



BISHOP HEBER COLLEGE (AUTONOMOUS)
TIRUCHIRAPPALLI – 620017
TAMILNADU, INDIA

COURSE OUTCOMES

**DEPARTMENT
OF
COMPUTER
SCIENCE**



BISHOP HEBER COLLEGE (AUTONOMOUS)

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TAMILNADU, INDIA

STRUCTURE OF THE SYLLABUS

PROGRAM NAME	COURSE	COURSE CODE	COURSE NAME
B Sc Computer Science	Core I	U21CS101	Programming Principles and Data Structures using C
B Sc Computer Science	Core Practical I	U21CS1P1	Programming Principles and Data Structures using C Lab
B Sc Computer Science	Core II	U21CS202	Python Programming
B Sc Computer Science	Core Practical II	U21CS2P2	Python Programming Lab
B Sc Computer Science	SBEC I	U21CSPS1	Business Communication and Collaboration Tools
B Sc Computer Science	Core III	U21CS303	Object Oriented Programming Concepts
B Sc Computer Science	Core Practical III	U21CS3P3	Object Oriented System Design Lab
B Sc Computer Science	NMEC I	U21CS3E1	E – Commerce
B Sc Computer Science	Core IV	U21CS404	Design and Implementation of Database
B Sc Computer Science	Core Practical IV	U21CS4P4	Design and Implementation of Database Lab
B Sc Computer Science	NMEC II	U21CS4E2	Digital Marketing
B Sc Computer Science	Core V	U21CS505	Web Programming
B Sc Computer Science	Core VI	U21CS506	Principles of Operating Systems
B Sc Computer Science	Core VII	U21CS507	Foundations of Computer Graphics
B Sc Computer Science	Core Practical V	U21CS5P5	Web Programming Lab
B Sc Computer Science	Elective I	U21CS5:1	1a) Software Engineering
B Sc Computer Science	Elective I	U21CS5:2	1b) Internet of Things
B Sc Computer Science	Elective I	U21CS5:3	1c) Cloud Computing



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B Sc Computer Science	SBEC II	U21CSPS2	Mini Project
B Sc Computer Science	SBEC III	U21CSPS3	Technical Communication for Computer Technocrats
B Sc Computer Science	Core VIII	U21CS608	Principles of Computer Networking
B Sc Computer Science	Elective II	U21CS6:1	2a) Machine Learning
B Sc Computer Science	Elective II	U21CS6:2	2b) Web Applications Development
B Sc Computer Science	Elective II	U21CS6:3	2c) XML Basics
B Sc Computer Science	Elective III	U21CS6:4	3a) Business Analytics
B Sc Computer Science	Elective III	U21CS6:5	3b) Foundations of Enterprise Computing
B Sc Computer Science	Elective III	U21CS6:6	3c) Mobile Application Development
B Sc Computer Science	Core / Project	U21CS6PJ	Project Implementation

PROGRAM NAME	COURSE	COURSE CODE	COURSE NAME
M Sc Computer Science	Core I	P21CS101	Data Analytics
M Sc Computer Science	Core II	P19CS102	Mobile Application Development
M Sc Computer Science	Core III	P20CS103	Mathematical Foundation for Computer Science
M Sc Computer Science	Elective I	P19CS1:1	Managing Software Development
M Sc Computer Science	Elective I	P19CS1:2	Design and Implementation of Compilers
M Sc Computer Science	Elective I	P19CS1:3	Multimedia Systems and Design
M Sc Computer Science	Core Practica 1 I	P19CS1P1	Data Analytics Lab



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M Sc Computer Science	Core Practica I II	P19CS1P2	Mobile Application Development Lab
M Sc Computer Science	Core IV	P21CS204	Advanced Programming with .NET
M Sc Computer Science	Core V	P21CS205	Real Time Web App Development
M Sc Computer Science	Core VI	P21CS206	Cloud and Big Data Computing
M Sc Computer Science	Elective II	P21CS2:1	Network Management
M Sc Computer Science	Elective II	P21CS2:2	Advanced Microprocessors and Microcontrollers
M Sc Computer Science	Elective II	P21CS2:3	Client Server Computing
M Sc Computer Science	Elective III	P21CS2:4	Block Chain Technologies
M Sc Computer Science	Elective III	P21CS2:5	Virtual and Augmented Reality
M Sc Computer Science	Elective III	P21CS2:6	Information Retrieval
M Sc Computer Science	Core Practica I III	P21CS2P3	Advanced Programming with .NET Lab
M Sc Computer Science	Core Practica I IV	P21CS2P4	Real Time Web App Development Lab
M Sc Computer Science	Core VII	P21CS307	Image and Video Analysis
M Sc Computer Science	Core VIII	P21CS308	Machine Learning
M Sc Computer Science	Core IX	P21CS309	Cognitive Computing
M Sc Computer Science	Elective IV	P21CS3:1	Design and Implementation of Data Warehouse
M Sc Computer Science	Elective IV	P21CS3:2	Mobile Computing
M Sc Computer Science	Elective IV	P21CS3:3	Distributed Object Technology
M Sc Computer Science	Core Practica I V	P21CS3P5	Image and Video Analysis Lab



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M Sc Computer Science	Core Practica I VI	P21CS3P6	Machine Learning Lab
M Sc Computer Science	Core X	P21CS410	Neural Networks and Deep Learning
M Sc Computer Science	Core XI	P21CS411	Network Security
M Sc Computer Science	Elective V	P21CS4:1	Internet of Things
M Sc Computer Science	Elective V	P21CS4:2	Supply Chain Management
M Sc Computer Science	Elective V	P21CS4:3	Linked Open Data and Semantic Web
M Sc Computer Science	Core Project	P21CS4PJ	Project



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CORE I: DATA ANALYTICS

SEMESTER: I
CREDITS: 4

CODE: P21CS101
HOURS/WEEK: 5

On successful completion of this course, students will be able to:

CO #	Course Outcomes	Level	Unit Covered
CO1	Experiment with the basic Python commands	K3	I
CO2	Develop array operations using NumPy and pandas data structures	K3	II
CO3	Discover data loading operations in Python	K4	III
CO4	Evaluate data wrangling methods in Python	K5	III
CO5	Construct Plotting, Visualization, Data Aggregation and Group operations	K6	IV
CO6	Create applications in Time Series and Financial analysis	K6	V

CORE II: MOBILE APPLICATION DEVELOPMENT

SEMESTER: I
CREDITS: 4

CODE: P19CS102
HOURS/WEEK: 5

On successful completion of this course, students will be able to:

CO #	Course Outcomes	Level	Unit Covered
CO1	Create android project from XML Layout	K3	I
CO2	Debug android app and create UI fragment	K3	II
CO3	Design and develop user interfaces for the Android platform	K4	III
CO4	Design mobile apps with audio play back	K5	IV
CO5	Create database and communicate with mobile application	K6	V
CO6	Apply Java programming concepts to Android application development	K6	V



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CORE III: MATHEMATICAL FOUNDATION FOR COMPUTER SCIENCE

SEMESTER: I
CREDITS: 4

CODE: P20CS103
HOURS/WEEK: 5

On successful completion of this course, students will be able to:

CO #	Course Outcomes	Level	Unit Covered
CO1	Examine and Evaluate the Logical propositions and predicates	K4	I
CO2	Solve the counting problems using Combinatorics and Probability	K5	II
CO3	Demonstrate the concepts of Sets and Relations for solving the complex problems	K4	III
CO4	Apply the knowledge on Graphs and Trees to real world applications.	K5	IV
CO5	Design the Languages using Grammars.	K5	V
CO6	Construct the different types of Machine using Languages and Grammars for computability.	K6	V

ELECTIVE 1A: MANAGING SOFTWARE DEVELOPMENT

SEMESTER: I
CREDITS: 4

CODE: P19CS1:1
HOURS/WEEK: 5

On successful completion of this course, students will be able to:

CO #	Course Outcomes	Level	Unit Covered
CO1	Apply the process to be followed in the software development life-cycle models.	K3	I
CO2	Use Agile process models for collaborative decision making.	K3	II
CO3	Analyze & design the software models using unified modeling language (UML).	K4	II
CO4	Implement quality management techniques & different types of metrics in software development.	K5	III
CO5	Schedule projects and manage risks using risk management strategies.	K5	IV
CO6	Apply project management concepts and techniques to an IT project.	K6	V



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CORE PRACTICAL I: DATA ANALYTICS LAB

SEMESTER: I
CREDITS: 3

CODE: P19CS1P1
HOURS/WEEK: 5

On successful completion of this course, students will be able to:

CO #	Course Outcomes	Level
CO1	Experiment with the basic Python commands	K3
CO2	Develop array operations using NumPy and pandas data structures	K3
CO3	Discover data loading operations in Python	K4
CO4	Evaluate data wrangling methods in Python	K5
CO5	Construct Plotting, Visualization, Data Aggregation and Group operations	K6
CO6	Create applications in Time Series and Financial analysis	K6

MOBILE APPLICATION DEVELOPMENT LAB

SEMESTER: I
CREDITS : 3

CODE: P19CS1P2
HOURS/WEEK : 5

On successful completion of this course, students will be able to:

CO #	Course Outcomes	Level	Ex. No.
CO1	Design the Mobile app for general purposes with preliminary concepts	K6	1
CO2	Design the Mobile App with Database connectivity	K6	2-6
CO3	Develop the app with Graphical Primitives	K5	7
CO4	Develop the app with multithread concepts	K5	8
CO5	Create the app GUI components	K6	9-10
CO6	Create the Mobile apps with Background designs	K6	9-10



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CORE VI: ADVANCED PROGRAMMING WITH .NET

SEMESTER: II

CREDITS : 4

CODE: P21CS204

HOURS/WEEK : 4

On successful completion of this course, students will be able to:

CO #	Course Outcomes	Level	Unit
CO1	Understand architecture of .NET Core, MVC web based Application.	K6	I
CO2	Implement real time applications using RazorView & signalR.	K6	II
CO3	Build interactive web based UI using AJAX & jQuery.	K5	III
CO4	Build interactive UI for desktop application.	K4	IV
CO5	Use advanced concepts related to Web Services and desktop application in project development.	K6	IV
CO6	Design the cloud applications using Azure Cloud	K6	V

CORE V: REAL TIME WEB APP DEVELOPMENT

SEMESTER: II

CREDITS: 4

CODE: P21CS205

HOURS/WEEK: 5

On successful completion of this course, students will be able to:

CO #	Course Outcomes	Level	Unit
CO1	Design and Develop the Web Applications using Node.js.	K5	I
CO2	Construct Web Applications using Express.js	K4	II
CO3	Understand MongoDB and its applicability.	K2	III
CO4	Illustrate the features of MongooseDB.	K4	IV
CO5	Build Web Applications using AngularJS.	K6	V
CO6	Develop various server side web applications using tools, middleware technologies and use them to develop web applications	K5	V



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CORE IV: CLOUD AND BIG DATA COMPUTING

SEMESTER: II

CREDITS : 4

CODE: P21CS206

HOURS/WEEK : 4

On successful completion of this course, students will be able to:

CO. #	Course Outcomes	Level	Unit
CO1	Understand the concepts of Cloud computing	K6	I
CO2	Develop and evaluate the cloud services	K6	II
CO3	Assess the SLA and Data Security in Cloud	K5	III
CO4	Explain the Big Data Fundamentals	K4	IV
CO5	Design the Big Data Storage concepts	K6	IV
CO6	Analyse the Big Data models	K5	V

ELECTIVE 2 A: NETWORK MANAGEMENT

SEMESTER: II

CREDITS: 4

CODE: P21CS2:1

HOURS/WEEK: 5

On successful completion of this course, students will be able to:

CO #	Course Outcomes	Level	Unit Covered
CO1	Interpret the communication protocols and standards	K4	I
CO2	Elaborate various aspects of network management	K5	II
CO3	Adapt different technologies for networking	K4	III
CO4	Analyze transmission technologies and management models	K5	IV
CO5	Illustrate the model of Simple Network Management Protocol	K5	V
CO6	Discover and apply Network Management Tools, System, and Engineering	K6	V



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ELECTIVE 3a: BLOCK CHAIN Technologies

SEMESTER: II
CREDITS: 4

CODE: P18CS2:4
HOURS/WEEK: 4

On successful completion of this course, students will be able to:

CO #	Course Outcomes	Level	Unit Covered
1	Perceive the role cryptography plays in securing block chain based cryptocurrencies	K5	I
2	Analyze transactions and operations on block chains and smart contracts required to plan more robust financial systems	K4	II
3	Discuss how emerging block chain and cryptocurrencies ecosystems are set to impact economies, finance, government and regulation	K5	III
4	Examine the technologies behind block chain and explore their application in the business context	K4	IV
5	Design, build and deploy smart contracts and distributed applications	K5	V
6	Elaborate the intrinsic value of leading cryptocurrencies, Bitcoin and Ethereum	K6	V

CORE PRACTICAL III: ADVANCED ASP .NET PROGRAMMING LAB

SEMESTER: II
CREDITS: 4

CODE: P21CS2P3
HOURS/WEEK: 3

On successful completion of this course, students will be able to:

CO #	Course Outcomes	Level	Ex. No.
CO1	Design the Website using ASP .NET MVC Controls	K6	1-2
CO2	Establish the database connectivity for ASP .NET MVC web applications	K6	3-4
CO3	Design the web applications using RazorView and SignalR Controls	K6	5-6
CO4	Develop the web application using AJAX Controls	K6	7
CO5	Design the webservice using XML	K6	8
CO6	Design the web applications using Azure Cloud and Xamarin	K6	9 - 10



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CORE PRACTICAL IV: REAL TIME WEB APP DEVELOPMENT LAB

SEMESTER: II
CREDITS: 4

CODE: P21CS2P4
HOURS/WEEK: 3

On successful completion of this course, students will be able to:

CO #	Course Outcomes	Level	Ex. No
CO1	Develop web application in Node JS, by understand the steps in designing a web page	K5	1-2
CO2	Design a webpage using server controls and manages the properties of server controls	K5	3
CO3	Develop an express .js code to create basic controls and model view controls	K5	4-6
CO4	Design web applications using controls of Angular js	K6	7-8
CO5	Develop the web application with ngModel and ngContorller	K6	9
CO6	Understand and implement the CRUD operations	K6	10

CORE VII: IMAGE AND VIDEO ANALYSIS

SEMESTER: III
CREDITS: 4

CODE: P21CS307
HOURS/WEEK: 5

On successful completion of this course, students will be able to:

CO #	Course Outcomes	Level	Unit
CO1	Apply the concepts of Image Transformation, Enhancement, segmentation, compression on the Monochrome and color images.	K3	I
CO2	Develop the algorithms for Image Enhancement, Segmentation, Compression, Video restoration, video enhancement and video motion estimation in MATLAB	K5	II
CO3	Develop a feature extraction algorithms for different types of images	K5	III
CO4	Develop the algorithms for Image Enhancement, Segmentation for Colour Images	K5	IV
CO5	Examine the video restoration, enhancement and motion estimation of videos	K5	V
CO6	Formulate the research problems on Computer Vision	K6	V



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CORE VIII: MACHINE LEARNING

SEMESTER: III
CREDITS: 5

CODE: P21CS308
HOURS/WEEK: 5

On successful completion of this course, students will be able to:

CO #	Course Outcomes	Level	Unit Covered
CO1	Elaborate the basics of building machine learning systems, to implement the perceptron learning model and the convergence.	K6	I
CO2	Demonstrate the sci-kit learning method and SVM for solving linear and non-linear problems.	K4	II
CO3	Apply the Dimensionality Reduction and model evaluation for different data set	K5	III
CO4	Compare the different cluster analysis algorithm	K4	IV
CO5	Develop the neural network for the various dataset to classify them	K6	IV
CO6	Design the web application using Scikit FLASH	K6	V

CORE IX: COGNITIVE COMPUTING

SEMESTER: III
CREDITS: 4

CODE: P21CS309
HOURS/WEEK: 5

On successful completion of this course, students will be able to:

CO. #	Course Outcomes	Level	Unit
CO1	Design and evaluate the cognitive system	K6	I
CO2	Develop the cognitive system using NLP	K6	II
CO3	Evaluate the role of big data in cognitive systems	K5	III
CO4	Design the business implications of cognitive computing	K4	IV
CO5	Build the application of cognitive computing for precision medicine	K6	V
CO6	Develop the applications of cognitive in Healthcare	K6	V



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ELECTIVE 4a: DESIGN AND IMPLEMENTATION OF DATA WAREHOUSE

SEMESTER: III
CREDITS: 4

CODE: P21CS3:1
HOURS/WEEK: 5

On successful completion of this course, students will be able to:

CO #	Course Outcomes	Level	Unit Covered
CO1	Explain the fundamental concepts of data warehouse	K2	I
CO2	Illustrate the model of data warehouse architecture	K4	II
CO3	Impart the concepts of analytical processing operation	K4	III
CO4	Determine data warehouse design concepts	K3	IV
CO5	Create queries to get the desired results from data warehouse	K5	V
CO6	Evaluate Extraction, Transformation and Loading techniques in order to get information from the internal and external sources	K6	V

CORE PRACTICAL VI: IMAGE AND VIDEO ANALYTICS LAB

SEMESTER: III
CREDITS: 3

CODE: P21CS3P5
HOURS/WEEK: 5

On successful completion of this course, students will be able to:

CO #	Course Outcomes	Level
CO1	Practice fundamental concepts of images and image Transformation	K4
CO2	Analyze the transformation, filtering, segmentation and edge detection methods	K5
CO3	Construct the Matlab applications for image compression techniques	K6
CO4	Develop the matlab programs for motions and objects from videos	K5
CO5	Design the applications for colour image processing operations	K6
CO6	Formulate the research problems on Computer Vision	K6



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MACHINE LEARNING LAB

SEMESTER: II
CREDITS: 3

Code: P18CS3P6
HOURS/WEEK:5

On successful completion of this course, students will be able to:

CO #	Course Outcomes	Level	Ex. No.
CO1	Apply the Pre-processing on the given dataset	K5	1
CO2	Develop and evaluate the regression model using Datasets	K6	2,3,4,
CO3	Develop and evaluate the Support Vector Machine using Datasets	K6	5
CO4	Develop and evaluate the Decision Tree Classifier and Regressor using Datasets	K6	6,7
CO5	Develop and evaluate the Clustering model using Datasets	K6	8, 9
CO6	Develop and evaluate the Neural Network and Perceptron model using Datasets	K6	10

CORE X: NEURAL NETWORKS AND DEEP LEARNING

SEMESTER: IV
CREDITS: 4

CODE: P21CS410
HOURS/WEEK: 5

On successful completion of this course, students will be able to:

CO #	Course Outcomes	Level	Unit Covered
CO1	Develop a simple Neural Network for the given problem	K4	I
CO2	Perform training and evaluation using various metrics	K5	II
CO3	Design NEAT network	K4	III
CO4	Design and develop convolutional neural network	K5	IV
CO5	Develop the algorithms for pruning the CNN	K5	V
CO6	Design and develop recurrent neural network	K6	V



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CORE XI: NETWORK SECURITY

SEMESTER: IV
CREDITS: 4

CODE: P21CS411
HOURS/WEEK: 5

On successful completion of this course, students will be able to:

CO #	Course Outcomes	Level	Unit Covered
CO1	Classify various of attacks	K2	I
CO2	Examine a variety of algorithm	K4	II
CO3	Apply the concepts of Encryption and decryption messages using block chippers and sign.	K3	III
CO4	Create digital signature using various algorithms.	K6	IV
CO5	Classify web security, intruders, viruses and firewalls	K4	V
CO6	Analyze Various Security Services	K5	V

ELECTIVE 5a: INTERNET OF THINGS

SEMESTER: IV
CREDITS: 4

CODE: P21CS4:1
HOURS/WEEK: 5

On successful completion of this course, students will be able to:

CO #	Course Outcomes	Level	Unit
1	Evaluate the architecture of IoT and Business Models	K6	I
2	Design and Develop the tools for IoT	K4	II
3	Assess the security and privacy in IoT	K5	III
4	Design the IoT devices using hardware and Arduino	K6	IV
5	Build the wearable device for IoT computing	K6	IV
6	Analyse the application of IoT	K6	V