DEPARTMENT OF COMPUTER SCIENCE
SOUTH EAST MANIPUR COLLEGE, KOMLATHABI
COURSE: BACHELOR OF COMPUTER APPLICATION (BCA)
Course Objective & Learning Outcomes (NEP 2020)

Bachelor of Computer Application is a 4(four) year undergraduate program aimed to shape students in contemporary knowledge of fundamentals to comprehend applicative technology towards efficient solutions for industrial and real-life problems. The course curriculum inculcates social awareness, communication skills & professionalism to work as a team in maintaining diverse environments towards the betterment of society. There is a growing need for qualified computer engineers and a BCA can help you create a multi-faceted career in the industry. BCA degree can be employed in these sectors: healthcare, IT, finance, trading, transportation, software, and education.

FIRST SEMESTER (24 credit)

Semester	Course code	Theory/ Practical	Credit	Paper Titles	Marks	
					S.A	L.A
I	BCA101	Theory	4	Fundamentals of information Technology	75	25
	BCA101 P	Practical	2	-do-	35	15
	BCA-102	Theory	4	Programming using C	75	25
	BCA102 P	Practical	2	-do-	35	15
	BCASE-123A/**B**/C	Theory and Practical	4	Mathematical Foundation/ **Office Automation Tools**/ PC Hardware and maintenance	75	25
	AECC-1	Theory	4	English/MIL	75	25
	VAC001	wr+lp+fp	2	NSS	30+20+50	
	VAC013	wr+pd+lp+fp+as	2	Non-Violence & World Peace	50+20+10+10+10	

Written: wr, Practical/Demonstration: pd, Laboratory/Presentation: lp, Fieldwork/Projectwork: fp, Assignment: as

BCA101: Fundamentals of Information Technology (Discipline Specific Core Course)

Credit: 06
Total Marks: 100 Marks (Theory: 75 Marks, Internal Assessment: 25 Marks)
Workload: 4 Lectures (Per Week), 4 Practical (Per Week)

Course Objective
This course is designed to help the students to learn the basic study of computer hardware, operating systems, networking, Internet, databases, etc.

Course Learning Outcomes
On successful completion of the course, students will be able to:
1. Understand the concept of hardware and software.

2. Acquainting with input and output devices.
3. Understand networking concepts and models.
4. Learn and aware of Internet activities.

BCA102: Programming using C (Discipline Specific Core Course)

Credit: 06
Total Marks: 100 Marks (Theory: 75 Marks, Internal Assessment: 25 Marks)
Workload: 4 Lectures (Per Week), 4 Practical (Per Week)

Course Objective
This course is designed to impart knowledge of programming using C language thereby enabling the students to induce thinking and develop logics which will help them to create programs, applications in C. Learning the fundamentals of C programming constructs shall help the students easily switch over to any other languages in future.

Course Learning Outcomes
On successful completion of the course, students will be able to:
1. Understand the art of programming.
2. Solve programming problems.
4. Develop applications
3. Handle external files as well as exceptions.

BCA123B: Office Automation Tools
Credit: 06
Total Marks: 100 Marks (Theory: 75 Marks, Internal Assessment: 25 Marks)
Workload: 4 Lecturers (Per Week), 4 Practicals (Per Week)

Objective of the Course: To provide an in-depth training in use of data entry, internet and internet tools. The course also helps the candidates to get acquainted with IT.

Learning Outcomes: After completion of the course, students would be able to documents, spreadsheets, make small presentations and would be acquainted with internet and will have good typing speed.

SECOND SEMESTER (24 credit)

Semester	Course code	Theory/ Practical	Credit	Paper Titles	Marks	
					S.A	L.A
II	BCA203	Theory	4	Programming with Python	75	25
	BCA203 P	Practical	2	-do-	35	15
	BCA204	Theory	5	Computer System Architecture	75	25
	BCA204	Tutorial	1			
	BCASE-224-A/B/C	Theory and Practical	4	Linux Environment/ Object oriented programming using C++/ **Digital Electronics**	75	25
	AECC-2	Theory	4	Environmental Science	75	25
	VAC020	wr+as	2	Cyber Security	50+50	

	VAC026	wr+lp+fp	2	Women Empowerment	40+50+10

Written: wr, Practical/Demonstration: pd, Laboratory/Presentation: lp, Fieldwork/Projectwork: fp, Assignment: as

BCA203: Programming Using Python (Discipline Specific Core Course)

Credit: 06
Total Marks: 100 Marks (Theory: 75 Marks, Internal Assessment: 25 Marks)
Workload: 4 Lectures (Per Week), 4 Practical (Per Week)

Course Objective
This course is designed to introduce the student to the basics of programming using Python. The course covers the topics essential for developing well documented modular programs using different instructions and built-in data structures available in Python.

Course Learning Outcomes
On successful completion of the course, students will be able to:
1. Develop, document, and debug modular python programs to solve computational problems.
2. Select a suitable programming construct and data structure for a situation.
3. Use built-in strings, lists, sets, tuples and dictionary in applications.
4. Define classes and use them in applications.
5. Use files for I/O operations.

BCA204: Computer System Architecture (Discipline Specific Core Course)

Credit: 06
Total Marks: 100 Marks (Theory: 75 Marks, Internal Assessment: 25 Marks)
Workload: 5 Lectures (Per Week), 1 Tutorial (Per Week)

Course Objective
This course introduces the students to the fundamental concepts of digital computer organization, Design, and architecture. It aims to develop a basic understanding of the building blocks of the computer system and highlights how these blocks are organized together to architect a digital computer system.

Course Learning Outcomes
1. On successful completion of the course, students will be able to:
2. Design Combinational Circuits using basic building blocks. Simplify these circuits using Boolean algebra and Karnaugh maps. Differentiate between combinational circuits and sequential circuits.
3. Represent data in binary form, convert numeric data between different number systems and perform arithmetic operations in binary.
4. Determine various stages of instruction cycle and describe interrupts and their handling.
5. Explain how CPU communicates with memory and I/O devices

BCA224C: Digital Electronics SEC-2

Credit: 06
Total Marks: 100 Marks (Theory: 75 Marks, Internal Assessment: 25 Marks)
Workload: 5 Lecturers (Per Week), 1 Tutorial (Per Week)

Course Objective
1. To design digital circuits using simplified Boolean functions
2. To analyze and design combinational circuits
3. To analyze and design synchronous and asynchronous sequential circuits
4. To understand Programmable Logic Devices.

Course Learning Outcome
On Completion of the course, the students should be able to:
1. Simplify Boolean functions using K Map
2. Design and Analyze Combinational and Sequential Circuits
3. Implement designs using Programmable Logic Devices
4. Write HDL code for combinational and Sequential Circuits

THIRD SEMESTER

Semester	Course code	Theory/ Practical	Credit	Paper Titles	Marks	
					S.A	L.A
III	BCA305	Theory	4	Data Structure using C	75	25
	BCA305 P	Practical	2	-do-	35	15
	BCA306	Theory	5	Operating System	75	25
	BCA306 P	Tutorial	1	-do-		
	BCA307	Theory	5	Discrete Mathematics	75	25
	BCA307 T	Tutorial	1	-do-		
	BBA303 GEC	Theory	5	Communication Skills & Personality Development	75	25
	BBA303 GEC T	Tutorial	1	-do-		
	VAC034	wr+pd+lp+as	2	Kabui Dance	20+50+20+10	
	VAC045	wr+pd+lp+fp	2	Web Designing	30+20+20+30	

Written: wr, Practical/Demonstration: pd, Laboratory/Presentation: lp, Fieldwork/Projectwork: fp, Assignment: as

BCA305: Data Structure using C (Discipline Specific Core Course)

Credit: 06
Total Marks: 100 Marks (Theory: 75 Marks, Internal Assessment: 25 Marks)
Workload: 4 Lectures (Per Week), 2 Practical (Per Week)

Course Objective
This course aims at developing the ability to use basic data structures like array, stacks, queues, lists, trees and hash tables to solve problems.

Course Learning Outcomes
At the end of the course, students will be able to: 1. Implement and empirically analyses linear and non-linear data structures like Arrays, Stacks, Queues, Lists, Trees, Heaps and Hash tables as abstract data structures. 2. Write a program, choosing a data structure, best suited for the application at hand. 3. Re-write a given program that uses one data structure, using a more appropriate/efficient data structure. 4. Write programs using recursion for simple problems. Explain the advantages and disadvantages of recursion.

BCA306: Operating system (Discipline Specific Core Course)

Credit: 06
Total Marks: 100 Marks (Theory: 75 Marks, Internal Assessment: 25 Marks)
Workload: 5 Lectures (Per Week), 1 Tutorial (Per Week)

Course Objective
The course introduces the students to different types of operating systems. Operating system modules such as memory management, process management and file management are covered in detail.

Course Learning Outcomes
On successful completion of the course, the students will be able to: 1. Implement multiprogramming, multithreading concepts for a small operating system. 2. Create, delete, and synchronize processes for a small operating system. 3. Implement simple memory management techniques. 4. Implement CPU and disk scheduling algorithms. 5. Use services of modern operating system efficiently 6. Implement a basic file system

BCA307: Discrete Mathematics (Discipline Specific Core Course)

Credit: 06
Total Marks: 100 Marks (Theory: 75 Marks, Internal Assessment: 25 Marks)
Workload: 5 Lectures (Per Week), 1 Tutorial (Per Week)

Course Objective
The course aims to introduce the students to Boolean algebra, sets, relations, functions, principles of counting, and growth functions so that these concepts may be used effectively in other courses.

Course Learning Outcomes
On successful completion of the course, students will be able to: 1. Define mathematical structures (relations, functions, sequences, series, and graphs) and use them to model real life situations. 2. Understand (trace) and construct simple mathematical proofs using logical arguments. 3. Solve class room puzzles based on counting principles. 4. Compare functions and relations with respect to their growth for large values of the input.

FOURTH SEMESTER

Semester	Course code	Theory/ Practical	Credit	Paper Titles	Marks	
					S.A	L.A
IV	BCA408	Theory	5	Probability and Statistics	75	25
	BCA408	Tutorial	1	-do-		
	BCA409	Theory	4	DBMS	75	25
	BCA409	Practical	2	-do-	35	15
	BCA410	Theory	4	Web technologies	75	25
	BCA410	Practical	2	-do-	35	15
	ENG – GEC 402	Theory	5	Language And Linguistics	75	25
	ENG – GEC 402 T	Tutorial	1	-do-		
	VAC049	wr+pd+lp+as	2	Office Automation	30+20+20+30	
	VAC059	wr+pd+lp+fp	2	First Aid in Day-to-day Life	30+40+20+10	

Written: wr, Practical/Demonstration: pd, Laboratory/Presentation: lp, Fieldwork/Projectwork: fp, Assignment: as

BCA408: Probability and Statistics (Discipline Specific Core Course) Core

Credit: 06
Total Marks: 100 Marks (Theory: 75 Marks, Internal Assessment: 25 Marks)
Workload: 5 Lecturers (Per Week), 2 Tutorials (Per Week)

Course Objectives:
To make the students familiar with the basic statistical concepts and tools which are needed to study situations involving uncertainty or randomness. The course intends to render the students to several examples and exercises that blend their everyday experiences with their scientific interests.

Course Learning Outcomes:
This course will enable the students to learn:
1. Distributions to study the joint behavior of two random variables.
2. To establish a formulation helping to predict one variable in terms of the other, i.e., correlation and linear regression.
3. Central limit theorem, which helps to understand the remarkable fact that the empirical frequencies of so many natural populations, exhibit a bell shaped curve.

BCA409: Database Management Systems (Discipline Specific Core Course)

Credit: 06
Total Marks: 100 Marks (Theory: 75 Marks, Internal Assessment: 25 Marks) 24
Workload: 4 Lectures (Per Week), 4 Practical (Per Week)

Course Objective
The course introduces the foundations of database management systems focusing on significance of a database, relational data model, schema creation and normalization, transaction processing, indexing, and the relevant data structures (files and B+-trees).

Course Learning Outcomes
On successful completion of the course, students will:
1. Describe major components of DBMS and their function
2. Model an application‟s data requirements using conceptual modelling tools like ER diagrams and design database schemas based on the conceptual model.
3. Write queries in relational algebra / SQL
4. Normalize a given database schema to avoid data anomalies and data redundancy. Describe the notions of indexes, views, constraints and transactions.

BCA410: Web Technologies (Discipline Specific Core Course)

Credit 06
Total Marks: 100 Marks (Theory: 75 Marks, Internal Assessment: 25 Marks)
Workload: 4 Lectures (Per Week), 4 Practical (Per Week)

Course Objectives:
The course content enables students to:
1. Understand best technologies for solving web client/server problems
2. Analyze and design real time web applications
3. Use Java script for dynamic effects and to validate form input entry
4. Analyze to Use appropriate client-side or Server-side applications

Course Outcomes:
At the end of the course students can:
1. Choose, understand, and analyze any suitable real time web application.
2. To develop and deploy real time web applications in web servers and in the cloud.

3. Extend this knowledge to .Net platform

FIFTH SEMESTER

Semester	Course code	Theory/ Practical	Credit	Paper Titles	Marks	
					S.A	L.A
V	BCA511	Theory	5	Computer Networks	75	25
	BCA511	Tutorial	1	-do-		
	BCA512	Theory	4	Java Programing	75	25
	BCA512	Practical	2	-do-	35	15
	BCA519A/B/C	Theory	4	**.NET**/ Network Security/Computer Oriented Numerical Methods/	75	25
	BCA519A/B/C	Practical/ Tutorial	2		35	15
	STG303T GEC	Theory	4	Introduction to Probability Theory	75	25
	STG303T P	Practical	2	-do-	35	15

BCA511: Computer Networks (Discipline Specific Core Course)

Credit: 06
Total Marks: 100 Marks (Theory: 75 Marks, Internal Assessment: 25 Marks)
Workload: 5 Lectures (Per Week), 1 Tutorial (Per Week)

Course Objective
This course covers the concepts of data communication and computer networks. It comprises of the study of the standard models for the layered protocol architecture to communicate between autonomous computers in a network and also the main features and issues of communication protocols for different layers. Topics covered comprise of introduction to OSI and TCP/IP models also.

Course Learning Outcomes
On successful completion of the course, the student will be able to:
1. Describe the hardware, software components of a network and their interrelations.
2. Compare OSI and TCP/IP network models.
3. Describe, analyze and compare different data link, network, and transport layer protocols.

BCA512: Java Programming (General Elective Course)

Credit: 06
Total Marks: 100 Marks (Theory: 75 Marks, Internal Assessment: 25 Marks)
Workload: 4 Lectures (Per Week), 4 Practicals (Per Week)

Course Objective
This course adds to the basic programming language skills acquired by the student in earlier semesters. The students are exposed to the advanced features available in Java such as exception handling, file handling, interfaces, packages, and GUI programming.

Course Learning Outcomes
On successful completion of the course the student will be

1. Implement Exception Handling and File Handling.
2. Implement multiple inheritance using Interfaces.
3. Logically organize classes and interfaces using packages.
4. Use AWT and Swing to design GUI applications.

BCA519A: .NET Programming

Core Credit 06
Total Marks: 100 Marks (Theory: 75 Marks, Internal Assessment: 25 Marks)
Workload: 4 Lectures (Per Week), 4 Practical (Per Week)

Objective of the Course:
1. This course is designed to provide the knowledge of Dot Net Frameworks along with C#.
2. To explore .NET technologies for designing and developing dynamic, interactive and responsive web applications.
3. Provide a consistent, object-oriented programming environment whether object code is stored and executed locally, executed locally but web distributed, or executed remotely.
4. Build all communication on industry standards to ensure that code based on .NET Framework integrates with any other code.

Learning Outcomes:
1. After completion of the course the student will be able to use the features of Dot Net Framework along with the features of C#.
2. Use ADO.NET for data persistence in a web application.
3. To understand the 3-tier software architecture (presentation/client tier, application tier, data tier) and develop multi-tier applications to understand and experiment with the deployment of enterprise applications.
4. Design/implement data link and network layer protocols in a simulated networking environment.

STG303T: Introduction to Probability Theory 4 credits (15 Classes)

Course Objective:
This course is designed for students other than statistics discipline and can be opted as choice based credit system (CBCS). This course will lay the foundation to probability theory and Statistical modelling of outcomes of real life random experiments through various Statistical distributions.

Learning Outcomes:
The students will get to know about
(a) Writing of sample space, events and algebra of events and finding Probability of events,
(b) Conditional Probability and applications of Theorem of total probability and Bayes' theorem,
(c) Discrete and continuous Random Variables, Probability mass function(p.m.f.) and Probability density function(p.d.f.), Cumulative distribution function(c.d.f.)
(d) Expectation, variance, moments and moment generating function.
(e) Problem solving pertaining to binomial, Poisson, geometric, negative binomial, hyper geometric, uniform, normal, exponential, beta, gamma distributions. (f) fitting of Binomial, Poisson and Normal distributions

(g) Chebyshev's inequality, Convergence in probability, Weak law of large numbers, Convergence in distribution, De-Moivre Laplace and Lindeberg-Levy Central Limit Theorems(C.L.T.),
(h) Various aspects as outlined above through practical assignments.

SIXTH SEMESTER

Semester	Course code	Theory/ Practical	Credit	Paper Titles	Marks	
					S.A	L.A
VI	BCA613	Theory	5	Theory of Computation	75	25
	BCA613	Tutorial	1	-do-		
	BCA614	Theory	5	Financial Accounting	75	25
	BCA614	Tutorial	1	Financial Accounting		
	BCA620A/B/C	Theory	4	Internet of Things (IOT) and its applications/ Cloud Computing/**Machine learning**	75	25
	BCA620A/B/C	Practical/Tutorial	2	-do-	35	15
	STG304T (GEC)	Theory	4	Introduction to Statistical Inference	75	25
	STG304P (GEC)	Practical	2	-do-	35	15

BCA613: Theory of Computation (Discipline Specific Core Course)

Credit: 06
Total Marks: 100 Marks (Theory: 75 Marks, Internal Assessment: 25 Marks)
Workload: 5 Lecturers (Per Week), 1 Tutorial (Per Week)

Course Objective
This course introduces formal models of computation, namely, finite automaton, pushdown automaton, and Turing machine; and their relationships with formal languages. Students will also learn about the limitations of computing machines.

Course Learning Outcomes
On successful completion of the course, a student will be able to:
1. Design a finite automaton, pushdown automaton or a Turing machine for a problem at hand.
2. Apply pumping lemma to prove that a language is non-regular/non-context-free.
3. Describe limitations of a computing machine.

BCA614: Financial Accounting (Discipline Specific Core Course)

Credit: 06
Total Marks: 100 Marks (Theory: 75 Marks, Internal Assessment: 25 Marks)
Workload: 5 Lectures (Per Week), 1 tutorial (Per Week)

Objective of this course:

1. This course helps students to work with well-known Computerized accounting software i.e. Tally Prime
2. Student will learn to create company, enter accounting voucher entries including advance voucher entries, do reconcile bank statement, do accrual adjustments, and print financial statements, etc. in Tally Prime software
3. Accounting with Tally certificate course is not just theoretical program, but it also includes continuous practice, to make students ready with required skill for employability in the job market

Outcome from this course:
1. After successfully qualifying practical examination, students will be awarded certificate to work with well-known accounting software i.e. Tally Prime Software.
2. Student will do by their own create company, enter accounting voucher entries including advance voucher entries, do reconcile bank statement, do accrual adjustments, and also print financial statements, etc. in Tally Prime software
3. Students do possess required skill and can also be employed as Tally data entry operator

BCA620C: Machine Learning (Discipline Specific Elective)

Credit: 06
Total Marks: 100 Marks (Theory: 75 Marks, Internal Assessment: 25 Marks)
Workload: 4 Lectures (Per Week), 4 Practical (Per Week)

Course Objective
The course aims at introducing the basic concepts and techniques of machine learning so that a student can apply machine learning techniques to a problem at hand.

Course Learning Outcomes
On successful completion of this course, the student will be able to:
1. Differentiate between supervised and unsupervised learning tasks.
2. Differentiate between linear and non-linear classifiers.
3. Describe theoretical basis of SVM
4. Implement various machine learning algorithms learnt in the course.

STG304T: Introduction to Statistical Inference

4 Credits

Course Objective:
This course is designed for students other than statistics discipline and can be opted as choice based credit system(CBCS).

Learning Outcomes:
The students will get an exposure to (a) Techniques of estimation and testing of hypotheses for mean, variance, proportions, correlation coefficient, association and goodness of fit, (b) Confidence intervals for the parameters of a normal distribution (one and two sample problems), (c) Test of significance for correlation coefficient, Fisher's z–transformation, (d) Tests of proportions, tests of association and goodness-of-fit using Chi square test, Yates' correction, (e) analysis of variance technique for one and two way classifications, (f) analysis of commonly used experimental designs such as CRD, RCBD etc., (g) non-parametric tests such as Sign test for median and symmetry, Wilcoxon two- sample test, (h) practical applications through laboratory assignments.