC522 - Core Lab - X : Software Testing
- 21UBC5S13 - Desktop Publishing Lab
- 21UBC6E22 - Current Trends And Technologies


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- 21UBC6E23 - Information Security
- 21UBC6E32 - Cloud Computing

New Course Added:

The following papers from BCA were accepted by the experts fully without further suggestions

- 21UBC5E13 - Data Science
- 21UBC6E33 - Nano Computing
- 21UBC5AL1 - Advanced Learner Course – I: Adhoc And Sensor Networks - Self Study
- 21UBC6AL2 - Advanced Learner Course – II: Disaster Management

These changes have been made effect for the students admitted in 2021 with I to VI Semesters accordingly.

BoS/BCA12.4 SUGGESTIONS GIVEN BY THE BoS MEMBERS

12.4.1: University Nominee

- ✓ Machine Learning topic to be included in Current Trends
- ✓ SBE can be handled as complete theory or complete practical paper according to the convenience
- ✓ Networks paper to be handled as core paper instead of elective paper.
- ✓ Nano Computing is difficult for UG students.

12.4.2 Academic Auditor

- ✓ Elaborate the Unit-V in Cloud Computing
- ✓ Simplification of Sum of Products and Product of Sums to be included in DCF.
- ✓ Latest book edition to be prescribed for Organizational Behaviour
- ✓ Sommerville book can be followed for Software Engineering
- ✓ Case studies can be accepted in RDBMS


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- ✓ Appropriate modifications expected in IOT
- ✓ William Stallings book can be followed for Information Security

12.4.3 Subject Expert

- ✓ List of exercises can be changed for Web Designing(Major) and NME
- ✓ Text book can be prescribed for Web Technology
- ✓ Syllabus for Data Science can be re-organized
- ✓ In Current Trends and Technologies Data Science topic to be removed.
- ✓ Machine Learning subject can be added as Major subject.
- ✓ Topics in Introduction to C++ and Java can be removed.
- ✓ Hands on Training for Mobile Phone Services.

12.4.4 Industry Expert

- ✓ Advanced Programs can be included for II years and III years.
- ✓ Workshops can be conducted for other OS.

12.4.5 Alumni

- ✓ Selenium can be replaced for WinRunner in ST
- ✓ Deep Learning, Digital Forensics, Artificial Intelligence can be inserted instead of Nano Computing.

The members had a brainstorming discussion and interaction among themselves. After discussion, fruitful suggestions were incorporated appropriately in the Curriculum and Syllabi.

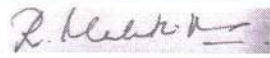
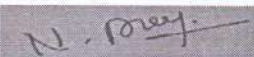
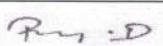
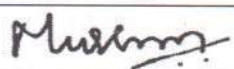
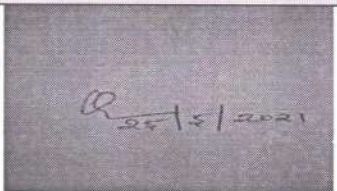
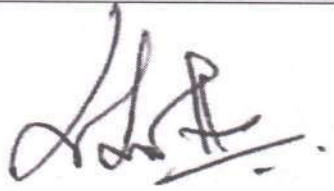
Based on the suggestions given by the members, BOS resolved to recommend the following to the Academic Council for further approval.

- The syllabus of First Year BCA under Regulation <<Regulation Number>>.
- The syllabus of Second Year BCA under Regulation <<Regulation Number>>.
- The syllabus of Third Year BCA under Regulation <<Regulation Number>>.
- Any other discussion


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Members Present:

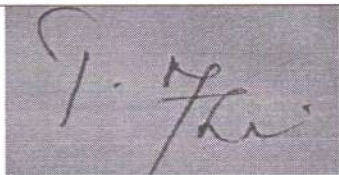
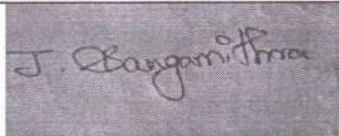
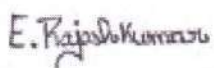
Chairman	
Dr.K.Haridas Head, Department of BCA	
Internal Members	
Dr.S.Hemalatha Associate Professor, BCA	
Ms.D.Umamaheswari Assistant Professor, BCA	
Dr.R.MalathiRavindran Associate Professor, BCA	
Ms.N.Shyamala Assistant Professor, BCA	
Mr.S.DilipKumar Assistant Professor, BCA	
Ms.N.Divya Assistant Professor, BCA	
Mr.D.Poobathy Assistant Professor, BCA	
Mr.AMuruganandham Assistant Professor, BCA	
Ms.M.Kirthika Assistant Professor, BCA	
University Nominee	
Dr.E.Chandra Professor and Head Department of Computer Science BharathiarUniversity,Coimbatore. Chandra.e@buc.edu.in	
Academic Expert	
Dr.S.Britto Ramesh Kumar Associate professor, Department of Computer Science St.Joseph's College Tiruchirapalli. brittork@gmail.com	
Subject Expert	



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Dr.T.Revathi Head, Department of Computer Science(SF) PSG College of Arts and Science Coimbatore. revathi@psgcas.ac.in	
Industrial Expert	
Mr.E.Nivek Senior Analyst HCL Technologies, Bangalore nivek031996@gmail.com	
Alumnus nominated by Principal / HoD	
Ms.J.Sangamithra Programmer Cognizant, Coimbatore sakthisangamithra53@gmail.com	
Student Members	
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ANNEXURE I

Minutes of the 20th / Previous Meeting – Action Taken Report

S.No	Suggestion given by expert members	Action taken
1	Fundamentals of Digital Computer is renamed as Digital Computer Fundamentals	Reviewed and Implemented
2	RDBMS and Visual Programming (Theory and Lab) should be replaced as RDBMS	Reviewed and Implemented
3	Web Development is replaced as Web Technology (3 units in ASP.Net and 2 units in PHP Programming)	Reviewed and Implemented
4	In Semester IV, Unit-IV of Software Engineering – all the SDLC phases should be included.	Reviewed and Implemented
5	Web Development Lab is replaced by ASP.Net Lab in Semester IV.	Reviewed and Implemented
6	In Semester IV Script and HTML is renamed as Web Designing Lab and Open Source Software lab is renamed as Photo Effects lab and 2-D Animation Lab is renamed as Animation Lab.	Reviewed and Implemented

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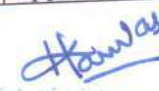


**List of Courses having focus on local, national, regional and global developmental needs
offered by BCA**

UG DEPARTMENT OF COMPUTER PPLICATIONS						
Programme: BCA					Year: 2021	
Course Code	Course Title	Need				Rationale
		Local	National	Regional	Global	
21UBC101	Core - I : Programming In C				✓	It is used in Embedded systems for developing desktop applications.
21UBC102	Core – II : Digital Computer Fundamentals	✓	✓			To meet the requirements to appear for NET& SET.
21UBC1A1	Allied - I :Mathematics I - Computer Oriented Numerical And Statistical Methods	✓		✓		Gain an experience in the implementation of numerical methods using a computer.
21UBC103	Core Lab -I : Programming In C				✓	It constitutes easier time solving problems.
21UBC204	Core - III : Object Oriented Programming With C++				✓	Powerful General Purpose Programming Language used to develop OS, Browsers, games and so on.
21UBC205	Core - IV : Data Structures			✓	✓	Key Component of Computer Science, back functionality in Internet Browser, largely used in Artificial Intelligence
21UBC2A2	Allied - II : Mathematics II –Mathematical Foundations Of Computer Applications	✓	✓			Tool for improving reasoning and problem-solving capabilities
21UBC206	Core Lab - II : Programming				✓	Helps to create computer applications that can be used to

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	In C++					solve real world problems
21EVS201	Environmental Studies				✓	To acquire the knowledge of environmental issues and enrich them to take responsible decisions
21UBC307	Core - V :Relational Database Management System And Oracle				✓	It is possible to store complex business models in a relational database.
21UBC308	Core - VI :Operating Systems				✓	It allows communicating with the computer without knowing how to speak the computer's language.
21UBC309	Core - VII :Organizational Behaviour	✓	✓	✓		It helps to understand one's own behaviors, attitudes, ethical views, and performance.
21UBC3A3	Allied - III :Accountancy For Decision Making		✓			To know financial transactions of a business.
21UBC310	Core Lab - III : Relational Database Management System And Oracle				✓	Gains Practical experience for data storage in order to perform complex business applications.
21UBC311	Core Lab - IV : Operating Systems				✓	Provides Problem-Oriented Learning.
21UBC312	Core Lab - V : Graphics	✓	✓			Enhances the knowledge of web page appearances.
21UBC3N11 /	Non Major Elective - I : Web Designing Lab				✓	1) Can learn in a short period of time. 2) Need limited skills. 3) Freelancing projects can be done.
21UBC3N12	Non Major Elective - I : Desktop Publishing Lab	✓				It is used to create documents like leaflets, brochures and newsletters.
21UBC413	Core - VIII :Web Technology				✓	Web technology concepts are required for developing web applications
21UBC414	Core - IX		✓	✓		To enhance the knowledge of

	:Computer System Architecture					designing, building and operating the Computers and knowing what is inside and how it works.
21UBC415	Core - X :Software Engineering		✓	✓		To gain the knowledge to solve the software and system challenges with a comprehensive set of skills
21UBC4A4	Allied - IV :Mathematics III - Computer Based Optimization Techniques			✓		By doing quantitative methods and techniques for effective decision making, model formulation and applications, it helps the students to equip them to solve business/job decision problems.
21UBC416.	Core Lab - VI: ASP.NET				✓	Reliable, fast, easy and open source framework to develop dynamic, rich web sites and web applications
21UBC417	Core Lab - VII : PHP Programming				✓	Extensively used for building web applications, web sides, cloud computing and machine learning also.
21UBC418	Core Lab - VIII: Web Designing				✓	Designing a web site is most essential in every sector which reflects in better business and revenue
21UBC4N21 /	Non Major Elective - II : Photo Effects Lab/	✓				To understand the expectations of industry and to improve employability skills
21UBC4N22	Non Major Elective – II: Animation Lab	✓				Every promotion in industry is closely related to animation. Due to its extensive and ever expanding field, animators are highly demanded persons
21UBC519	Core - XI : Java Programming				✓	It is primarily used for Internet-based applications.
21UBC520	Core - XII :Skill Enhanced Course Software Testing			✓		It provides the opportunity and knowledge for a client to develop and strengthen the necessary skills to gain, maintain, and advance in a chosen area
21UBC5E11	Core Elective -				✓	Interconnects the people and

/	I Networks					companies across the world.
21UBC5E12	Grid Computing			✓		It provides Collaborative computingsupport.
21UBC5E13	Data Science				✓	Students are recruited for most highly paid jobs
21UBC521	Core Lab - IX: Java Programming				✓	It is used for creating internet based applications.
21UBC522	Core Lab - X : Software Testing				✓	To identify any errors, gaps or missing requirement versus the actual requirement.
21UBC523	Project	✓				Project allows the students to study, do research and act by themselves using their abilities, interests, personal experience and aptitudes.
21UBC5AL1	Advanced Learner Course – I: Adhoc And Sensor Networks - Self Study	✓	✓	✓		It is helpful during meetings or in any location where a network doesn't exist.
21UBC5S11 /	Skill Based Elective – I Mobile Phone Services				✓	Business and personal use.
21UBC5S12	Internet of Things				✓	To know about physical objects that is embedded with sensors.
21UBC5S13	Desktop Publishing Lab	✓				It is used to create documents like leaflets, brochures and newsletters.
21UBC624	Core - XIII :Python Programming				✓	Faster growing, easily written and executed much faster than other programming language, highly demand for job
21UBC625	Core - XIV : Mobile Application Development		✓	✓		Hiring more mobile app developers by the enterprises are increased day by day
21UBC6E21 /	Core Elective - II : Storage Management				✓	Provides a comprehensive learning on storage technology
21UBC6E22	Current Trends And				✓	To determine what is currently accepted to be the best and to

	Technologies					take a constructivist approach to develop a leadership vision for implications of past, current and future developments in Technology
21UBC6E23	Information Security				✓	Everything is online and information security is more important, exciting job opportunities
21UBC6E31 /	Core Elective – III: Data Mining And Warehousing				✓	Very popular to analyze and explore the data in many different sectors of business
21UBC6E32 /	Cloud Computing				✓	Future of computing is cloud based computing, More user friendly and affordable
21UBC6E33	Nano Computing		✓			Rapidly developing field, able to work in one of the fastest growing occupations
21UBC626	Core Lab - XI : Python Programming				✓	Faster growing, easily written and executed much faster than other programming language
21UBC627	Core Lab - XII : Mobile Application Development				✓	Hiring more mobile app developers by the enterprises are increased day by day
21UBC6S21 /	Skill Based Elective - II: Corporate Systems		✓			Essential to learn about the operations of the Corporate industry and prepare themselves to meet their requirement.
21UBC6S22	Multimedia And Animation	✓				Every promotion in industry is closely related to animation. Due to its extensive and ever expanding field, animators are highly demanded persons
21UBC6S23	Personality Development Skills				✓	Mandatory for everyone to sustain and survive in the field

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List of Courses having focus on employability/ entrepreneurship/ skill development offered by BCA

UG DEPARTMENT OF COMPUTER APPLICATIONS						
Programme: BCA				Year: 2021-2024		
Course Code	Course Title	Employability (EM) / Entrepreneurship (EN) / Skill Development (SD)			Focus	Year of Introduction
		EM	EN	SD		
21UBC101	Core - I : Programming In C			✓	SD: Programming Skills	
21UBC102	Core – II : Digital Computer Fundamentals		✓		EN: Digital Components	
21UBC1A1	Allied - I : Mathematics I - Computer Oriented Numerical And Statistical Methods			✓	SD: Correlation, Integration and Interpolation	
21UBC103	Core Lab -I : Programming In C			✓	SD: Programming Skills	
21UBC204	Core - III : Object Oriented Programming With C++			✓	SD: Programming Skills	
21UBC205	Core - IV : Data Structures			✓	SD: Structural Representations	
21UBC2A2	Allied - II : Mathematics II –Mathematical Foundations Of Computer Applications			✓	SD: Matrices and Probability	

21UBC206	Core Lab - II : Programming In C++			✓	SD: Programming Skills	
21UBC307	Core - V :Relational Database Management System And Oracle	✓		✓	EM: Oracle SD: Database Management System	
21UBC308	Core - VI :Operating Systems	✓		✓	EM: Linux & Shell Programming SD:Functioning of OS	
21UBC309	Core - VII :Organizational Behaviour	✓			EM: Human Behaviour	
21UBC3A3	Allied - III :Accountancy For Decision Making			✓	SD: Problems in Accounting	
21UBC310	Core Lab - III : Relational Database Management System And Oracle	✓		✓	EM: Oracle SD: Database Management System	
21UBC311	Core Lab - IV : Operating Systems			✓	SD: OS Commands	
21UBC312	Core Lab - V : Graphics	✓		✓	EM: Graphical Designing SD: Scaling, Rotation&Transformation	
21UBC3N11 /	Non Major Elective - I : Web Designing Lab	✓			EM: Web Page Development	
21UBC3N12	Non Major Elective - I : Desktop Publishing Lab	✓	✓		EM: Desktop Publishing EN: Filtering & Retouching	
21UBC413	Core - VIII :Web Technology	✓			EM: .Net Technologies	

21UBC414	Core - IX :Computer System Architecture	✓			EM: Computer Organisation	
21UBC415	Core - X :Software Engineering	✓			EM: Software Development Process	
21UBC4A4	Allied - IV :Mathematics III - Computer Based Optimization Techniques			✓	SD: Transportation and Assignment Problems	
21UBC416	Core Lab - VI: ASP.NET	✓			EM: .Net Technologies	
21UBC417	Core Lab - VII : PHP Programming			✓	SD: Programming Skills	
21UBC418	Core Lab - VIII: Web Designing	✓			EM: Web Page Development	
21UBC4N21 /	Non Major Elective - II : Photo Effects Lab/			✓	SD: Photo Effects	
21UBC4N22	Non Major Elective – II: Animation Lab			✓	SD: Animated Effects	
21UBC519	Core - XI : Java Programming			✓	SD: Programming Skills	
21UBC520	Core - XII :Skill Enhanced Course Software Testing	✓		✓	EM: Selenium SD: Testing Skills	
21UBC5E11 /	Core Elective - I Networks	✓		✓	EM: Error detection and Error Correction SD: Networking Concepts	
21UBC5E12	Grid Computing			✓	SD: Grid Concepts	

21UBC5E13	Data Science	✓		✓	EM: Python and R-Programming SD: Machine Learning	2021
21UBC521	Core Lab - IX: Java Programming			✓	SD: Programming Skills	
21UBC522	Core Lab - X : Software Testing	✓		✓	EM: Selenium SD: Testing Skills	
21UBC523	Project	✓		✓	EM & SD: Software Design and Development	
21UBC5S11 /	Skill Based Elective – I Mobile Phone Services	✓			EM: Service and Techniques	
21UBC5S12	Internet of Things	✓			EM: Internet Concepts	
21UBC5S13	Desktop Publishing Lab	✓	✓		EM: Desktop Publishing EN: Filtering & Retouching	
21UBC624	Core - XIII :Python Programming			✓	SD: Programming Skills	
21UBC625	Core - XIV : Mobile Application Development	✓	✓	✓	EM: Developing Android Apps EN: Designing Interfaces SD: SMS, Location based services	
21UBC6E21 /	Core Elective - II : Storage Management	✓			EM: Memory Management	
21UBC6E22	Current Trends And Technologies	✓			EM: Latest Technologies	
21UBC6E23	Information Security	✓	✓	✓	EM: Cyber security & Cryptography EN: Security based infrastructures SD: Security Features & Concepts	

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21UBC6E31 /	Core Elective – III: Data Mining And Warehousing	✓			EM: Mining Concepts	
21UBC6E32 /	Cloud Computing	✓	✓		EM: Cloud Security & Services EN: Cloud Storage Providers	
21UBC6E33	Nano Computing	✓			EM: Computing Concepts	2021
21UBC626	Core Lab - XI : Python Programming			✓	SD: Programming Skills	
21UBC627	Core Lab - XII : Mobile Application Development	✓	✓	✓	EM: Desktop Publishing EN: Filtering & Retouching	
21UBC6S21 /	Skill Based Elective - II: Corporate Systems	✓			EM: Software Industry Domains	
21UBC6S22	Multimedia And Animation			✓	SD: Animation Effects	
21UBC6S23	Personality Development Skills			✓	SD: Soft Skills	


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Percentage of Revision of BCA Syllabus under Regulation 2021-2024

BCA							
S. No	Course Code	Course Title	Change Details	% of Changes	Content Deleted	Content Updated	Reason for Change Subject Expert / Course Teacher / Alumni Opinion
	21UBC101	Core - I: Programming In C	Text book added				Suggested by Subject Expert
	21UBC102	Core - II: Digital Computer Fundamentals	One topic alone added in Unit- II.	5%	Nil	Yes	Asked by Academic auditor to include Map Simplification
	21UBC204	Core - III: Object Oriented Programming With C++	Text book added				Suggested by Subject Expert
	21UBC206	CoreLab- II: Programming In C++	List of Programs updated	20%			Suggested by Subject Expert
	21UBC307	Core - V: Relational Database Management System And	Changed the title.				Suggested by University Nominee

		Oracle					
	21UBC309	Core - VII :Organizational Behaviour	Updated the latest version of Text book				Suggested by Academic Auditor
	21UBC310	Core Lab - III : Relational Database Management System And Oracle	Changed title.				Suggested by University Nominee
	21UBC413	Core - VIII :Web Technology	Included separate text book for ASP.Net				Suggested by Subject Expert
	21UBC415	Core - X :Software Engineering	Reduced the number of text books and included new book for reference.				Suggested by Academic Auditor
	21UBC418	Core Lab - VIII: Web Designing	Updated Program List	20%			Suggested by Academic Auditor& Subject Expert
	21UBC520	Core - XII: Skill Enhanced Course Software Testing	Changed Unit- V	20%			Suggested by Alumini
	21UBC522	Core Lab - X : Software Testing	Replaced Winrunner by Selenium	100%			Suggested by Alumni

	21UBC5S13	Desktop Publishing Lab	Updated List of Programs	20%			Suggested by Academic Auditor & Subject Expert & Alumni
	21UBC6E22	Current Trends And Technologies	Changed Unit - 4	20%	Topics in Unit-4	Machine Learning included in Unit-4	Suggested by University Nominee & Subject Expert
	21UBC6E23	Information Security	Updated the latest version of Text book.				Suggested by Subject Expert
	21UBC6E32	Cloud Computing	Included topics in Unit-V	20%			Suggested by Academic Auditor



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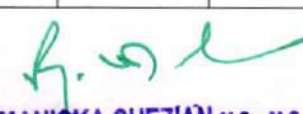
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N.G.M College – UG Department of Computer Applications
Scheme of Examination for 2021 - 2024
Choice Based Credit System & OBES

SEMESTER - I

Part	Subject Code	Title of the Paper	Hrs / Week		Hrs / Sem.	Exam Hrs.	Maximum Marks		Total Marks	Credits
			L	P			Internal	External		
I	21UTL101 /	Tamil Paper - I /	6	-		3	50	50	100	3
	21UHN101 /	Hindi Paper - I /	6	-	-					
	21UFR101	French Paper - I	6	-	-					
II	21UEN101	Communication Skills-I (Level I)	5	-	-	3	50	50	100	3
	21UEN102	Communication Skills-I (Level II)	5	-	-					
III	21UBC101	Core - I : Programming In C	5		5	3	50	50	100	4
	21UBC102	Core – II : Digital Computer Fundamentals	4		5	3	50	50	100	4
	21UBC1A1	Allied - I : Mathematics I - Computer Oriented Numerical And Statistical Methods	4		5	3	50	50	100	4
	21UBC103	Core Lab -I : Programming In C		4		3	25	25	50	2
IV	21UHR101	Human Rights	1	-	-	2	-	50	50	2
	21HEC101	Human Excellence - Personal Values & SKY Yoga Practice - I	1	-	-	2	25	25	50	1
V		Extension Activities –Annexure I	-	-	-	-	-	-	-	-
CC	21CFE101	Fluency in English-I	-	-	-	-	-	-	-	-
		Online Course (Optional) (MOOC / NPTEL / SWAYAM)								Grade
Total									650	23




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SEMESTER - II										
Part	Subject Code	Title of the Paper	Hrs / Week		Hrs / Sem.	Exam Hrs.	Maximum Marks		Total Marks	Credits
			L	P	T		Internal	External		
I	21UTL202 / 21UHN202 / 21UFR202	Tamil Paper - II /	6	-	-	3	50	50	100	3
		Hindi Paper - II /	6	-	-					
		French Paper - II	6	-	-					
II	21UEN202	Communication Skills-II (Level I)	5	-	-	3	50	50	100	3
	21UEN203	Communication Skills-II (Level II)	5	-	-					
III	21UBC204	Core - III : Object Oriented Programming With C++	4		5	3	50	50	100	4
	21UBC205	Core - IV : Data Structures	4		-	3	50	50	100	4
	21UBC2A2	Allied - II : Mathematics II – Mathematical Foundations Of Computer Applications	4		5	3	50	50	100	4
	21UBC206	Core Lab - II : Programming In C++		4		3	25	25	50	2
IV	21EVS201	Environmental Studies	2	-	-	2	-	50	50	2
	21HEC202	Human Excellence - Family Values & SKY Yoga Practice - II	1	-	-	2	25	25	50	1
V		Extension Activities - Annexure I	-	-	-	-	-	-	-	-
CC	21CFE202	Fluency in English - II	-	-	-	-	-	-	-	-
	21CMM201	Manaiyiyal Mahathuvam - I	1*	-	-	2	-	50	50	Grade
	21CUB201	Uzhavu Bharatham - I	1*	-	-	2	-	50	50	Grade
		Online Course (Optional) (MOOC/ NPTEL /SWAYAM)								Grade
Total									650	23




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SEMESTER - III										
Part	Subject Code	Title of the Paper	Hrs / Week		Hrs / Sem.	Exam Hrs.	Maximum Marks		Total Marks	Credits
			L	P	T		Internal	External		
III	21UBC307	Core - V : Relational Database Management System	5		5	3	50	50	100	4
	21UBC308	Core - VI : Operating Systems	5			3	50	50	100	3
	21UBC309	Core - VII : Organizational Behaviour	4		5	3	50	50	100	3
	21UBC3A3	Allied - III : Accountancy For Decision Making	5			3	50	50	100	4
	21UBC310	Core Lab - III : Relational Database Management System		4		3	25	25	50	2
	21UBC311	Core Lab - IV : Operating Systems		4		3	25	25	50	2
	21UBC312	Core Lab - V : Graphics		1		2	25	25	50	1
IV	21UBC3N1/ 21UBC3N2	Non Major Elective - I : WebDesigning Lab Non Major Elective - I : Desktop Publishing Lab		1		2	-	50	50	2
	21HEC303	Human Excellence - Professional Values & Ethics- III	1	-	-	2	25	25	50	1
		Extension Activities -Annexure I	-	-	-	-	-	-	-	-
V	21CFE303	Fluency in English - III	-	-	-	-	-	-	-	-
CC	21CMM302	Manaiyiyal Mahathuvam - II	1*	-	-	2	-	50	50	Grade
	21CUB302	Uzhayu Bharatham - II	1*	-	-	2	-	50	50	Grade
Total									650	22



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SEMESTER - IV										
Part	Subject Code	Title of the Paper	Hrs / Week		Hrs / Sem.	Exam Hrs.	Maximum Marks		Total Marks	Credits
			L	P			Internal	External		
III	21UBC413	Core - VIII : Web Technology	5			3	50	50	100	4
	21UBC414	Core - IX : Computer System Architecture	5			3	50	50	100	3
	21UBC415	Core - X : Software Engineering	4			3	50	50	100	3
	21UBC4A4	Allied - IV : Mathematics III -Computer Based Optimization Techniques	5		5	3	50	50	100	4
	21UBC416	Core Lab - VI: ASP.NET		4		3	25	25	50	2
	21UBC417	Core Lab - VII : PHP Programming		4		3	25	25	50	2
	21UBC418	Core Lab - VIII: Web Designing		1		2	25	25	50	1
IV	21UBC4N1 /	Non Major Elective - II :Photo Effects Lab/		1		2		50	50	2
	21UBC4N2	Non Major Elective – II: Animation Lab								
	21HEC404	Human Excellence - Social Values & SKY Yoga Practice - IV	1	-	-	2	25	25	50	1
V		Extension Activities -Annexure I	-	-	-	-	-	-	50	1
CC	21CFE404	Fluency in English - IV	-	-	-	-	-	-	-	-
	21CMM403	Manaiyiyal Mahathuvam - III	1*	-	-	2	-	50	50	Grade
	21CUB403	Uzhavu Bharatham - III	1*	-	-	2	-	50	50	Grade
Total									700	23




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SEMESTER - V										
Part	Subject Code	Title of the Paper	Hrs / Week		Hrs / Sem.	Exam Hrs.	MaximumMarks		Total Marks	Credits
			L	P	T		Internal	External		
III	21UBC519	Core - XI : Java Programming	5		5	3	50	50	100	4
	21UBC520	Core - XII :Skill Enhanced Course Software Testing	4			3	50	50	100	4
	21UBC5E1 / 21UBC5E2 / 21UBC5E3	Core Elective - I	5			3	50	50	100	4
	21UBC521	Core Lab - IX: Java Programming		4		3	25	25	50	2
	21UBC522	Core Lab - X : Software Testing		4		3	25	25	50	2
	21UBC523	Project	2	2			25	75	100	3
	21UBC5AL	Advanced Learner Course – I: Adhoc and Sensor Networks - Self Study					50	50	100	4*
	21UBC5VA	PC Assembly and Maintenance			30 Hours					2*
IV	21UBC5S1 / 21UBC5S2 21UBC5S3	Skill Based Elective - I	3 Hours			2	25	25	50	3
	21HEC505	Human Excellence - National Values & SKY Yoga Practice - V	1	-	-	2	25	25	50	1
CC	21CFE505	Fluency in English - V	-	-	-	-	-	-	-	-
	21CSD501	Soft Skills Development - I	-	-	-	-	-	-	-	Grade
	21GKL501	General Awareness - Self Study	SS			2	-	50	50	Grade
Total									600	23
List of Core Electives –I			List of Skill Based Electives – I							
21UBC5E1 – Networks/			21UBC5S1 – Mobile Phone Services/							
21UBC5E2 - Grid Computing/			21UBC5S2 - Internet Of Things/							
21UBC5E3 - Data Science			21UBC5S3 - Desktop Publishing Lab							

ALC - Advanced Learner Course (Optional) VA – Department Specific Value Added Course *Extra Credits



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SEMESTER - VI

Part	SubjectCode	Title of the Paper	Hrs / Week		Hrs / Sem.	Exam Hrs.	MaximumMarks		Total Marks	Credits
			L	P			Internal	External		
III	21UBC624	Core - XIII : Python Programming	4		5	3	50	50	100	4
	21UBC625	Core - XIV : Mobile Application Development	4			3	50	50	100	4
	21UBC6E1 / 21UBC6E2 / 21UBC6E3	Core Elective - II :	5			3	50	50	100	5
	21UBC6E4 / 21UBC6E5 / 21UBC6E6	Core Elective - III :	5			3	50	50	100	5
	21UBC626	Core Lab - XI : Python Programming		4		3	50	50	100	2
	21UBC627	Core Lab - XII : Mobile Application Development		4		3	25	25	50	2
	21UBC6AL	Advanced Learner Course – II: DisasterManagement					50	50	100	4*
	21UBC6VA	Hardware Troubleshooting and Network Essentials			30 Hrs					2*
IV	21UBC6S1 / 21UBC6S2 21UBC6S3	Skill Based Elective - II :	3			2	25	25	50	3
	21HEC606	Human Excellence - Global Values & SKY Yoga Practice - VI	1	-	-	2	25	25	50	1
CC	21CFE606	Fluency in English - VI	-	-	-	-	-	-	-	-
	21CSD602	Soft Skills Development - II	-	-	-	-	-	-	-	Grade
Total									650	26
List of Core Electives –II			List of Core Electives –III			List of Skill Based Electives – II				
21UBC6E1 - Storage Management			21UBC6E4-Data Mining and Warehousing			21UBC6S1 - Corporate Systems				
21UBC6E2 - Current Trends and Technologies			21UBC6E5 - Cloud Computing			21UBC6S2 – Multimedia & Animation				
21UBC6E3 - Information Security			21UBC6E6 - Nano Computing			21UBC6S3- Personality Development Skills				

ALC - Advanced Learner Course (Optional) VA – Department Specific Value Added Course *Extra Credits

Grand Total = 3900; Total Credits = 140




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 PRINCIPAL i/c
 Nallamuthu Gounder Mahalingam College
 Pollachi - 642 001, Coimbatore District.

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	21UBC204			Title	Batch:	2021 - 2024
Lecture Hrs./Week	4	Tutorial Hrs./Sem.	5	Core - III : Object Oriented Programming With C++	Semester:	II
					Credits:	4

Course Objective

To develop a greater understanding of the issues involved in programming language design and implementation. To develop an in-depth understanding of functional, logic and object-oriented programming paradigms. To implement several programs in languages other than the one emphasized in the core curriculum. To understand design/implementation issues involved with variable allocation and binding, control flow, types, subroutines, parameter passing. To train them to meet day-to-day demands of industry.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Gain the basic knowledge on Object Oriented concepts	K1
CO2	Ability to demonstrate applications using Object Oriented Programming Concepts	K2
CO3	Develop the differences between traditional imperative design and object-oriented Design	K3
CO4	Examine class structures as fundamental, modular building blocks	K4
CO5	Explain the role of inheritance, polymorphism, dynamic binding and generic structures in building reusable code.	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO 9	PO10	PSO 1
CO1	H	H	M	H	H	H	M	H	M	H	H
CO2	H	H	M	H	H	H	M	H	H	H	H
CO3	H	H	M	H	H	H	H	H	H	H	H
CO4	H	H	M	H	H	M	L	H	M	H	H
CO5	H	H	M	H	H	M	L	H	M	H	H

Units	Content
Unit I	Procedure Oriented Programming-Object Oriented Programming Paradigm- Basic Concepts of Object -Oriented Programming-Benefits of OOP-Object Oriented Languages-Applications of OOP-Steps in Object Oriented Analysis- Steps in Object Oriented Design.
Unit II	Tokens-Keywods-Identifiers and Constants-Data Types-Reference Variables Operators in C++ - Scope Resolution Operator-Member Dereferencing Operator Memory Management Operators-Manipulators-Type Cast Operators-Expression and their Types-Control Structures.
Unit III	Functions: Function Prototype-Call By Reference-Return By Reference-Inline Functions-Default and Constant Arguments-Function Overloading-Friend and Virtual Functions-Classes and Objects- Constructors and Destructors.
Unit IV	Operator Overloading – Inheritance – Pointers - Virtual Functions and Polymorphism.

Unit V	Managing Console Input / Output operations: C++ Streams-C++ Stream Classes-Formatted and Unformatted I/O Operations-Managing Output Manipulations- <i>Working Files.</i>	12
	Total Contact Hrs	60

Methodology and Assessment Methods:

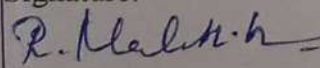
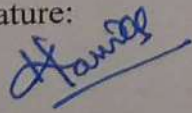
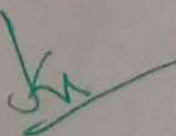
Seminar, Power Point Presentation, Chalk and talk, Quiz, Assignments, Group Task.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	E.Balagurusamy	Object Oriented Programming with C++	Tata McGraw-Hill Education, Fourth Edition	2008

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	C.Ravichandran	Programming in C++	Tata McGraw Hill Publications, Fourteenth Edition	2001
2	K.R Venugopal, RajkumarBuyya	Mastering C++	Tata McGraw-Hill Education	2017

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.R.MALATHI RAVINDRAN Signature: 	Name: Dr.K.HARIDAS Signature: 	Name: Mr.K.SRINIVASAN Signature: 	Name: Dr.R.MANICKACHEZHIAN Signature: 

K. SRINIVASAN, M.C.A.,

Co-ordinator

Curriculum Development Cell (CDC)

NGM College (Autonomous)

Pollachi - 642 001.

Dr. R. MANICKACHEZHIAN, M.Sc., M.S., Ph.D.

Controller of Examinations

NGM College (Autonomous)

POLLACHI - 642 001.

Programme Code:	BCA		Programme Title:	Bachelor of Applications
Course Code:	21UBC3N1		Title	Batch: 2021
Practical Hrs./Week	1	Tutorial Hrs./Sem.	Non Major Elective - I : Web Designing Lab	Semester: 3
				Credits: 3

Course Objective

To provide the necessary knowledge of various techniques in web development and to design a complete website.

Course Outcomes

On the successful completion of the course, students will be able to

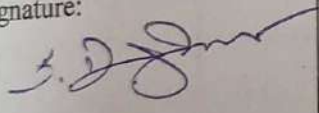
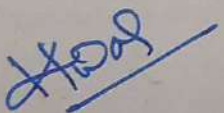
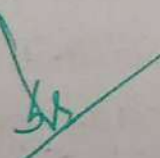
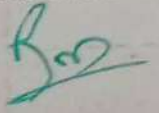
CO Number	CO Statement	Knowledge
CO1	Recollect the concepts of website Development	K1
CO2	Demonstrate knowledge and skills utilizing various HTML tags for designing a static web page.	K2
CO3	Analyze the HTML tags, CSS and JavaScript.	K3
CO4	Recognize and apply the elements of Creating Style Sheet (CSS).	K4
CO5	Develop and incorporate dynamic capabilities in Web pages using JavaScript.	K5

Mapping

PO / PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO										
CO1	M	M	M	M	H	M		M	H	H
CO2	M	H		H	M	M	M		M	M
CO3	M	H		H	H	M		H	M	M
CO4	M	H		H	M		M	H	H	
CO5	H	H		H	M		M	H	M	M

1. Design a home page which will display your information i.e. Bio data.
2. Create Hyperlinks in home page i.e educational details, Hobbies, Achievement, My Ideals etc.
3. Design a timetable and display it in tabular format.
4. Design a Registration form in HTML.
5. Design a webpage for Biodata using CSS.
6. Design webpage using Frames, Framesets.
7. Embedding Javascripts in HTML pages.
8. Design a Biodata page whose content can be changed using JavaScript like events.
9. Design a Signup form with all validations.

Total contact hours : 15 hrs

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Mr.S.DILIP KUMAR Signature: 	Name: Dr.K.HARIDAS Signature: 	Name: Mr.K.SRINIVASAN Signature: 	Name: Dr.R.MANICKACHEZHIAN Signature: 

K. SRINIVASAN, M.C.A.,
Co-ordinator
Curriculum Development Cell (CDC)
NGM College (Autonomous)
Pollachi - 642 001.

Dr. R. MANICKACHEZHIAN, M.Sc., M.S., Ph.D.,
Controller of Examinations
NGM College (Autonomous)
POLLACHI - 642 001.

Programme Code:	BCA			Programme Title:	Bachelor of Applications
Course Code:	21UBC520			Title	Batch:
Lecture Hrs./Week	4	Tutorial Hrs./Sem		Core - XII :Skill Enhanced Course Software Testing	Semester: 2021
					Credits:

Course Objective

The course is to expose the students to different software testing tools and techniques to create test plan and manage test cases. To gain software testing experience by applying testing knowledge and methods to practice-oriented software testing projects using automation.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge
CO1	Recollect the fundamental concepts and types in software testing.	KL
CO2	Understand the process of applying tests to software and the basic components of a test case.	KS
CO3	Apply a test plan by learning its process and components.	KS
CO4	Analyze the automation techniques and use modern testing tools to support software testing projects.	KS
CO5	Evaluate the test code and automate test execution.	KS

Mapping

PO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1
CO											
CO1	H	H	M		H	H			M	H	H
CO2	H	H		M	H	H	M		H	H	H
CO3	H	H	M	M	H	H	H	M	H	H	H
CO4	M	M	M		M	M				H	M
CO5	H	H		M	H	H	H		H	H	H

Units	Content	Hrs
Unit I	Software Quality Assurance (SQA), Quality Control (QC), Comparison between QA & QC. Introduction to Testing, Black Box Testing: Equivalence Partitioning- Boundary Value Analysis-Error Guessing- White Box Testing: Statement Coverage-Decision Coverage- Path Coverage- Test Case- Levels of Testing: Unit Testing-Integration Testing- Sub System Testing-System Testing- Acceptance Testing.	12
Unit II	Software Testing Life Cycle-Special Types of Testing: Documentation Testing- Smoke Testing- Sanitary Testing- Compatibility Testing- Usability Testing- Configuration Testing- Disaster Testing- Interoperability Testing- Acceptance Testing- Load Testing- Stress Testing- Recovery Testing-Regression Testing- Security Testing, Client/Server Testing- Web Testing-Performance Testing.	12
Unit III	Test Plan- Phases of Test Plan- <i>Hierarchy of Test Plan</i> -Hierarchy of Test Document-Test Plan Process-Components of a Test Plan.-Verification and Validation- Audits-Reviews- Software Metrics- Process Metrics- Project Metrics-Product Metrics- Testing Metrics.	12
Unit IV	Introduction to Automation Test Tools- Automation Process-Features of Automation Tools: Record and Playback- Integration- Environment Support- Database Test- Data Function- Object Mapping-Image Testing- Object Name- Map-Object Identity Tool- Test/Error Recover-Web Testing- Extensible Language- Mercury Interactive- Quality Standards	12
Unit V	Introduction-Selenium IDE-Web Driver-Launching AUT and Inspecting properties of Elements-Automating Operations on various Elements-Automating Keyboard and Mouse Events-Handling multiple Windows-Handling Alerts- Handling Frames-Page Object Model (POM)& Page Factory in Selenium-Database Testing using Selenium .	12
	Total Contact Hrs	60

* The topics given in **Italics** are noted as Self-Study topics.

Pedagogy and Assessment Methods:

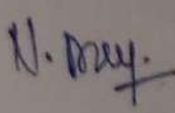
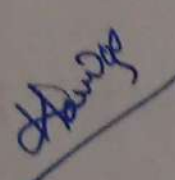
Seminar, Power Point Presentation, Chalk and talk, Quiz, Assignments, Group Task

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Course Material prepared by the Department of Computer Science based on the web references (Unit 1 to 4).			
2	Mark Fewster & Dorothy Graham	Software Test Automation (Unit 5)	Addiso_Wesley	1999

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Srinivasan Desikan & Gopalswamy Ramesh	Software Testing	Pearson Edition	2007

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Ms.N.DIVYA Signature: 	Name: Dr.K.HARIDAS Signature: 	Name: Mr.K.SRINIVASAN Signature: 	Name: Dr.R.MANICKACHEZHIAN Signature: 

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Co-ordinator
Curriculum Development Cell (CDC) NGM College (Autonomous)
Pollachi - 642 001.

Dr. R. MANICKACHEZHIAN
Controller of Examinations
NGM College (Autonomous)
Pollachi - 642 001.

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	21UBC522			Title	Batch:	2021
Practical Hrs./Week	4	Tutorial Hrs./Sem		Core Lab - X : Software Testing	Semester:	02
					Credits:	

Course Objective

The course has been designed to provide knowledge on how to planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, and generate report.

Course Outcomes (CO)

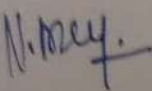
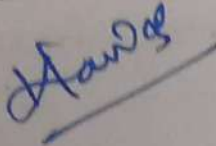
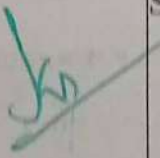
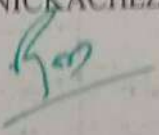
Upon completion of this course students shall be able to

CO	Co Statement
CO1	Recollect the essential characteristics of tools used for test automation.
CO2	Understands the Automation testing approach and to write test suites for software
CO3	Develop analyzing techniques through automation testing tool
CO4	Generate test cases from software requirements using various test processes for continuous quality improvement
CO5	Evaluate the automation process in software testing.

Mapping

PO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1
CO											
CO1		H	M	M	H	H	H	H	M	H	H
CO2	H	M			H	M		H	H	H	M
CO3		H	M	M	H	H		H	H	H	H
CO4	H	H	M	M	M	M	M	H	M	M	H
CO5	M	M	M	M	H	H	H	M	H	M	M

1. Write a test case based on controls.
2. Using Selenium IDE, Write a test suite containing minimum 4 test cases.
3. Using Selenium write a simple test script to validate each field of the registration page.
4. Conduct a test suite for any two web sites.
5. Write and test a program to login a specific web page.
6. Write and test a program to count number of items present on a desktop.
7. Write and test a program to get the number of list items in a list / combo box.
8. Write and test a program to provide total number of objects present / available on the page.
9. Test a program in MS Excel for Data Driven Wizard.
10. Test the addition of two values in C++ Program
11. Test a HTML file

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Ms.N.DIVYA Signature: 	Name: Dr.K.HARIDAS Signature: 	Name: Mr.K.SRINIVASAN Signature: 	Name: Dr.R.MANICKACHEZHIAN Signature: 

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Programme Code:	BCA		Programme Title:	Bachelor of Computer Applications	
Course Code:	21UBC5S3		Title	Batch:	2021-2024
Practical Hrs/Week:	3	Tutorial Hrs/sem	-	Semester	V
			Skill Based Elective I : Desktop Publishing Lab	Credits	03

Course Objective

The course is designed to provide a deep knowledge in various image processing tools and effects.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

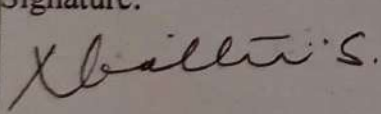
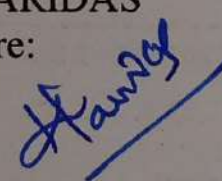
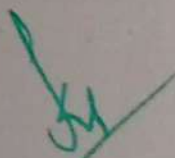
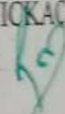
K3	CO1	Design the application using desktop handling tools.
K4	CO2	Analyze various effects that is suitable to access various formats in this platform for editing.
K5	CO3	Implement the desktop applications
K5	CO4	Develop to-do-list for better understanding and planning the use of time needed to solvedesign problems
K6	CO5	Analyze existing problems for new ideas and solutions.

Mapping

PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO												
CO1	M	H	H	H	M	H	L	M	H	L	H	M
CO2	M	H	H	M	H	H	M	M	H	H	H	H
CO3	M	H	M	M	H	H	M	M	H	H	H	H
CO4	M	H	M	H	H	H	H	M	H	H	H	H
CO5	M	H	H	M	H	H	M	M	H	H	M	H

1. Design the Wedding Invitation using the associated tools in Photoshop.
2. Apply special art effects for the image using various options from the Filter Gallery.
3. Implement the Usage of different modes in a Single Image.
4. Work with different images to implement Sharpen tool and Smudge Tool
5. Edit the image using Blur tool, Burn tool, Clone tool and Sponge tool.
6. Design the College Profile.
7. Create to make smooth curved lines in Photoshop
8. Extract an object from a given picture
9. Create a new picture. Make it 300 pixels high and 400 pixels wide.
The resolution should be 72 pixels / inch.
10. Create your very own animated beating heart in Photoshop

Total Contact Hours

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.S.NIRAIMATHI Signature: 	Name: Dr.K.HARIDAS Signature: 	Name: Mr.K.SRINIVASAN Signature: 	Name: Dr.R.MANICKACHEL Signature: 

K. SRINIVASAN, M.C.A., Dr. R. MANICKACHEL
Co-ordinator
Curriculum Development Cell (CDC)
NGM College (Autonomous)
Pollachi - 642 001.
Controller of Examinations
NGM College
POLLACHI

Programme Code:	BCA			Programme Title:	Bachelor of Applications
Course Code:	21UBC6E2			Title	Batch: 2021-2024
Lecture Hrs./Week	5	Tutorial Hrs./Sem.		Core Elective II : Current Trends and Technologies	Semester: VI Credits: 05

Course Objective

The main objective of the course is to study and apply IT applications with a wide range of concepts and technical skills in the areas to succeed in the future.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember the latest trends in technology	
CO2	Understand the Objectives and Guidance of Cyber security.	K1
CO3	Apply the knowledge of big data and its analytical technologies	K2
CO4	Analyze the concepts Cyber Security Policy and Security Evolution.	K3
CO5	Implement the Data and Knowledge Management and use of Devices in IOT Technology.	K4
		K5

Mapping

PO / PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PS01	PS
CO												
CO1	M	H	L	M	H	M	M	L	H	M	H	
CO2	M	H	M	M	H	H	M	L	H	M	H	
CO3	H	H	L	H	H	H	H	M	H	L	H	
CO4	M	H	M	H	H	H	H	L	H	H	H	
CO5	H	H	M	H	H	H	H	M	H	H	H	

Content

	Content	Hrs
Unit I	Introduction - Putting the Internet of Things forward to the Next Level - Internet of Things Strategic Research and Innovation Agenda: Internet of Things Vision - Internet of Things Strategic Research and Innovation Directions - IoT Smart X Applications.	15
Unit II	Introduction SAP: Definition – SCM Applications component with some definitions – SAP SCM-APO – SCM processes – Activities – Objectives. Technical overview and System Architecture: Business Application components – Middleware – Multi-tier computing architecture – SAP kernel architecture.	15
Unit III	Fundamentals of Big Data: Evolution of Data Management-Managing the data – Big Data – Big data management architecture. Big Data Types: Structured data – Unstructured Data –Real Time and Non- real time requirements – Big Data together. Distributed Computing: History of Distributed Computing – <i>Basics of Distributing Computing</i> – Performance.	15
Unit IV	Introduction to Machine Learning: Introduction – Types of Machine Learning – Supervised Learning – The Brain and the Neuron – Design a Learning System – Perspectives and Issues in Machine Learning – Concept Learning Task – Concept Learning as Search- Finding a Maximally Specific Hypothesis – Version Spaces and the Candidate Elimination Algorithm – Linear Discriminants – Perceptron – Linear Separability – Linear Regression	15
Unit V	Block chain :Introduction: Define block chain- structure and operational aspects of Bit coin blockchain, - compare different types of block chains-The concept of asymmetric key encryption- the concept of hashing- techniques that use algorithms to manage the integrity of transactions and blocks in blockchain.	15
	Total Contact Hrs	75

The topics given in **Italics** are noted as Self-Study topics.

Teaching and Assessment Methods:

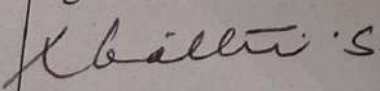
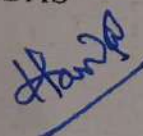
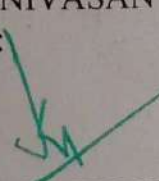
Seminar, Power Point Presentation, Chalk and talk, Quiz, Assignments, Group Task.

TEXT BOOK

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER S EDITION	YEAR OF PUBLICATION
1	Ovidiu Vermesan and Peter Friess	. Internet of Things - From Research Innovation to Market Deployment	River Publishers,	2014. (Unit 1)
2	Agrawal	Programming in Sap Apo	Mcgraw Hill Edition	(unit 2)
3	. Judith Hurwitz, Alan Nurgent, Dr. Fern Halper, Marcia Kaufman,	" Big Data for Dummies"	First Edition, A Wiley Publication	(2013) (Unit 3)
4	Ethem Alpaydin	Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series)	Third Edition, MIT Press	2014 (Unit 4)
5	Manav Gupta	"Block Chain"	2 nd IBM Limited Edition	2018 (Unit 5)

REFERENCES BOOK

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Adrian McEwen and Hakim Cassimally, John Wiley and Sons,	Designing the Internet of Things by Adrian McEwen		2014.
2	Glynn c. Williams	Implementing sap Erp sales & distribution		
3	Rajkumar Buyya, Amir Vahid Dastjerdi	Internet of Things: Principles and Paradigms		
4	Brij B. Gupta	Computer and Cyber Security: Principles, Algorithm, Applications,		

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.S.NIRAIMATHI Signature: 	Name: Dr.K.HARIDAS Signature: 	Name: Mr.K.SRINIVASAN Signature: 	Name: Dr.R.MANICKACHEZHIAN Signature: 

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Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	21UBC6E5			Title	Batch:	2021 - 2024
Lecture Hrs./Week	5	Tutorial Hrs./Sem.	-	Core Elective-III: Cloud Computing	Semester:	VI
					Credits:	05

Course Objective

This course provides with the basics of Cloud Computing, the key concepts of Virtualization and different Cloud Computing services. It also offers students a sound foundation of the Cloud environment so that they are able to start using and adopting Cloud services in their real life scenarios.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	KnowledgeLevel
CO1	Recall the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing.	K1
CO2	Demonstrate the fundamental concepts of cloud storage and their use in storage systems such as Amazon S3 (Simple Storage Service) and Microsoft Azure.	K2
CO3	Apply fundamental concepts in cloud infrastructures to understand the tradeoffs in power, efficiency and cost.	K3
CO4	Analyze the performance of Cloud Computing.	K4
CO5	Explain the core issues of Cloud Computing such as security, privacy, and interoperability.	K5

Mapping

PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1		H		H	M	H	H		H		H	H
CO2		H		H	M	H	H		H		H	H
CO3		M		H	M	H	H		H		H	H
CO4		H		H	H	H	H		H		H	H
CO5		M		H	M	M	M		H		H	H

Units	Content	Hrs
Unit I	Cloud Computing Basics: Cloud Computing Overview-Cloud Components-Infrastructure- Services-Applications-Storage-Database Services-Intranets and the cloud-Components – Hypervisor Applications. First Movers in the Cloud: Amazon- Google-Microsoft.	15
Unit II	Organization and Cloud Computing-Benefits-Limitations of Cloud Computing-Security Concerns-Privacy concerns with a third party-Security Benefits.	15
Unit III	Cloud Computing Technology: Hardware and Infrastructure-Clients-Security-Network- Services-Accessing the cloud-Platforms-Web APIs-Web Browsers-Cloud Storage- Overview- <i>Cloud Storage Providers</i> -Standards	15
Unit IV	Cloud Computing with the Titans: Google-Google App Engine-Google Web tool kit-EMC Technologies-VMware Acquisition-Microsoft-Azure Services Platform-Windows live- Exchange online-Sharepoint Services-Microsoft Dynamics CRM-Amazon-Amazon Elastic Compute Cloud-Amazon Simple Storage Service-Amazon Simple Queue Service-Salesforce.com-IBM.	15
Unit V	Security Concerns in Cloud Computing-Key Areas of Cloud Security- <i>Threats and Vulnerabilities in Cloud Computing</i> -How to overcome Cloud Security Challenges and Solutions. <i>Case Studies:</i> <i>Research Topics in the field of Cloud Computing</i>	15
	Total Contact Hrs	75

- The topics given in **Italics** are noted as Self-Study topics.

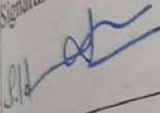
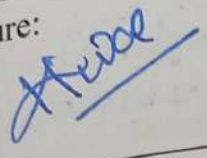
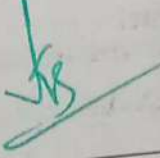
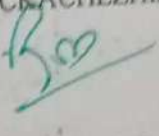
Pedagogy and Assessment Methods:

Seminar, Power Point Presentation, Chalk and talk, Quiz, Assignments, Group Task.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Anthony T. Velte, Toby J. Velte, Robert Elsenpeter	Cloud Computing- A Practical Approach	McGraw Hill Publications (Unit 1 to 5)	2010

SNO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Dr. Kumar Saurabh	Cloud Computing	Wiley India, Second Edition	2012

Course Designed by	HOD	CDC	COE
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