



Bachelor of Science (Computer Applications & Information Technology)
B.Sc. (CA & IT)
Semester - V

Course Code	US05MABIT01	Title of the Course	Fundamentals of Computer Networks
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	1. To understand the basic concepts of computer networks and data communication. 2. To acquire knowledge of basic concepts related to network protocols and standards. 3. To learn fundamentals of wireless networking.
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Course Content		
Unit	Description	Weightage (%)
1.	Introduction <ul style="list-style-type: none">Computer networks : definition, advantages-disadvantagesClassification of computer networksCategories of computer network : local area networks, metropolitan area networks, wide area networksUses of Computer NetworkMeaning of the basic terms : topology, data rate, modulation rate, spectrum, bandwidth, server, host	25
2.	Data Communication Fundamentals <ul style="list-style-type: none">Various types of transmission mediaGuided transmission media: magnetic media, twisted pair, coaxial cables, fiber opticsIntroduction to the concept of modulation, Types of modulationSerial transmission vs. Parallel transmissionCircuit switching, packet switching, message switchingConcept of multiplexing: frequency division multiplexing, time division multiplexing	25
3.	Layered Protocols and Satellite Communication <ul style="list-style-type: none">Protocol significance and hierarchiesDesign issues for the layersThe OSI reference modelExamples of protocols for different layers of the OSI modelIntroduction communication satellites and categories (LEO, MEO, GEO)	25





4.	Introduction to Wireless Networks and Networking Devices <ul style="list-style-type: none"> – Introduction to wireless networks: Bluetooth – LAN topologies with advantages and disadvantages: bus, star, ring, tree, mesh – Introduction to carrier sense multiple access (CSMA), carrier sense multiple access with collision detection (CSMA/CD) protocol for LAN – Functions of various network connecting devices: modems, amplifiers, repeaters, hubs, switches, bridges, routers, gateway 	25
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Teaching-Learning Methodology	Blended learning approach incorporating both traditional classroom teaching as well as usage of ICT tools.
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written Examination (As per CBCS R.6.8.3) Internal Continuous Assessment in the form of Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	50%
2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to develop	
1.	ability to describe the significance and functioning of computer networks.
2.	understanding of the fundamental concepts related to data communication.
3.	knowledge of various network protocols and standards.
4.	knowledge of basic concepts related to wireless networking.

Suggested References:	
Sr. No.	References
1.	Tanenbaum A. S., computer networks, 3rd edition prentice-hall of India Pvt. Ltd., New Delhi, 1997.
2.	Behrouz Forouzan, introduction to data communications and networking, Tata McGraw-hill publishing co. Ltd., New Delhi, 4th edition, 1998.
3.	Stallings W., Data and Computer Communications, 3rd edition, Macmillan Pub. Company, New York, 1991.





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Course Code	US05MABIT02	Title of the Course	Visual Programming
Total Credits Of the Course	4	Hours per Week	4

Course Objectives:	<ol style="list-style-type: none"> 1. To understand .NET Framework and describe some of the major enhancements to the new version of Visual Basic. 2. To describe the basic structure of a Visual Basic .NET project and use main features of the Integrated Development Environment (IDE). 3. To understand how to create applications using Microsoft Windows Forms. 4. To understand Exception handling. 5. To understand and create applications that use ADO.NET
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Course Content		
Unit	Description	Weightage (%)
1.	Introduction to .NET Framework (4.5) and VB.NET <ul style="list-style-type: none"> – .NET Architecture – .NET Languages, Microsoft Intermediate Language (MSIL) – The Just-In-Time (JIT) compiler – Working with Assemblies – The .NET framework class library VB.NET, introduction, applications and types of project Introduction to Visual Studio IDE – Creating simple Windows Application using VB.NET Variables, data types, constants and operators – Type casting, Boxing and Unboxing – Working with arrays and strings Creating simple Windows Application using VB.NET 	25
2.	Fundamentals of VB.NET <ul style="list-style-type: none"> – VB.NET Basics, Use of conditional statement (if), Multi branching statement (select) and With...End With statement – Looping Statement: DO, FOR, FOR EACH..NEXT and WHILE, Working with EXIT, CONTINUE and WITH statements – Working with procedures – introduction, types, use of parameters, parameter passing, and procedures – OOP concepts - Encapsulation, Inheritance – Interfaces and Polymorphism, working with modules, classes (partial) and namespaces – Working with Windows Forms – introduction, life cycle, basic properties, methods and events, use of simple windows forms control. – Working with SDI and MDI forms 	25





3.	Developing Windows Forms, Exception Handling <ul style="list-style-type: none"> Working with basic controls – Button, CheckBox, CheckedListBox, ComboBox, DateTimePicker, GroupBox, HScrollBar, RadioButton, VscrollBar, Label, ListBox, PictureBox, TextBox and Time controls. Working with advanced controls – LinkLabel, RichTextBox, ColorDialog, FontDialog, TreeView, Error Provider Control Working with modules, classes (partial) and namespaces Error Handling: exception, structured exception using try...catch and final statement 	25
4.	Database with ADO.NET <ul style="list-style-type: none"> Persisting Data Using Databases and Files ADO.NET –introduction and applications ADO.NET – architecture (connected and disconnected) Database connectivity using ADO.NET Use of Data sources, Server Explorer and working with DataSet, Populating data in a DataGridView Working with report 	25

Teaching- Learning Methodology	Blended learning approach incorporating both traditional classroom teaching as well as usage of ICT tools
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written Examination (As per CBCS R.6.8.3) Internal Continuous Assessment in the form of Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	50%
2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to understand	
1.	The .NET Framework and describe some of the major enhancements to the new version of Visual Basic.
2.	The basic structure of a VisualBasic .NET project and use main features of the integrated development environment (IDE).
3.	How to create applications using Microsoft Windows Forms.
4.	The basic concepts related to Exception handling.
5.	How to develop applications that use ADO.NET.





Suggested References:

Sr.No.	References
1.	Steven Holzner; VB.NET Black Book by Dreamtech publication, 2005.
2.	Francesco Balena : Programming Microsoft Visual Basic.NET, Microsoft Press, 2003.
3.	Bill Evjen, BillyHollis, Bill Sheldon, KentSharkey and Tim McCarthy: Professional VB 2005 with .NET 3.0, 2007.

On-line resources to be used if available as reference material

On-line Resources

1. <https://www.tutorialspoint.com/>

2. <https://www.w3schools.com/>

3. <https://www.javatpoint.com/>





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Course Code	US05MABIT03	Title of the Course	Practical based on US05MABIT02
Total Credits of the Course	4	Hours per Week	8

Course Objectives:	<ol style="list-style-type: none"> 1. To understand .NET technology and describe some of the major enhancements to the new version of Visual Basic. 2. To describe the basic structure of a Visual Basic .NET project and use main features of the Integrated Development Environment (IDE). 3. To understand how to create applications using Microsoft Windows Forms. 4. To understand Exception handling. 5. To understand and create applications that use ADO.NET
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Course Content		
	Description	Weightage (%)
	Practical Based on Programming Fundamental Using Visual Basic .NET	100%

Teaching-Learning Methodology	Practical-based learning in small groups and Hands on training through required ICT tools.
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Practical Examination (As per CBCS R.6.8.3) Internal Continuous Assessment in the form of Practical, Viva-voce, Attendance (As per CBCS R.6.8.3)	50%
2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to understand	
1.	the basic structure of a VisualBasic .NET project and use main features of the integrated development environment (IDE).
2.	how to create applications using Microsoft Windows Forms and Exception Handling





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Course Code	US05MIBIT04	Title of the Course	Python Programming
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	<ol style="list-style-type: none"> 1. To learn the fundamentals of the Python programming language. 2. To study the concepts of object-oriented programming using Python. 3. To learn exception handling in Python.
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Course Content		
Unit	Description	Weightage (%)
1.	Basic Python <ul style="list-style-type: none"> – Python Overview, Features of Python, Differences among C, JAVA and Python – Applications of Python, Programming Structure of Python – Introduction to Python Libraries (NumPy, Pandas, Matplotlib, etc.) – Python Environment Setup, Basic Syntax of Python, Python Data types, Python variables, Casting, Operators, Comments, – User Input, Decision making and Branching, Looping, Range, List and Tuple, Set and Dictionary, Strings and basic operations 	50
2.	Advanced Python <ul style="list-style-type: none"> – Concept of Class, Object and Instances, Constructor, class attributes and destructors, Functions, Scope, Iterators – Inheritance, method overloading and overriding in Python, concepts of Modules, Lambda function – Debugging, Python Error with its Types, Exception handling in Python. 	50

Teaching-Learning Methodology	Blended learning approach incorporating traditional classroom teaching and online /ICT-based teaching practices.
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written Examination (As per CBCS R.6.8.3) Internal Continuous Assessment in the form of Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	50%
2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to develop	
1.	ability to develop computer programs using the Python programming language.
2.	knowledge of manipulating different Python data types.
3.	ability to develop object-oriented programs using Python.
4.	basic knowledge of exception handling.

Suggested References:	
Sr. No.	References
1.	John V Guttag. "Introduction to Computation and Programming Using Python", Prentice Hall of India, 2016.
2.	Wesley J. Chun. "Core Python Programming -Second Edition", Prentice Hall, 2006.
3	Learning Python: By Mark Lutz, David Ascher, 2009
4	Exploring Python Book by Timothy Budd, 2011.
5	Head First Python: A Brain-Friendly Guide by Aul Barry, 2016.
6	Introducing Python -Modern Computing in Simple Packages – Bill Lubanovic, O'Reilly Publication, 2014.

On-line resources to be used if available as reference material

1.	https://www.w3schools.com/python
2.	https://www.tutorialspoint.com/python





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Course Code	US05MIBIT05	Title of the Course	Practical based on US05MIBIT04
Total Credits of the Course	2	Hours per Week	4

Course Objectives:	<ol style="list-style-type: none"> 1. To learn the fundamentals of the Python programming language. 2. To study the concepts of object-oriented programming using Python. 3. To learn exception handling in Python.
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Course Content		
	Description	Weightage (%)
	Practical Based on Programming Fundamentals of Python	100%

Teaching-Learning Methodology	Practical-based learning in small groups and Hands on training through required ICT tools.
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Practical Examination (As per CBCS R.6.8.3) Internal Continuous Assessment in the form of Practical, Viva-voce, Attendance (As per CBCS R.6.8.3)	50%
2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to develop	
1.	ability to implement computer programs using the Python programming language.
2.	ability to implement object-oriented programs using Python.





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Course Code	US05MIBIT06	Title of the Course	Object Oriented Programming - II
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	1. To study the fundamental concepts related to Servlet, Multi-threading. 2. To acquire knowledge about basic concepts and implementation of JSP.
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Course Content		
Unit	Description	Weightage (%)
1.	Servlet <ul style="list-style-type: none"> – Introduction – Types of servlets – Life cycle of servlet – Introduction to Session Tracking and Cookie Multi-threading <ul style="list-style-type: none"> – Introduction – Thread Life Cycle – Creating Thread – Introduction to Thread Methods and Thread Synchronization 	50
2.	Java Server Pages (JSP) <ul style="list-style-type: none"> – Introduction to JSP and Lifecycle – Components of JSP – Directives, Tags, Scripting Elements – Execution process of JSP Application – Building a simple application using JSP 	50

Teaching-Learning Methodology	Blended learning approach incorporating both traditional classrooms teaching as well as usage of ICT tools.
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**Evaluation Pattern**

Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written Examination (As per CBCS R.6.8.3) Internal Continuous Assessment in the form of Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	50%
2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to understand

1.	the concept of Servlet and execution of multi-processing using multithreading environment
2.	web application development using JSP.

Suggested References:

Sr. No.	References
1.	The Complete Reference – JAVA Herbert Schildt, 2017.
2.	Core Java –II By Cay S. Horstmann and Gary Cornell, 2020.
3.	Complete Reference J2EE – Jim Keogh, 2017.
4.	Programming with Java- A Primer by E. Balagurusamy, 3rd Edition, TMH, 2007.





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Course Code	US05MABIT07	Title of the Course	Practical based on US05MIBIT 06
Total Credits of the Course	2	Hours per Week	4

Course Objectives:	1. To study the fundamental concepts related to Servlet, Multi-threading. 2. To acquire knowledge about basic concepts and implementation of JSP.
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Course Content		
	Description	Weightage (%)
	Practical Based on Programming Fundamental Using Java	100%

Teaching-Learning Methodology	Practical-based learning in small groups and Hands on training through required ICT tools.
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Practical Examination (As per CBCS R.6.8.3) Internal Continuous Assessment in the form of Practical, Viva-voce, Attendance (As per CBCS R.6.8.3)	50%
2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to implement	
1.	the concept of Servlet and multi-processing using multithreading environment
2.	web application using JSP.





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Course Code	US05SEBIT08	Title of the Course	Basics of Data Science
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	1. To acquire basic knowledge of data science, data analytics and big data. 2. To learn development of data science applications using Python and R.
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Course Content		
Unit	Description	Weightage (%)
1.	Introduction to Data Science Data Analytics <ul style="list-style-type: none">– Data science definition– Need and features– Importance of data science in modern business– Current trends in data science– Analytical techniques– Classification of analytics	50
2.	Big Data and R Studio <ul style="list-style-type: none">– What is data? Types of digital data – structured and unstructured data.– Evolution and definition of big data.– Characteristics of big data.– Introduction to R– Introduction to R Studio– Developing data science applications using Python and R	50

Teaching-Learning Methodology	Blended learning approach incorporating both traditional classrooms teaching as well as usage of ICT tools.
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written Examination (As per CBCS R.6.8.3) Internal Continuous Assessment in the form of Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	50%
2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to gain	
1.	basic knowledge of data science, data analytics and big data
2.	skill to development of data science applications using Python and R

Suggested References:	
Sr. No.	References
1.	Davy Cielen, Arno D.B. Meysman, Mohamed Ali, Introducing Data Science: Big Data, Machine Learning and More, Using Python Tools, 2016.
2.	Vignesh Prajapati, Big Data Analytics with R and Hadoop – Packt, 2013.
3.	Mark Lutz, "Learning Python", 4th Edition, O'Reilly, 2009.
4.	Wes McKinney, "Python for Data Analysis", O'Reilly, 2013.
5.	Robert I. Kabacoff, "R in Action: Data Analysis and Graphics with R", Manning, 2011.

