Rajarshi Shahu Mahavidyalaya (Autonomous), Latur
Department of Computer Science
Program Skeleton for
B. Voc. (Computer Technology)
Third Year (Semester V + Semester VI)

	Course Code	Course Title	Credits	Hrs / Week	Marks ESE	Marks CE	Total Marks
Semester V	CT.GE.501	Logical Reasoning and Personality Development (General Education)	4	4	60	40	100
	CT.GE.502	Computer Ethics (General Education)	4	4	60	40	100
	CT.GE.503	Free and Open Source Software (FOSS) (General Education)	4	4	60	40	100
		Total Credit (A)	**12**		**Total Marks (A)**		**300**
	CT.SC.501	Web Development using Angular	4	4	60	40	100
	CT.SC.502	Kotlin Programming (Skill Component)	4	4	60	40	100
	CT.SC.503	Mobile Application Development (Skill Component)	4	4	60	40	100
	CT.SC.PR1	LAB Course12 Angular (Skill Component)	2	4	30	20	50
	CT.SC.PR2	LAB Course13 Kotlin (Skill Component)	2	4	30	20	50
	CT.SC.PR3	Mini Project (Skill Component)	2	4	30	20	50
		Total Credit (B)	**18**		**Total Marks (B)**		**450**
		Total Credit (Sem – V) (A + B)	**30**		**Total Marks(A+B)**		**750**

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	Course Code	Course Title	Credits	Hrs / Week	Marks ESE	Marks CE	Total Marks
Semester-VI	CT.GE.601	Cyber Security (General Education)	4	4	60	40	100
	CT.GE.602	Data Visualization Tools (General Education)	4	4	60	40	100
	CT.GE.603	Introduction to Digital Marketing (General Education)	4	4	60	40	100
		Total Credit (A)	**12**		**Total Marks (A)**		**300**
	CT.SC.601	Android Application Development using Kotlin (Skill Component)	4	4	60	40	100
	CT.SC.602	Software Development using C#.net	4	4	60	40	100
	CT.SC.603	Test Engineering (Skill Component)	4	4	60	40	100
	CT.SC.PR1	LAB Course 14 App and Software Development (Skill Component)	2	4	30	20	50
	CT.SC.PR2	Industry Visit (Skill Component)	2	4	30	20	50
	CT.SC.PR3	Project (using any one of the courses above) (Skill Component)	2	4	30	20	50
		Total Credit (B)	**18**		**Total Marks (B)**		**450**
		Total Credit (Sem-VI) (A + B)	**30**		**Total**		**750**
		Total Credit (SemV + SemVI)	**60**	Total Marks (Sem V + SemVI)			**1500**

ESE- End Semester Examination CE-Continuous Evaluation

Split-up of Continuous evaluation marks

Total Marks: 40

Unit Test 1	Unit Test II	Total Marks	Converted Marks	Marks for Attendance	Total Marks
30	30	60	**30**	**10**	**40**

B. Voc. –Computer Technology
Semester: V
General Education-XIII

Logical Reasoning and Personality Development CT.GE.501

Credit: 04 Periods: 60

(To be implemented from the Academic year 2020-2021)

Learning Objectives:

- To enhance the problem-solving skills.
- To improve the basic mathematical skills.
- To help students who are preparing for any type of competitive examinations.
- The Personal Development domain recognizes the importance of developing an integrated sense of personal identity, a positive sense of self, and a personal code of ethics.

Learning Outcomes:

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

1. Understand the basic concepts of QUANTITATIVE ABILITY
2. Understand the basic concepts of LOGICAL REASONING Skills
3. Solve campus placements aptitude papers covering Quantitative Ability, Logical Reasoning.
4. Compete in various competitive exams.
5. Students who participate in Student Affairs programs, activities and services will develop an integrated sense of personal identity, a positive sense of self, and a personal code of ethics.

Unit I Quantitative Aptitude I	**NOS**	**Hours**
Area, Average, Discount, Boats and Streams, Surds and Indices, Ratio and Proportion, Partnership, Volume and Surface Area. Compound Interest, Problem on Ages, Percentage, Seating arrangement, Blood Relations, Syllogisms and Venn Diagrams. HCF and LCM Simple Interest, Problems on Trains, Profit and Loss, Square Root and Cube Root, Time and Distance, Time and Work.		15
Unit II Quantitative Aptitude II and Logical Reasoning	**NOS**	**Hours**
Permutation & Combination, Geometry & Mensuration, Selection and Conditionals, Mapping and best routes. **A**ssumption and Binary Logic, Clock and Calendars, Puzzles, Data Sufficiency, Graph Related, Tables and Caselets, Trigonometry, Logarithms, and Sets.		15

Unit III PERSONALITY DEVELOPMENT	NOS	Hours
Leadership, Self-Preparation and Communication Leadership: Introduction to Leadership, Leadership Power, Leadership Styles, Leadership in Administration. • Preparation of Self –Introduction • Body language • SWOT Analysis • Increasing vocabulary Introduction to Communication, Flow of Communication, Listening, Barriers of Communication, How to overcome barriers of communication. Communication Skills and Listening Skills 1) Group Discussion 2) Debate 3)Extempore 4)Seminar 5) Effective presentations. Interview Skills		15
Unit IV Stress and Time Management and Motivation	**NOS**	**Hours**
Stress: Introduction to Stress, Causes of Stress, Impact Management Stress, Managing Stress, Building self-esteem and self-confidence. **Time**: Time as a Resource, Identify Important Time Management Wasters, Individual Time Management Styles, Techniques for better Time Management. **Motivation**: Introduction to Motivation, Relevance and types of Motivation, Motivating the subordinates, Analysis of Motivation		15
	Total	60

Reference Books:

1. Quantitative abilities **Author:** by Arun Sharma
2. Quantitative Aptitude for Competitive Examinations **Author:** by R S Agrawal.

B. Voc. –Computer Technology
Semester: V
General Education-XIV

Computer Ethics CT.GE.502

Credit: 04 Periods: 60

(To be implemented from the Academic year 2020-2021)

Learning Objectives:

- This course prepares students to distinguish between the various ethical theories which can be used to form the basis of solutions to moral dilemmas in computing.
- Identify traditional and current Issues related to Computers, Information Systems, Ethics, Society and Human Values;

Learning Outcomes:

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

1. Describe and distinguish between the various ethical theories which can be used to form the basis of solutions to moral dilemmas in computing.
2. The student will be able to identify and define the components of a structured plan for solving ethical problems and, in the process, will be able to understand the basis for her/his own ethical system.
3. Develop skills of critical analysis and applying ethical principles to situations and dialectical thinking.

Unit I The Need for Computer Ethics Training	**NOS**	**Hours**
Definition of Ethics, The Importance of Integrity, The Difference between Morals, Ethics, and Laws, Defining the Field of Computer Ethics, Computer ethics codes		15
Unit II Sample topics in Computer Ethics	**NOS**	**Hours**
Computer crime and computer security, Software theft and intellectual property rights, Computer hacking and the creation of viruses, Computer and information system failure, Invasion of privacy. Privacy in the Workplace and on the Internet, Social implications of artificial intelligence and expert systems.		15
Unit III Components, Binding and Directives	**NOS**	**Hours**
IT Professionals, Are IT Workers Professionals, Professional Relationships that Must Be Managed, Professional Codes of Ethics, Professional Organizations, Certification Copyright, Government Licensing, IT Professional Malpractice IT Users, Common Ethical		15

Issues for IT Users, Supporting the Ethical Practices of IT Users, Compliance		
Unit IV Social Networking	**NOS**	**Hours**
What Is a Social Networking Web Site? , Business Applications of Online Social Networking, Social Network Advertising, The Use of Social Networks in the Hiring Process, The Use of Social Media to Improve Customer Service , Social Shopping Web Sites, Social Networking Ethical Issues, Cyber bullying, Cyber stalking, Uploading of Inappropriate Material, Online Virtual Worlds, Crime in Virtual Worlds		15
	Total	60

Reference Books:

1. Computing Ethics & Social Values, Deborah J Nissenbaun
2. Readings in Cyber ethics by Spinello, R, Tavani,
3. Computer Ethics and Professional Responsibility by Bynum, T, W and Rogersons
4. Ethics in information Technology by George w Renolds

B. Voc. –Computer Technology
Semester: V
General Education-XV

Free and Open Source Software CT.GE.503

Credit: 04 Periods: 60

(To be implemented from the Academic year 2020-2021)

Learning Objectives:

- Students will understand FOSS benefits and licenses.
- Students will understand Linux commands.
- Students will understand working of OBS software.
- Students will understand Google drive, docs, sites, slides.

Learning Outcomes:

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

1. Understand FOSS software.
2. Learn Linux operating system working.
3. Learn working in Google drive, Google Docs, Google sites, Google slides, etc.

Unit I Introduction to FOSS	**NOS**	**Hours**
Notion of Community–Guidelines for effectively working with FOSS community–, Benefits of Community based Software Development – Requirements for being open, free software, open source software – Four degrees of freedom – FOSS Licensing Models – FOSS Licenses – GPL- AGPL- LGPL – FDL – Implications – FOSS examples. **FOSS Operating System:** Introduction to O.S, examples of FOSS operating system.		15
Unit II Open Source Operating System	**NOS**	**Hours**
Linux Basic History of Linux, Comparison of Linux with Windows, Linux as Layered structure. Linux commands ls, rm, cp, cd, mkdir, mv, more, head, tail, pwd, chmod, tar, gzip, echo, date, cal, bc, cut, paste, sort command. grep with all options, man, info, ps, kill, fg, bg, redirection and pipe command. Linux Tree Structure, Creating user and assigning password, creating user defined command. Linux shell scripts vi Editor Basic Concepts, Shell Programming, Types of Shell, Environment Variables, Programming Construct: loops, conditions, logical operators, case constructs, if statement.		15

Unit III Open Source Tools- I	NOS	Hours
Google Drive: Introduction, create an account, upload, download, delete and restore files in Google drive **Google Docs:** Introduction, Creating Your First Document, Naming the Document, Entering Text, Saving the Document, Introducing Formatting, Using the Formatting Toolbar, Printing a Document, Inserting Page Breaks, Checking Your Spelling, Choosing Your Print Settings, Exporting and Printing the Document, Deleting a Document, Formatting Documents, Formatting a Document, Using a Dictionary, Thesaurus, or Encyclopedia, Taking Your Docs to the Next Level: Lists, Tables, and Insertions, Working with Lists, Creating a List, Editing a List, Adding Tables to a Document, Creating a Table, Editing a Table, Inserting and Editing Images, Creating a Table of Contents, Editing a Table of Contents, Sharing a Document, Choose Sharers and Set Permissions **Google Sheets:** Introduction, Creating Google Sheets, Format Cells, Rows, Columns and Entire Worksheet, Editing, Printing, Working with Formulas and Functions, Creating Charts. **Google Forms:** Introduction, Create A Google Form, Adding a Question, Adding Text, Adding an Image, Copying and Deleting Questions, Require a Response, Rearranging Questions and Images Question Types: Introduction, Short Answer, Paragraph, Multiple Choice, Checkboxes, Dropdown, File Upload, Linear Scale, Multiple Choice Grid, Checkbox Grid, Date and Time. Form and Question Setting, Response Validation Changing Color and Backgrounds, Viewing Responses.		15
Unit IV Open Source Tools- II	**NOS**	**Hours**
Google Scholar: Introduction, Create a Profile, Adding The Paper in Library, Searching The Papers. **Google sites:** Introduction, Google Sites Setup, Create Your Site, Customize the Site and Update The Look Of Site, Create More Pages, Add Content to Your Pages, Review The Content Tips and Resources Review and Share. **Google Slides:** Introduction, Navigating Google Slides, Working with Templates and Existing Presentations, The Basics of Creating Presentation, Applying Themes, Background, and Layouts to Slides, Entering, Editing and Formatting Text, Inserting Images on Slides, Adding Transitions, Animations and Videos.		15

Introduction to OBS: Introduction, OBS Interface, OBS Settings, Creating a Video.		
	Total	60

Reference Books:

1. Complete Reference Linux by Sixth Edition (English, Paperback, Petersen Richard)
2. Red Hat Linux
3. Linux and Unix – Sumitbha Das—TMH

Online References:

1. https://www.revereschools.org/cms/lib/OH01001097/Centricity/Domain/10/Google%20Sheets%20Ultimate.pdf
2. http://images.pcmac.org/Uploads/marshallcountysd/marshallcountysd/Divisions/DocumentsCategories/Documents/Beginner%27s%20Guide%20to%20Google%20Form_%7BSISdcf210b2670d%7D.pdf
3. https://novel.utah.edu/files/nanos/2010/Google_Scholar-Books.pdf
4. https://www.uis.edu/informationtechnologyservices/wp-content/uploads/sites/106/2013/04/GoogleSitesHandout-2011.pdf

B. Voc. –Computer Technology
Semester: V
Skill Component-XIII

Web Programming using Angular CT.SE.501

Credit: 04 Periods: 60

(To be implemented from the Academic year 2020-2021)

Learning Objectives:

- This course helps students to learn latest version of Angular as per industry requirement for web and app development.

Learning Outcomes:

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

1. Understand the basic knowledge of Typescript and its use in Angular.
2. Use Angular for application development as per Industry requirement.
3. Implement the interactive and responsive web pages using Angular Framework.

Unit I Introduction to TypeScript	**NOS**	**Hours**
Introduction, Overview, Environment Setup, Basic Syntax, Variables, Operators, Decision Making, Loops, Functions, Numbers, String, Arrays, Union, Interfaces, Classes, Objects.		15
Unit II Introduction to Angular	**NOS**	**Hours**
What is Browser? Introduction to Angular, History of Angular, Development Environment, Angular Life Cycle, Project Setup, Project Structure, Installation, Bootstrap in Angular.		15
Unit III Components, Binding and Directives	**NOS**	**Hours**
Components, Module, Scope, Interpolation. **Binding**- Data Binding, Event Binding, Class Binding, Style Binding, Templates. **Directives**- Definition, scope, Directive with child scope, Passing data into a Directive.		15
Unit IV Pipes, Routing and Animation	**NOS**	**Hours**
Pipes, CLI, NgIf, NgSwitch, Ngfor, Services. **Routing-** Routing modes, Advance Routing. **Angular Animation**- Installation, using css3 animation, using css3 transition, built in directives.		15
	Total	60

Reference Books:

1. "ng-book The Complete Book on AngularJS" by Ari Lerner.
2. "Angular: Up and Running" by Shyam Seshadri.

B. Voc. –Computer Technology
Semester: V
Skill Component-XIV

Kotlin Programming CT.GE.502

Credit: 04 Periods: 60

(To be implemented from the Academic year 2020-2021)

Learning Objectives:

- This course helps students to learn concept of Kotlin, also this course teaches students how to develop applications for the Android operating system.

Learning Outcomes:

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

1. Understand basics of Kotlin programming.
2. To gain an understanding of the processes that are involved in an Android Application Development.

Unit I Introduction to Kotlin	NOS	Hours
Introduction, Overview, Environment Setup, Basic Syntax, Architecture, Variable, Datatypes, Operator, Conditional statements, Loops, Enum. **Array-** Generic Array, Arrays of Primitives, Create an Array, Create an array using closure, Create an uninitialized array. **String-** String Equality, String Literals, Elements of string. **Kotlin Application**-Kotlin on server side, Kotin on Android. **Functions**- Definition, Recursive Function, Default and Named Argument, Higer order function, Inline function, Vararg parameter in function, Basic Lambdas. **Ranges-** Integral types Ranges, downTo() function, step() function, until function.		15
Unit II Classes and Objects	**NOS**	**Hours**
Defining Class Hierarchies-Class, Visibility Modifiers, Inner and nested classes, Inheritance. **Declaring a Class with nontrivial constructor or properties:** Primary Constructor and initializer blocks, Secondary constructor, initializing the superclass in different ways, implementing properties declared in interfaces. **Compiler-generated methods:** Universal object methods, Data Classes, Class Delegation.		15

Declaring an instance- Object Declaration**:** Singleton Objects, Annotations		
Unit III Exception Handling and Null Safety	**NOS**	**Hours**
Exception Handling: Introduction, try catch, Multiple catch Block, Nested try-catch block, finally Block, throw keyword **Null Safety:** Nullable Types and Non-Nullable Types, Smart cast, Unsafe and Safe Cast Operator, Elvis Operator		15
Unit IV Kotlin for Android	**NOS**	**Hours**
Why use Kotlin on android? Kotlin on Android, Setting up kotlin for android, Using Kotlin in Android Studio, Auto-Generated Gradle Configuration, Converting Java Code to Kotlin, APP #1: A TO-DO List app.		15
	Total	60

Reference Books:

1. "Kotlin in Action" Dmitry Jemerov, Svetlana Isakova -Manning Publications (2017)
2. "Kotlin for Android App Development" by Peter Sommerhoff.
3. KotlinNotesForProfessionals

Online reference:

JataTpoint
Tutorialspoint
https://books.goalkicker.com/KotlinBook/

B. Voc. –Computer Technology
Semester: V
Skill Component -XV

Mobile Application Development-I CT.GE.503

Credit: 04 Periods: 60

(To be implemented from the Academic year 2020-2021)

Learning Objectives:

- This course shall build a platform for students to start their own enterprise
- To become familiar with Android development tools and user interface.

Learning Outcomes:

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

1. Awareness of existing demanding trends in IT industry in order to get placement & research.
2. Understand the Android OS architecture.
3. Install and use appropriate tools for Android development, including IDE.

Unit I Introduction	**NOS**	**Hours**
Introduction to Mobile Programming, Overview of the Operating Systems used on different mobile devices, Need of Mobile Application, Introduction to Android, Types of Mobile Applications, Android History, Android Features and Versions, Various IDE for Android, Installing Android Studio.		15
Unit II Android and UI Architecture	**NOS**	**Hours**
Android Architecture, Linux Kernal, Dalvik Virtual Machine, Android Stack, Android applications structure, Creating a project, Working with the AndroidManifest.xml, Using the log system, Activities, Application context, Intents, Activity life cycle, Supporting multiple screen sizes, Android Components, Android Application Structure, Call Back Methods.		15
Unit III Android UI Elements	**NOS**	**Hours**
<TextView>, <EditText>, <Button>, <RadioGroup>, <RadioButton>, <CheckBox>, <ListView>, <WebView>, <Spinner>, <ImageView>, ProgressBar.		15
Unit IV Android Menu, Service & Database	**NOS**	**Hours**
Android Menu, Resource File, Toast, Custom Toast, AlertDialog, PromptDialog, Service Life Cycle, Service Type, Sql Query, SQLite Database Connectivity, Android with Php & Mysql		15
	Total	60

Reference Books:

1. Professional Android 4 Application Development, Edition 3 by Reto Meier, Wrox Publication
2. Beginning Android 4 Application Development, Edition illustrated by Wei-Meng Lee, John Wiley & Sons, Wrox Publication
3. Sams Teach Yourself Android Application Development in 24 Hours, Edition illustrated by Darcey & Shane Conder, Sams Publishing
4. Learning Android by Marko Gargenta, OREILLY
5. Android Black Book

Online reference:

https://developer.android.com/

B. Voc. –Computer Technology
Semester: V

Skill Laboratory Course- XII

Credit: 02 Periods: 60

(To be implemented from the Academic year 2020-2021)

Experiments based on Skill Component-XII

1. Introduction and Installation of Visual studio code and Typescript.
2. Program for Variables declaration and Operators in Typescript.
3. Program for Decision Making and Loops in Typescript.
4. Program for Functions in Typescript.
5. Program for Numbers, String, Arrays in Typescript.
6. Program for Classes, Objects and Interfaces in Typescript.
7. Introduction and Installation of Angular.
8. Program for “Hello World” in Angular.
9. Program for Bootstrap in Angular.
10. Program for Interpolation in Angular.
11. Program for Data Binding and Event Binding in Angular.
12. Program for Class Binding, Style Binding in Angular.
13. Program for NgIf, NgSwitch, Ngfor in Angular.
14. Program for Routing in Angular.
15. Program for CSS animation in Angular.

B. Voc. –Computer Technology
Semester: V
Skill Laboratory Course- XIII

Credit: 02 Periods: 60

(To be implemented from the Academic year 2020-2021)

Experiments based on Skill Component-XIII

1) Installation of Kotlin.
2) Program for variable declaration in Kotlin.
3) Program for declaring String and manipulating string.
4) Program on Operators.
5) Program on Conditional Statement.
6) Program on Loops.
7) Program on Arrays.
8) Program for Simple function and Recursive function.
9) Program on Default and Named argument in function.
10) Program for Inline function and Vararg parameter in function,
11) Program for Classes and Objects.
12) Program on Constructor.
13) Program for interfaces.
14) Program for Exception handling.
15) Program for App development.

B. Voc. –Computer Technology
Semester: V
Skill Laboratory Course- XIV

Credit: 02 Periods: 60
(To be implemented from the Academic year 2020-2021)

Experiments based on Skill Component-XIV

1) Installation of Android Studio.
2) Study of Android Application structure.
3) Sample App for Working with AndroidManifest.xml
4) Sample App for Working with Activities.
5) Sample App for Working with Application Context.
6) App for Demonstration of Activity Life Cycle.
7) App for demonstration of TexView and EditText.
8) Sample App for Working with Checkboxes and Buttons.
9) Sample App for Working with RadiGroup and RadioButton.
10) Sample App for Working with ListView and WebView.
11) Sample App for Working with Spinner, ImageView and Progressbar
12) Sample App for Working with Toast.
13) Sample App for Working with AlertDialog and PromptDialog
14) Database Connectivity.
15) Simple app development with database connectivity.

B. Voc. –Computer Technology
Semester: V
Skill Laboratory Course- XV

Credit: 02 Periods: 60

(To be implemented from the Academic year 2020-2021)

Prerequisite: HTML5, CSS3, Bootstrap4, JavaScript, jQuery, XML, Java or Any Programming Language and Android Studio.

Database (MYSQL/MongoDB/Oracle/Access etc).

Mini Project should contain minimum 5 pages of your Mobile Application.

User Interface should be in HTML5, CSS3, Bootstrap4, XML or any latest UI framework.

App must contain all UI elements

App may contain JavaScript, jQuery for more attractiveness.

Establish Database connectivity with backend.

Try to publish your app in Playstore.