

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.



CIRCULAR NO.SU/ Faculty of Science & Technology./B.VOC./ 60 /2023.

It is hereby informed to all concerned that, on the recommendation of Ad-hoc Board in Vocational Studies and Dean, Faculty of Science & Technology the Hon'ble Vice-Chancellor has **accepted the curriculum of following B.Voc. Courses under Choice Based Credit and Grading System** in his emergency powers under Section-12 [7] of the Maharashtra Public Universities Act, 2016 on behalf of the Academic Council as appended herewith:

Sr.No.	Course Name	Semester
1.	B.Voc in Medical Laboratory Technology	V & VI
2.	B.Voc in Software Development	V & VI

This is effective from the **Academic Year 2022-23 and** onwards. This curriculum is also available on the University website www.bamu.ac.in.

All concerned are requested to note the contents of the circular and bring notice to the students, teachers and staff for their information and necessary action.

University campus,
Aurangabad-431 004.

Ref. No.SU/B.voc./Curri./2022-23/28094-104

Date: 28.04.2023

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**Deputy Registrar,
Academic [Syllabus]
Section.**

Copy forwarded with compliments to :-

- 1] **The Principal All Affiliated Concerned Colleges, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.**
- 2] **The Director, University Network & Information Centre, UNIC, with a request to upload the curriculum along with this Circular on University Website.**

Copy to :-

- 1] The Director, Board of Examinations & Evaluation, Dr.BAMU, A'bad
- 2] **The Concerned Section, Examination Branch,**
- 3] The Section Officer, [Eligibility Unit],
- 4] **The Programmer [Computer Unit-1] Examinations, section, Dr. BAMU, A'bad**
- 5] **The Programmer [Computer Unit-2] Examinations, section, Dr. BAMU, A'bad**
- 6] The In-charge, [E- Suvidha Kendra],
- 7] The B.Voc Section, Dr. BAMU, A'bad
- 8] The Public Relation Officer,
- 9] The Record Keeper,

MARATHWADA UNIVERSITY AURANGABAD



SYLLABUS OF BACHELOR OF VOCATIONAL IN B.Voc in Software Development Sem-V & VI

Choice Based Credit System

Effective form the Academic Year
2022-23 Onwards



कृष्णाई शिक्षण प्रसारक मंडळ, लातूर संचलित,

जनविकास महाविद्यालय, बनसारोळा

ता. केज, जि. बीड - ४३१५१८ (महाराष्ट्र)
दूरध्वनी (०२४४५) २३७२४९, फॅक्स : ०२४४५ - २३७२४९
संलग्न : डॉ. बाबासाहेब आंबेडकर मराठवाडा विद्यापीठ, औरंगाबाद
Email : principaljanvikas@rediffmail.com

सौ. आर.ए. तट
अध्यक्ष

डॉ.बी.एम. गोरे
सचिव

डॉ. बाबासाहेब गोरे
प्राचार्य

जा.क्र.
जा.क्र. : जमब/अभ्यासक्रम/२०२२-२३/९४२-१

दि.
दि.१२/०४/२०२३

प्रति,

मा. उपकुलसचिव,
शैक्षणिक विभाग (बी.व्होक.),
डॉ.बाबासाहेब आंबेडकर मराठवाडा विद्यापीठ,
औरंगाबाद.



विषय:- बी.व्होक. तृतीय वर्ष (पाचवे व सहावे सत्र) पदवी कोर्सचा (विज्ञान व तंत्रज्ञान विद्याशाखा) त्रुटी पुर्ततेसह स्विकारणे बाबत.

संदर्भ:- जा.क्र. : जमब/अभ्यासक्रम/२०२२-२३/८८६ दि.०५/०९/२०२२.

महोदय,

वरील संदर्भित पत्रान्वये आमच्या महाविद्यालयात कडून सादर Software Development केलेल्या अभ्यासक्रमात विज्ञान व तंत्रज्ञान विद्याशाखा यांच्या बैठकीमध्ये निघालेली त्रुटीची पुर्तता करुन सुधारीत अभ्यासक्रम सादर करत आहोत. अभ्यासक्रम प्रमाणित करण्यासाठी विद्यापीठाच्या विहीत फॉर्मेट मध्ये अभ्यासक्रम तयार करुन सोबत देत आहोत. अभ्यासक्रम प्रमाणित करुन मिळावा ही विनंती.

आपला विश्वासू

जनविकास महाविद्यालय
बनसारोळा, ता. केज, जि. बीड

सोबत :

१) अभ्यासक्रम आराखडा

Pattern verified
12/4/23

**Dr. Babasaheb Ambedkar Marathwada University,
Aurangabad (MS)**



**Syllabus of
B. Voc.
Software Development
(Third Year) (3 years Degree Course)**

**Introduced from Academic Year
2022-23**

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (MS)

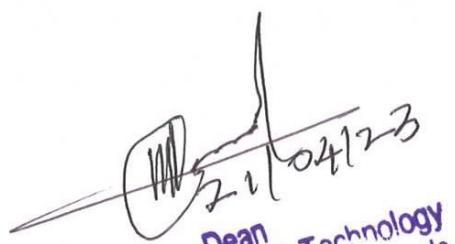
B. Voc. Software Development

Syllabus with effective from 2022-2023

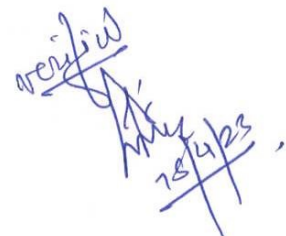
B.Voc. Software Development, Second Year

Semester V

Sr. No.	Course Code	Course Title	Contact Hours Per Week		Evaluation Scheme (Marks)		Total Credits
			L	P	CIA	SEE	
	General Education						
1	BVOC501	Logical and Analytical Reasoning	4	0	20	80	4
2	BVOC502	Fundamentals of Cyber Security	4	0	20	80	4
3	BVOC503	Software Project Management	4	0	20	80	4
	Skill Courses						
4	BVOC 504	Mobile Application Development -I	4	0	20	80	4
5	BVOC 505	Dot Net Programming -II	4	0	20	80	4
6	BVOC 506	OOPs with Java	4	0	20	80	4
	Practical Skill Courses						
7	BVOC 507	LAB 1 : Lab based on Android	0	4	25	25	2
8	BVOC 508	LAB 2 : Lab based on Cyber Security	0	4	25	25	2
9	BVOC 509	LAB 3 : Lab based Software Project Management	0	4	25	25	2
	Total				195	555	30


 21/04/23
 Dean
 Faculty of Science & Technology
 Dr. Babasaheb Ambedkar
 University, Aurangabad




 18/4/23

Semester VI

Sr. No.	Course Code	Course Title	Contact Hours Per Week		Evaluation Scheme (Marks)		Total Credits
			L	P	CIA	SEE	
	General Education						
1	BVOC 601	Social Media Networking	4	0	20	80	4
2	BVOC 602	Introduction to Artificial Intelligence	4	0	20	80	4
3	BVOC 603	Software Testing and Quality Assurance	4	0	20	80	4
	Skill Courses						
4	BVOC 604	Mobile Application Development-II	4	0	20	80	4
5	BVOC 605	Seminar Presentation	4	0	20	80	4
6	BVOC 606	Concepts of Data Mining	4	0	20	80	4
	Practical Skill Courses						
7	BVOC 607	LAB 1 : Industrial Case study	0	4	25	25	2
8	BVOC 608	LAB 2 : Industrial Visit	0	4	25	25	2
9	BVOC 609	LAB 3: Software testing tools	0	4	25	25	2
	Total				195	555	30


 21/04/23
 Dean
 Faculty of Technology
 D. J. Somaiya Institute of Technology
 Wadgaon, Wadgaon
 Wadgaon, Wadgaon

Course Code	Course Title	Credits 04
BVOC 501	Logical and Analytical Reasoning	Marks - 100
Objectives	1. To build and improve mental aptitude, critical thinking and logical skills of the students for problem solving 2. To dissect and study a problem in a logical manner to determine a practical solution to the problems 3. To improve ability of students to study information and apply logic to find patterns and make inferences. 4. To understand statements and making sense of them using logic and establishing theory.	
Outcome	After successful learning of this course students will be able to: 1. Find solutions to common problems and make informed decisions about which action to take next. 2. Understand problems and analyzing the situation for viable solutions. 3. Make important decisions, determine the truth, solve problems, come up with new ideas and set achievable goals 4. Apply logical thinking to a situation to derive the correct problem solving strategy	
Unit I	Introduction of Mathematical Reasoning Basics of mathematical reasoning, Problems on Number series, Letter series, Letters -Numbers mixed series, Elementary statistics, Progressions, Averages and mixtures. (15 Hours)	
Unit II	Arithmetic Based Problems on Quantitative Aptitude Problems and solution methods on Percentage, Profit and Loss, Proportion, Interest and Discounting, Time Speed and Distance, Time and Work, Ratio and proportion. (15 Hours)	
Unit III	Logical Reasoning-I & Logical Reasoning-II i) Important concepts in logical reasoning (Logic and Language), Understanding structure of arguments, Statements and assumptions, Statements and arguments, Statements and course of actions, Decision making. ii) Assertion and reasons Cause and effect, Syllogisms, Logical diagrams (Simple diagrammatic, Multi diagrammatic relationships), Venn diagrams, problems based on the logical diagrams. (15 Hours)	
Unit IV	Analytical Reasoning Important concepts in analytical reasoning, Analytical reasoning problems on Seating arrangement, Complex arrangements, Ranking and time sequence test, Directions, Calendars, Clocks, Blood Relationship, Number Series, Coding-Decoding, Assumption. (15 Hours)	

Suggested Readings	Reference Books: 1. How prepare for Logical Reasoning By Arun Sharma 2nd edition Mcgraw Hill Education 2. Analytical & Logical Reasoning , By Peeyush Bhardwaj 3. Best Book on Analytical Reasoning, By Dr.Vandana Gupta, Writersgram Publications 4. How prepare for Quantitative Aptitude By Arun Sharma 6nd edition Mcgraw Hill education Text Book : 1. Analytical Reasoning by MK Pandey 2. A Modern Approach to Verbal & Non-Verbal Reasoning by R.S. Aggarwal 3. How to Crack Test Of Reasoning by Arihant Experts. 4. 8. Shortcuts in Reasoning (Verbal, Non-Verbal, Analytical & Critical) for Competitive Exams by Disha Experts. 5. 9.Reasoning by Disha Experts · Analytical & Logical Reasoning For CAT
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Course Code	Course Title	Credits 04
BVOC 502	Fundamentals of Cyber Security	Marks - 100
Objectives	1. To Identify Key concept and Terminology of Cyber Security. 2. To examine the concept of privacy and its legal protections. 3. To explain the primary concepts involving encryption. 4. To perform basic computer forensics and describe the social implications of cyber security. 5. To Understand the risks and benefits of social networks	
Outcome	After successful learning of this course students will be able to: 1. Evaluate fundamental cyber security concepts, theories, and strategies as they apply to real world case studies. 2. Explain technical and non-technical security solutions on different types of cyber systems. 3. Assess risks, vulnerabilities, and threats to sample cyber systems. 4. Identify attributes associated with cyber security professionals.	
Unit I	Introduction to Information System & Information Security (15 Hours) Information System- Components, Categories, Individuals, Development of Information Systems, Beginning with users, Determining need and performance expectations, Characteristics of good organizational IS talent, Stages in process design. Introduction, Threats to Information Systems, Information Assurance, Cyber Security and Security Risk Analysis	
Unit II	Application Security and Encryption (15 Hours) Introduction(Database/Email/Internet Security), Data Security Considerations(Backup Considerations, Archival Storage, Disposal of Data), Security Technology (Firewall,VPN), Intrusion Detection, Access Control, Cryptography; Cryptographic mechanisms; Digital signatures; Encryption Certificates.	
Unit III	Security Threats (15 Hours) Introduction to security threats, (Virus, Worms, Trojan Horse, Bombs, Trap Door, Email Spoofing, Email Virus, Macro Viruses, Malicious Software), Network and Security Attack, (Denial of Service Attack, Types of DOS Attacks, Methods of Attacks, Examples of Attacks-SYN Flood Attack, TCP/UDP/ICMP Flooding, Smurf, Ping of death, Tear Drop, LAND, Echo/Chargen, Naptha Attack,) (Electronic Payment System, Credit/Debit Cards, Smart Cards, E-Money, Electronic Fund Transfer, E-Commerce Business Model, E-Commerce Advantages and Disadvantages, E-Commerce Security Systems, Electronic Cash, Digital Signature, Public Key Cryptography.	

Unit IV	(15 Hours) Development of Secure Information System and Hardware issues Key Elements of an Information Security Policy, Information System Development Life Cycle, Application Security, (The foundation of security, Threats, Vulnerabilities,), Information Security Governance and Risk Management, Risk Management, Security Architecture and Design, Data Storage and Downloadable Devices, Physical Security of IT assets, CCTV and Intrusion Detection Systems, Security Measures
Suggested Readings	Reference Books: 1. Cyber security – Attack and Defense Strategies: 2nd Edition Paperback Yuri Diogenes (Author), ErdalOzkaya (Author) 2. Cyber Security Basics: Protect your organization ... (Paperback) by Franke, Don 3. Fundamentals of Cyber Security by MayankBhushan, BPB Publications, 1st Edition 4. Fundamentals of Cyber Security by Anil V. Turukmane, Lambert Academic Publishing 5. Cyber Security Basics: Protect Your Organization by Applying the Fundamentals by Don Franke, Create Space Independent Publishing Platform 6. Fundamentals of Cyber security by National Learning Corporation 7. CyberSecurity Basics: Protect Your Organization by Applying the Fundamentals by Don Franke Text Book 1. Information Security Basics: Fundamental Reading For InfoSec Including The Cissp, Cism, Ccna-Security Certification Exams by Ron McFarland Ph.D. 2. Cyber security for Beginners by RaefMeeuwisse 3. Computer Security Fundamentals by William (Chuck) Easttom, II, Chuck Easttom, Pearson, 2016

Course Code	Course Title	Credits 04
BVOC 503	Software Project Management	Marks - 100
Objectives	1. To understand the basics of software project and its management activities 2. To understand and highlights an importance of software project management 3. To understand the software project planning and evaluation techniques. 4. To plan and manage projects at each stage of the software development life cycle.	
Outcome	After successful learning of this course students will be able to: 1. Understand Project Management principles while developing the software project. 2. Apply extensive knowledge of basic project management concepts, framework, and process models while developing the software. 3. Implement a project to manage project schedule, project progress, expenses and resources with the application of suitable project management tools. 4. Estimate the risks involved in various project activities.	
Unit I	Introduction of Software Project Management & Planning (15 Hours) Fundamentals of Software Project Management (SPM), Need Identification, Vision and Scope, Project Management Cycle, SPM Objectives, Management Spectrum, SPM Framework. Software Project Planning, Planning Objectives, Project Plan, Types of project plan, Structure of a Software Project Management Plan, Software project estimation, Estimation methods, Estimation models, Decision process.	
Unit II	Project Organization and Scheduling (15 Hours) Project Elements, Work Breakdown Structure (WBS), Types of WBS, Functions, Activities and Tasks, Project Life Cycle and Product Life Cycle, Ways to Organize Personnel, Project schedule, Scheduling Objectives, Building the project schedule, Scheduling terminology and techniques, Network Diagrams: PERT, CPM, Bar Charts: Milestone Charts, Gantt Charts.	
Unit III	Project Monitoring and Control (15 Hours) Dimensions of Project Monitoring & Control, Earned Value Analysis, Earned Value Indicators: 23 Budgeted Cost for Work Scheduled (BCWS), Cost Variance (CV), Schedule Variance (SV), Cost Performance Index (CPI), Schedule Performance.	
Unit IV	Project Management and Project Management Tools (15 Hours) Software Configuration Management: Software Configuration Items and tasks, Baselines, Plan for Change, Change Control, Change Requests Management, Version Control, Risk Management: Risks and risk types, Risk Breakdown Structure (RBS), Risk Management Process: Risk identification, Risk analysis, Risk planning, Risk monitoring, Cost Benefit Analysis, Software Project Management Tools: CASE Tools, Planning and Scheduling Tools, MS-Project.	

Suggested Readings	Reference Book 1. Project Management: The Managerial Process with MS By Clifford F. Gray and Erik W. Larson, McGraw Hill 2. Project Management and Tools & Technologies – An overview, By Shailesh Mehta SPD Publications 3. Software Project Management – M. Cotterell, Tata McGraw-Hill Publication. 4. Software Project Management – Royce, Pearson Education 5. Software Project Management – S. A. Kelkar, PHI Publication. 6. Peopleware: Productive Projects and Teams. Text Book 1. Software Estimation: Demystifying the Black Art. 2. Project Management Absolute Beginner's Guide Author: Greg Horine 3. Be Fast or Be Gone: Racing the Clock with Critical Chain Project Management Author: Andreas Scherer 4. Making Things Happen: Mastering Project Management Author: Scott Berkun.
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Course Code	Course Title	Credits 04
BVOC 504	Mobile Application Development-I	Marks - 100
Objectives	1. To aware the programming environment of Android Studio 2. To develop an application using android studio 3. To understand the working of various palates used in Android Studio.	
Outcome	After successful learning of this course students will be able to: 1. Students are able to Android apps 2. Students are able to use various palates to develop Android apps	
Unit I	Introduction & Android Operating System Installations (15 Hours) Introduction to mobile devices Palm, Pocket, smart phones, MS windows based smart phones, iphoneetc, features of mobile devices, Overview of application development platforms (OS-Palm , Symbian, BlackBerry, Windows CE, OS for iphone, Android). Comparative study of all versions of Android, Features of Android O.S. Pre-Requisite requirements for Installation of Android Studio, Hardware requirements Android SDK Features, Components of Android SDK. Introducing the Development Framework. Installation of Android SDK.	
Unit II	Android Virtual Device (15 Hours) Introduction to Android Virtual Device, Android Emulator: introduction, use and Installation of Android Emulator, How to activate developer option on Android device, How to execute program on virtual device or Smartphone.	
Unit III	Android Application Development (15 Hours) Introduction to Integrated Development Environment : Manifest, Java, drawable, Gradle Script, Android Application Life cycle, components of Design window, Properties of Text palate and Button palate, components of Text palate and Button palate. Build a simple program for login page, Arithmetic Operation, introduction to events used in Android studio.	
Unit IV	Intents, Broadcast Receivers, and the Internet (15 Hours) Introducing Intents, Creating Intent Filters and Broadcast Receivers, Using Internet Resources. Introducing Dialogs and Action Bars, Creating and Using Menus.	

Suggested Readings	Reference Book. 1. Reto Meier. Professional Android Application Development, Wrox Publications ISBN: 978-0-470-34471-2. 2. Rick Rogers, John Lombardo, ZigurdMednieks, G. Blake Meike. Android Application Development: Programming with the Google SDK. O'Reilly ISBN 10: 0596521472 / ISBN 13: 9780596521479. 3. Auxiliary Resources:https://developer.android.com/index.html 4. Android App Development For Dummies 5. Android Programming with Kotlin for Beginners John Horton 1st edition Packt Publishing Limited 6. Head -First Kotlin Dawn Griffiths 1st edition O'Reilly Media 7. Android App. Development FD Michael Burton 3rd edition For Dummies
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Course Code	Course Title	Credits 04
BVOC 505	Dot Net Programming-II	Marks - 100
Objectives	1. To understand .Net programming environment for developing fast and good quality software project. 2. To give understanding of C#.Net programing language for writing console and windows applications. 3. To understand object oriented programing features supported by C#.Net 4. To give understanding of web applications and database handling using ASP.Net with C#.Net programing.	
Outcome	After successful learning of this course students will be able to: 1. Identify application areas for developing the software project using .Net platform. 2. Understand OOP's features supported by C#.Net and write programs for small modules. 3. Understand and write code for console, web applications using ASP.Net with C#.Net programing 4. Develop a small software program in some application areas using web applications and ADO.Net database.	
Unit I	Introduction to C#.Net & Programing with C# .Net Introduction of .Net framework and its architecture, Introduction to C#, Building Blocks of C#, keywords, tokens, constants, identifiers, Data types, Console applications in C#, , Exception Handling in C#, Type Conversion, Functions. I/O statements, Decision making statements, Control flow statements, working with collections, arrays and enumeration.	
Unit II	Object Oriented Programming using C#.Net Class and objects, properties, methods and events, Constructor and destructors, Inheritance and its types, Access modifiers: Private, Public, Protected, Friend, Interfaces, and Polymorphism.	
Unit III	Introduction to ASP.Net: What is ASP.Net? ASP.Net Page Life Cycle, Architecture of ASP. Net, Forms, Web Pages, and HTML forms, Request & Response, Introduction to ASP. Net Controls (Server Controls, HTML controls, Web Server Controls), Overview of Control structures, Functions, HTML events, web control events, Event driven programming and Post back, Validation Controls.	
Unit IV	Handling Databases using C# and ASP.Net Introduction and architecture of ADO.Net, Data Provider in .Net, Connection, Command objects in ADO.Net, Data Reader, Data adapter, Datasets, Connection to the database with server control, data binding with some controls like Text Boxes, Navigating Data source, Connected and disconnected architecture.	

Suggested Readings	1. C#.Net Programming, Black Book Steven Holzner 2. C# 4.5 The Complete Reference, Herbert Schildt 3. C# 6.0 and .NET 4.6 Framework by Andrew Troelsen and PhilipJapikse 4. ASP.Net Programming Black Book, Kogent Learning Solutions Inc. 5. ASP.NET: The Complete Reference, Matthew Macdonald 6. Murach's ASP. NET Core MVC 7. NET Core in Action Dustin Metzgar · 2018 Text Book 8. Dot Net Technology by Daminni Grover (Author) List Of The Top Websites To Download Free PDF Textbooks • Smashwords. • Open Textbook Library. • Libre Texts. • OpenStax.org. • Bookboon.com. • Project Gutenberg. • Free E-Books.net. • Internet Archive Books.
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Course Code	Course Title	Credits 04
BVOC 506	OOPs with Java	Marks - 100
Objectives	- To understand .Net programming environment for developing fast and good quality software project. - To give understanding of C#.Net programming language for writing console and windows applications. - To understand object oriented programming features supported by C#.Net - To give understanding of web applications and database handling using ASP.Net with C#.Net programming.	
Outcome	After successful learning of this course students will be able to: Codes basic programs in Java programming language. Prints to the screen in Java language. Makes relational operations in Java. Constructs loops in Java. Defines arrays in Java and uses them. Uses objects and classes. Declares objects and classes. Distinguishes classes and objects.	
Unit I	(15 Hours) History of java, Advantages of java, JVM, Java Environment Setup, Programming Structure and naming conventions, Variables and Data types, Operators, Decision and Control Statements, Arrays and Strings	
Unit II	(15 Hours) Object Oriented Programming, Features of OOPS, Class and Object, Access modifiers, Methods, Static variables and static methods, Overloading methods, Passing and returning object as argument, Constructors and Overloading constructors	
Unit III	(15 Hours) Use of inheritance, IS-A, HAS-A, USES-A relationship, Method overriding, Super keyword and Final keyword, Abstract classes and methods, Packages, interfaces.	
Unit IV	(15 Hours) Exception handling and Multithreading 06 Exceptions and their types, Handling exceptions, Use of Multithread programming, Thread class and Runnable interface, Thread priority, Thread synchronization.	

Suggested Readings	Reference Books 1. Name of Authors Title of the Book Publisher Herbert Schildt Java™: 2. The Complete Reference, Seventh Edition TMH Cay S Horstmann, Fary Cornell Core Java Vol I Sun Microsystems Press Ken,D.Holmers, J. Gosling, P. Goteti 3. The Java Programming Language 3rd Edition Sun Microsystems Press Deitel&Deitel 4. How To Program JAVA Pearson Education Text Books E Balguruswamy Programming with Java- A Primer TMH Steven Holzner 5. JAVA 2 Programming Black Book, Wiley India Reference Website:http://www.tutorialspoint.com, 6. http://www.javatpoint.com, 7. Java for Dummies. Author: Barry A. Burd. ... 8. Effective Java. Author: Joshua Bloch. 9. Head First Design Patterns. Author: Eric Freeman. 10. http://www.roseindia.net, http://www.studytonight.com/ Text Book 1. Thinking in Java written by Bruce Eckel and first published in 1998. Prentice Hall published the 4th edition of the work in 2006 2. Java: A Beginner's Guide Author: Herbert Schildt.
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Course Code	Course Title	Credits 02
BVOC 507	LAB13: Lab based on Android	Marks – 50
	(30 Hours) Students should provide hands-on knowledge with the Android studio for preparing small Android Apps with the knowledge they acquired through Course Code BVSD504, BSD 505 and Objectives and Outcome as per the Lab Manual designed by the subject Teacher.	

Course Code	Course Title	Credits 02
BVOC 508	LAB : Lab based on Cyber Security	Marks – 50
	(30 Hours) The cyber lab offers cyber security students enrolled in the bachelor's program at Friends an opportunity to learn and practice real-time attack and defense mechanisms. The lab utilizes the most comprehensive cyber defense training platform available.	

Course Code	Course Title	Credits 02
BVOC 509	LAB14: Lab based Software Project Management	Marks – 50
	(30 Hours) Lab Software means the Labtricity server and workstation Software platform developed by Licensor and all associated components, including Labtricity server, Gateway server, print server and all other related components and successor Lab Software products.	

Course Code	Course Title	Credits 04
BVOC 601	Social Media Networking	Marks - 100
Objectives	1. To make aware student with the social networking sites. 2. To prepare students for implementing the social media platform. 3. To enable students to classify various types of social media 4. To understand the basic uses of the social media.	
Outcome	After successful learning of this course students will be able to: 1. Understand the social media concept and create their account on social media. 2. Students are able to use social media effectively. 3. Understand how social media helpful for marketing purpose. 4. Understand how social media provide different services to customer and social services to society by using blogs.	
Unit I	Basics of Social Networking Introduction to social networking sites: Facebook, twitter, Linkedin, YouTubeetc, creating login to social networking sites, setting properties of an account, communication using social networking sites, advantages and disadvantages of social networking sites. (15 Hours)	
Unit II	Social Media Strategy for Organization Social Media concept, creating and implementing the socialmedia platform, use of social media for society, Thinking of social media, The power and social Risk of Social Media, Social media strategy, Social media and customer. (15 Hours)	
Unit III	Marketing and sales in social media Social media and voice of customer, Social Feedback cycle, Open access to information, Social web and engagement, Business social interaction, Product development and new services to sell, Social community marketing and selling. (15 Hours)	
Unit IV	The New Role of the Customer The New Role: Social Interactions to make Friends, Club Membership Brings Expectations, Social Profiles, Social Applications: Support Forums, Content Sharing, Purpose-Built Applications Social media policies, Use of social media in customer service and support, responding to customer complaints (15 Hours)	

Suggested Readings	1. Stevenson, Social Media Communications Technology” published by StevensonInc. 2. Kevin lee, “Actionable Social Media Strategy” eBook available onhttps://buffer.com/resources/social-media-strategies 3. Charles Kadushin, Understanding Social Networks: Theories, Concepts, andFindings,Oxford University Press, 2012 4. MaksimTsvetovat, Alexander Kouznetsov, Social Network Analysis for Startups,O'Reilly, 2014 5. Dave Evans with Jake Mc “Social Media Marketing”. 6. Influencer: Building Your Personal Brand in the Age of Social Media. 7. The Manifesto on Content Marketing Teams by Xenia Muntean. 8. Everybody Writes by Ann Handley. ... 9. Confident Digital Content by Adam Waters. ... 10. 10x Marketing Formula by Garrett Moon. ... 11. They Ask, You Answer by Marcus Sheridan.
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Course Code	Course Title	Credits 04
BVOC 602	Introduction to Artificial Intelligence	Marks - 100
Objectives	1. To understand the concept of Artificial Intelligence 2. To study the Heuristic Search Techniques for problem solving 3. To study knowledge representation and logic	
Outcome	After successful learning of this course students will be able to: 1. Students will be able to understand working of intelligent machines 2. Students will be able to use various searching techniques to find the solution of the problem	
Unit I	Introduction Definition of Artificial Intelligence, Need of Artificial Intelligence, Problem domains of Artificial Intelligence, Applications of Artificial Intelligence, AI Technique. (15 Hours)	
Unit II	Problem Solving Techniques What is problem?, Problem Characteristics, State Space Search, Control Strategy, Production System, Water Jug Problem, River Crossing Problem. (15 Hours)	
Unit III	Knowledge Representation and Logic Definition of Knowledge, Approaches to Knowledge representation, Issues in Knowledge Representation, Introduction to Propositional Logic and Predicate Logic, Representing Simple Facts in logic, representing Instance and ISA relationships. (15 Hours)	
Unit IV	Intelligent Agents Agents and Environment, Good behaviour: The concept of Rationality, The nature of environments, The Structure of Agents, Types of Agents. (15 Hours)	
Suggested Readings	1. Elaine Rich and Kerin Knight , "An Introduction to Artificial Intelligence", McGraw Hill, 4th ed., 2001 2. . Russell and Norvig , "Artificial Intelligence: a modern approach", PHI , 3rd ed, 2013 3. Patrik Henry Winston " Artificial Intelligence", 3rd ed., ISBN-10: 0201533774, 2004. 4. Woolbridge, "Reasoning about Intelligent Agents", ISBN-10: 0262515563	

Course Code	Course Title	Credits 04
BVOC 603	Software Testing and Quality Assurance	Marks - 100
Objectives	1. To learn and understand the principles of the Software Testing. 2. To understand the methods of software testing and its maintenance. 3. To understand different types and levels of software testing 4. To understand different software testing techniques and tools.	
Outcome	After successful learning of this course students will be able to: 1. Understand and differentiate functional and non-functional software testing 2. Choose and apply appropriate software testing methods or techniques for developed software. 3. Differentiate verification and validation while software testing 4. Apply appropriate software quality assurance activities while developing complete software.	
Unit I	Introduction to Software Testing Introduction to software testing, Testing objectives, Testing principles, Testing lifecycle, Test Cases, Types of software testing, Level of software testing (Unit Testing, Integration Testing, System Testing, Acceptance Testing, Alpha testing & Beta testing, Static vs. Dynamic testing), Software maintenance and its types	
Unit II	Black Box & White Box Testing: Functional Testing (Black Box) Equivalence partitioning, Structural Testing (White Box), Coverage testing, Statement coverage, Branch & decision coverage, Path coverage, Domain Testing, Non-functional testing techniques, Validation testing Activities, Low level testing, High level testing.	
Unit III	Verification & Validation Verification & Validation Planning, Software inspections, Automated static Analysis, Clean room software engineering	
Unit IV	Software Quality Concept and Assurance Quality Concept, Definition of Quality, QA, SQA, Quality factors, Software Quality Metrics, Process Improvement, Process and Product Quality, The SEI Process Capability Maturity Model (CMM), ISO, Six-Sigma, Process Classification.	
Suggested Readings	1. Roger S. Pressman, Software Engineering: A Practitioner's Approach, Mcgraw-Hill, ISBN: 0073375977, Seventh or Eighth Edition. 2. Introducing Software Testing Louise Tamres 3. Effective Methods for software Testing William Perry 4. Software Testing in Real World Edward Kit 5. Software Testing Techniques Boris Beizer 6. Lessons Learned in Software Testing: A Context-Driven Approach. ... 7. Software Testing: 2nd Edition. ... 8. Agile Testing: A Practical Guide for Testers and Agile Teams. ... 9. How Google Tests Software. ... 10. Explore It!: Reduce Risk and Increase Confidence with Exploratory Testing.	

Course Code	Course Title	Credits 04
BVOC 604	Mobile Application Development II	Marks - 100
Objectives	1. To aware the programming environment of Android Studio 2. To develop an application using android studio 3. To connect form with database using android studio 4. To provide in depth knowledge and hands on experience in android application development, the latest trends and features.	
Outcome	After successful learning of this course students will be able to: 1. Students are able to Android apps using database 2. Students are able to understand how to convert existing apps into android app	
Unit I	Android Development I Notifications, Toast, Custom Toast, Dialogs, Status bar Notifications. Multithreading: Using Java Muti threading classes, AsyncTask, Handler, Post. Styles and Themes: Creating and applying simple Style, Inheriting built-in Style and User defined style, Using Styles as themes. Resources and Assets: Android Resource. (15 Hours)	
Unit II	Android Development II Fragment Lifecycle, Fragment Example, Dynamic Fragment. Adaptor: Array Adaptor, Array List Adaptor, Base Adaptor. View: Grid View, Web View, Scroll View, Search View, Tab Host, Dynamic List View, Expanded List View. Creating UI through code and the XML, Communicating data among Activities, Overview of services in Android, and Implementing a Service, Service lifecycle, Recycler View. (15 Hours)	
Unit III	Database Introducing Android Databases, SQLite Databases, Content Providers, Introducing SQLite, Content Values and Cursors, Working with SQLite Databases (15 Hours)	
Unit IV	Data Storage, Retrieval, and Sharing FILES, SAVING STATE, AND PREFERENCES: Saving Application Data, Creating and Saving Shared Preferences, Retrieving Shared Preferences, Introducing the Preference Framework and the Preference Activity, Including Static Files as Resources, Working with the File System. (15 Hours)	
Suggested Readings	1. Reto Meier. Professional Android Application Development, WroxPublications ISBN: 978-0-470-34471-2. 2. Rick Rogers, John Lombardo, ZigurdMednieks, G. Blake Meike. Android ApplicationDevelopment: Programming with the Google SDK. O'Reilly ISBN 10:0596521472 / ISBN 13: 9780596521479. 3. Auxiliary Resources: https://developer.android.com/index.html 4. Android App Development For Dummies 5. Android Programming with Kotlin for Beginners John Horton 1st edition Packt Publishing Limited 6. Head -First Kotlin Dawn Griffiths 1st edition O'Reilly Media 7. Android App Development FD Michael Burton 3rd edition For Dummies	

Course Code	Course Title	Credits 04
BVOC 606	Concepts of Data Mining	Marks - 100
Objectives	1. Data mining is the method by which businesses look for trends in data to gain insights that are important to their needs. 2. Both business intelligence and data science need it. Organizations may use a variety of data mining strategies to transform raw data into actionable insights	
Outcome	1. Data mining has opened a world of possibilities for business. 2. This field of computational statistics compares millions of isolated pieces of data and is used by companies to detect and predict consumer behaviour. 3. Its objective is to generate new market opportunities. Data mining converts information into knowledge	
Unit I	(15 Hours) Data Mining Introduction 06 Introduction to Data Mining, Need of Mine Data, Evolution of Data Mining, Data Mining Tasks, Classification, Clustering, Association Mining, Challenges of Data Mining	
Unit II	(15 Hours) Preprocessing 06 Data, Attribute Values, Measurement of Length, Types and Properties of Attributes & data , Data Preprocessing.	
Unit III	(15 Hours) Data Exploration 06 Data Exploration Techniques, Summary Statistics, Frequency and Mode, Percentiles, Mean and Median, Visualization, Histograms, Box Plots	
Unit IV	(15 Hours) Data Mining Association 06 Data Mining Association Analysis, Association Rule Mining, Frequent Item set Generation, FP-growth Tree Algorithm, Cluster Analysis	
Suggested Readings	1. Name of Authors Title of the Book Publisher Jiawei Han, Micheline Kamber Data Mining: 2. Concepts and Techniques Morgan Kaufmann Publishers Reference Books Tan, Steinbach, Kumar Introduction to Data Mining Pearson Addison Wesley, 2006 David Hand, 3. Heikki Mannila & Padhraic Smyth Principles of Data Mining PHP Publicatio 4. Data Mining -The Textbook- Authors: Charu C. Aggarwal 5. Association Pattern Mining- The Textbook- Authors: Charu C. Aggarwal 6. Outlier Analysis: Advanced Concepts- The Textbook- Authors: Charu C. Aggarwal WebLink https://learn.microsoft.com/en-us/analysis-services/data-mining/data-mining-concepts?view=asallproducts-allversions	

Course Code	Course Title	Credits 02
BVOC 607	Industrial Case Study	Marks – 50
	(30 Hours) Students should undertake the seminar topic relevant to the computer science/information technology other than the syllabus or as per the concern teacher allot the seminar topics to the students. Student should give the seminar presentation and submit the report of the same.	

Course Code	Course Title	Credits 02
BVOC 608	LAB15: Industrial Visit work	Marks – 50
	(30 Hours) It is considered as a part of the curriculum. The objective of an industrial tour is to provide an insight regarding internal working of companies. We understand that theoretical knowledge is not enough for a successful professional career. A candidate may in certain cases be permitted to work on the projects in an industry under their guidance and supervision. Student should prepare project documentation by consulting their respective project guides and industry experts and submit the project report to the department at the time of evaluation.	

Course Code	Course Title	Credits 02
BVOC 609	LAB 3: Software Testing tools	Marks – 50
	(30 Hours) Students should be able to use the software testing tools or some manual testing methods for testing the demo software projects using designed test cases. Concern subject teacher can design the lab manual based on the relevant subjects and knowledge they acquired through these subjects.	


Principal
 Janvikas Mahavidyalaya,
 Bansarola, Tq. Kail, Dist. Beed