Bachelor of Vocation Programme
Information Technology

SYLLABUS

(For Students admitted in the year 2018 – 2019)

Bishop Heber College (Autonomous)

Affiliated to Bharathidasan University

Reaccredited with 'A' Grade by NAAC with a CGPA of 3.58 out of 4

Recognized by UGC as "College of Excellence"

Tiruchirappalli – 620 017

South India

Department of Information Technology
Bishop Heber College (Autonomous), Tiruchirappalli – 620 017

B. Voc. (Information Technology)
(Syllabus for students admitted in the year 2018 – 2019)

Features of the Programme :

- Skill Oriented Curriculum to meet the Industry Requirements.
- Curriculum Aligned to the Qualification Packs specified by the NSDC.
- Industry involvement in Training and Development of Skills.
- Academic flexibility with multiple entries and exits.
- Vertical Mobility in higher education leading to Research.
- Awarded with both the University Degree and the NSDC Partner Certification (NASSCOM) on successful completion of the Programme.
- Empowerment to become an Entrepreneur.
- Placement opportunities provided through Industry Partners.

Eligibility : 10 +2 or its equivalent in any stream

Duration	Award	NSQF Level	Credits Earned	Total Hours
1st Semester	Certificate in Information Technology	4	30	540
1st Year	Diploma in Information Technology	5	60	1080
2nd Year	Advanced Diploma in Information Technology	6	120	2160
3rd Year	B. Voc. Degree in Information Technology	7	180	3240

Department of Information Technology, Bishop Heber College (Autonomous), Tiruchirappalli – 620 017

B. Voc. (Information Technology)

(Programme Structure for Students Admitted from 2018 – 2019 onwards)

Semester I – NSQF Level 4

Component	*Course Title*	Course Code	QP	Credits	Course Type			Total Hours	MARKS		
					T	P	I		CIA	ESE	Total
General Component	Language – 1 (Tamil / Hindi / French)	U18ITT01	SSC/Q0508	4	T			60	25	75	100
	Communication Skills in English – 1	U18ITE01		2	T	-	-	30	25	75	100
	Fundamentals of Information Technology	U18IT101		2	T	-	-	30	25	75	100
	Programming with C and C++	U18IT102		2	T	-	-	30	25	75	100
	Value and Life Oriented Education	U15VL1:1 U15VL1:2		2	T			30	25	75	100
TOTAL (General Components)				**12**				**180**			
Skill Component	English Language Lab – 1	U18ITEP1		2		P		30	40	60	100
	Mathematics for Competitive Exam– 1	U18IT1P1		2		P		30	40	60	100
	PC Software Packages Lab	U18IT1P2		4		P	-	60	40	60	100
	C and C++ Programming Lab	U18IT1P3		4		P	-	60	40	60	100
	Project Work – 1	U18IT1F1		6	-	-	I	180	40	60	100
TOTAL (Skill Components)				**18**	**-**			**360**	-		
GRAND TOTAL				**30**	**-**			**540**	-		

Semester II – NSQF Level 5

Component	*Course Title*	Course Code	QP	Credits	Course Type			Total Hours	MARKS		
					T	P	I		CIA	ESE	Total
General Component	Language – 2 (Tamil / Hindi / French)	U18ITT02	SSC/Q0801	4	T	-	-	60	25	75	100
	Communication Skills in English-2	U18ITE02		2	T	-	-	30	25	75	100
	Database Management Systems	U18IT203		2	T	-	-	30	25	75	100
	Data Communication Networks	U18IT204		2	T	-	-	30	25	75	100
	Environmental Studies	U16EST21		2	T	-	-	30	25	75	100
TOTAL (General Component)				**12**				**180**			
Skill Component	English Language Lab – 2	U18ITEP2		2				30	40	60	100
	Mathematics for Competitive Examinations – 2	U18IT2P4		2	-	P	-	30	40	60	100
	DBMS Lab	U18IT2P5		4	-	P	-	60	40	60	100
	Computer Hardware & Networking Lab	U18IT2P6		4	-	P	-	60	40	60	100
	Project Work – 2	U18IT2F2		6	-	-	I	180	40	60	100
TOTAL (Skill Component)				**18**	**-**			**360**	-		
GRAND TOTAL				**30**	**-**			**540**	-		

Semester III – NSQF Level 6

Component	*Course Title*	Course Code	QP	Credits	Course Type			Total Hours	MARKS		
					T	P	I		CIA	ESE	Total
General Component	Programming with Java	U18IT305	SSC/Q0509	3	T	-	-	45	25	75	100
	Operating Systems	U18IT306		3	T	-	-	45	25	75	100
	Digital Computer Fundamentals	U18IT307		4	T	-	-	60	25	75	100
	Personal Effectiveness	U18IT308		2	T			30	25	75	100
TOTAL (General Components)				**12**				**180**			
Skill Component	Java Programming Lab	U18IT3P7		4	-	P	-	60	40	60	100
	Operating Systems Lab	U18IT3P8		4	-	P	-	60	40	60	100
	Multimedia Lab	U18IT3P9		4	-	P	-	60	40	60	100
	Project Work – 3	U18IT3F3		6	-	-	I	180	40	60	100
TOTAL (Skill Components)				**18**	**-**			**360**	-		
GRAND TOTAL				**30**	**-**			**540**	-		

Semester IV – NSQF Level 6

Component	Course Title	Course Code	QP	Credits	Course Type			Total Hours	MARKS		
					T	P	I		CIA	ESE	Total
General Component	Data Structures and Algorithms	U18IT409	SSC/Q0509	3	T	-	-	45	25	75	100
	.NET Programming	U18IT410		3	T	-	-	45	25	75	100
	Computer Organization and Architecture	U18IT411		4	T	-	-	60	25	75	100
	Professional Ethics and Cyber Laws	U18IT412		2	T	-	-	30	25	75	100
TOTAL (General Component)				**12**				**180**			
Skill Component	Data Structures & Algorithms Lab	U18ITP10		4	-	P	-	60	40	60	100
	.NET Programming Lab	U18ITP11		4	-	P	-	60	40	60	100
	Web Development Lab	U18ITP12		4	-	P	-	60	40	60	100
	Project Work – 4	U18IT4F4		6	-	-	I	180	40	60	100
TOTAL (Skill Component)				**18**	**-**			**360**	-		
GRAND TOTAL				**30**	**-**			**540**	-		

Semester V – NSQF Level 7

Component	Course Title	Course Code	QP	Credits	Course Type			Total Hours	MARKS		
					T	P	I		CIA	ESE	Total
General Component	Mobile Computing Technologies	U18IT513	SSC/Q0501	4	T	-	-	60	25	75	100
	Microprocessors and its Applications	U18IT514		3	T	-	-	45	25	75	100
	Principles of Marketing	U18IT515		2	T	-	-	30	25	75	100
	Software Engineering / Software Project Management / Software Testing	U18IT5:1 U18IT5:2 U18IT5:2		3	T	-	-	45	25	75	100
TOTAL (General Components)				**12**				**180**			
Skill Component	Mobile Application Development Lab	U18ITP13		6	-	P	-	90	40	60	100
	Assembly Language Programming Lab	U18ITP14		6	-	P	-	90	40	60	100
	Project Work – 5	U18IT5F5		6	-	-	I	180	40	60	100
TOTAL (Skill Components)				**18**	**-**			**360**	-		
GRAND TOTAL				**30**	**-**			**540**	-		

Semester VI – NSQF Level 7

Component	Course Title	Course Code	QP	Credits	Course Type			Total Hours	MARKS		
					T	P	I		CIA	ESE	Total
General Component	Programming with PHP and MySQL	U18IT616	SSC/Q0501	3	T	-	-	60	25	75	100
	Information Security	U18IT617		3	T	-	-	45	25	75	100
	Entrepreneurial Development	U18IT618		2	T	-	-	30	25	75	100
	Web Service Technologies / Open Source Technologies / Distributed Computing Technologies	U181T6:1 U18IT6:2 U18IT6:2		3	T	-	-	45	25	75	100
TOTAL (General Component)				**12**				**180**			
Skill Component	PHP and MySQL Programming Lab	U18ITP15		6	-	P	-	90	40	60	100
	Information Security Lab	U18ITP16		6	-	P	-	90	40	60	100
	Project Work – 6	U18IT6F6		6	-	-	I	180	40	60	100
TOTAL (Skill Component)				**18**	**-**			**360**	-		
GRAND TOTAL				**30**	**-**			**540**	-		

KANINI TAMIL

Credits: 4 **Course Code : U18ITT01**
SEMESTER – I **No. of Hrs : 30**

fzpdpj; jkpo;

myF – 1

6 Hours

fzpdpapd; tuyhW - njhlf;ffhyg; gad;ghL - Kjy;> ,uz;lhk;> %d;whk;> ehd;fhk; jiyKiwf; fzpdp - fzpdpapd; mikg;G - fzpdpj; jkpo; tuyhW - fzpdpj; jkpo; tsh;r;rpapy; muR - jd;dhh;t mikg;G kw;Wk; jdpegh; gq;fspg;Gfs;.

myF – 2

6 Hours

jkpo; mr;Rg;gjpg;G ghpkhw;wk; - vk;. V];. Nth;L> vf;]y;> gth;gha;z;l;> - fzpdpj; jkpo; fiyr; nrhw;fs; mwpKfk; - fiyr;nrhy; gad;ghl;Lr; rpf;fy;fSk; jPh;TfSk;.

myF – 3

6 Hours

jkpo; tpirg;gyif mwpKfk; - gy;NtW jkpo; tpirg;gyiffs;- jkpo; vOj;JU mwpKfk; - xUq;Fwp vOj;JU mwpKfk; - gytpj tpirg;gyiffshy; Neh;e;j rpf;fy;fSk; mtw;Wf;fhd jPh;Tk; - xUq;Fwp vOj;jikg;gpd; NjitAk; mjd; epiwFiwfSk;.

myF – 4

6 Hours

gy;NtW jkpo; nkd;nghUs;fs; - gy;NtW jkpo; vOj;JUf;fs; - jkpo; vOj;JU khw;wp - ,yf;fzj; jpUj;jp - nrhw;gpio jpUj;jp - re;jpg;gpio jpUj;jp - jkpo; xypkhw;wp.

myF – 5

6 Hours

kpd; jkpo; - kpd;D}y; - kpd;D}y; tuyhWk; mjd; gad;ghLfSk; - kpd;D}y; tiffs; - kpd;D}y; cUthf;fk; - kpd; E}yfk; : mwpKfKk; gad;ghLk; - ,e;jpa kpd;D}yfk;.

<u>gl E}w;fs;;</u>

1. ,y. Re;juk;> - ‘fzpdpj; jkpo;”
2. vk;. tp. vk;. Kj;J kzpfz;ld;> - ‘fzpg;nghwp mwptpay; fw;gpj;jy;”
3. kh. Md;Nlh gPl;lu;> ‘jkpOk; fzpg;nghwpAk;;”
4. Jiuaurd;> - ‘,izaKk; ,dpa jkpOk;”
5. Jiu kzpfz;ld;> - ‘jkpo;f; fzpdp ,izag; gad;ghLfs;;”
6. nghd;d itf;Nfh> - ‘,izaj; jkpo; tuyhW”
7. %. Godpag;gd;;> “,izaKk;; jkpOk;”

ENGLISH FOR COMMUNICATION - I

Credits : 2 **Course Code : U18ITE02**
SEMESTER – I **No. of Hrs : 30**

Objectives:

- *To acquire skills of listening, reading and speaking.*
- *To understand the elements of language and establish the appropriate relationship among linguistic components.*

UNIT 1

6 Hours

Grammar
Correction of common errors
Transformation of Sentences

UNIT 2

6 Hours

Types of Communication
Reading Comprehension

UNIT 3

6 Hours

Word Building
Vocabulary-I
Vocabulary-II

UNIT 4

6 Hours

Notices, Agendas and Minutes
Business Correspondence

UNIT 5

6 Hours

Listening Skills
Teamwork Skills
Emotional Intelligence Skills

Text Books

1. Board of Editors, **"Synergy-Communication in English and Study Skills"**, Orient Blackswan. Pvt. Ltd., 2008.
2. G. M. Sundaravalli, A.S. Kamalakar, P. Kusuma Harinath, **"Communication and Soft Skills"**, Orient Blackswan Pvt. Ltd., 2015.
3. Bikram K. Das, **"Functional Grammar and Spoken and Written Communication in English"**, Orient Blackswan Pvt. Ltd., Kolkatta, 2006.

FUNDAMENTALS OF INFORMATION TECHNOLOGY

SEMESTER: I **COURSE CODE : U18IT101**
CREDITS : 2 **HOURS/WEEK 3**

Objective : *To understand the concepts and technologies associated with the Computer Hardware, Software, Database Management, Communication Networks, World Wide Web, Information Security, Multimedia and other recent advancements in the fields of Computing, Communication and Information Technologies.*

UNIT 1:Introduction to Computer Systems

Introduction to Computers – Generations of Modern Computers – Classification of Digital Computer Systems – Anatomy of a Digital Computer – Computer Architecture – The Number System – Central Processing Unit and Memory Units – Secondary Storage Devices – Input Devices – Output Devices

UNIT 2: Computer Software and Software Development

Introduction to Computer Software & Software Development – Programming Languages – Operating Systems – General Software Features and Trends – Database Management Systems : Introduction to Database Management Systems – Database Architecture and Design – Relational Database Management Systems and SQL – Modern DBMS.

UNIT 3: Telecommunications

Introduction– Computer Networks – Communication Systems – Distributed Data Processing – Internet and Intranets: Internet & WWW – Overview of Electronic mail – Introduction to Intranets – Introduction to E-Commerce and E-Business – Introduction to Web Design – Overview of Web Technologies

UNIT 4: Security, Multimedia and Virtual Reality:

Introduction to Computer Security – Cryptography – Computer Viruses, Bombs, and Worms – Multimedia and Virtual Reality: Introduction to Multimedia – Multimedia and its applications – Introduction to Virtual Reality

UNIT 5: New Technologies in Information Technology:

Introduction to Hypermedia – Artificial Intelligence and Business Intelligence – Knowledge Discovery in Database – Data Warehouses and Data Marts – Data Mining and OLAP – ERP – Supply Chain Management – Customer Relationship Management – GIS – Applications of Information Technology: Computers in Business and Industry – Home – Education and Training – Entertainment, Science, Medicine and Engineering – Mobile computing and Business on the Internet

Text Book

1. Alexis Leon, Mathews Leon, "**Fundamentals of Information Technology**", Second Edition, Vikas Publishing House Pvt. Ltd., Chennai, 2009.

Reference Book

1. Reema Thareja, **"Fundamentals of Computers",** Oxford University Press, 2014.

PROGRAMMING WITH C AND C++

SEMESTER: I **COURSE CODE : U18IT101**
CREDITS : 2 **HOURS/WEEK 3**

Objective: *To acquire problem solving and programming skills with the facilities in C & C++ languages.*

UNIT 1

Overview of C: History - Importance of C – Sample Programs - Basic Structure of C programs- Character Set – C tokens – keywords and Identifiers – Constants – Variables – Data types – Declaration of variables – Assigning values to variables – Symbolic constants. - **Operators and Expressions:** Introduction – Arithmetic operators – Relational Operators – Logical operators – Assignment Operators – Increment and Decrement operators – Conditional operators- Bitwise Operators – Special Operators – Expressions – **Managing input and output operators:** Reading a character – Writing a Character – Formatted input and output – **Decision making and Branching:** If statement, Switch Statement – goto Statement – **Decision Making and Looping:** While – Do-while – For loop.

UNIT 2

Arrays: One, Two and Multidimensional arrays – **Functions :** User defined functions –Mathematical and String Handling functions- Category of functions – Recursion – Scope and life time of variables in functions. - **Structures and Unions:** Introduction – Structure definition – Giving values to members – Structure Initialization – Comparison of Structure variables – Arrays of structures – Arrays within structures – Structures within structures – Structures and functions – Unions.

UNIT 3

Pointers: Introduction – Understanding pointers – Accessing the address of a variable through input pointer – Pointer expressions – Pointer Increments and Scale factor – Pointers and Arrays – Pointers and character strings – Pointers to functions – Pointers and structures – Points on pointers – **File Management:** Introduction – Defining and opening a file – Closing a file – Input or Output operations on files – Error handling during I/O operations – Random access to files – Command line arguments. Preprocessors.

UNIT 4

Introduction to Object Oriented Programming: OOP Paradigm - OOP Concepts – Benefits of OOP – OOP Languages – Functions in C++ - Classes and Objects – Constructors and Destructors – Operator Overloading – Type Conversions – Inheritance.

UNIT 5

Pointers - Virtual Functions – Polymorphism – Managing Console Operations – Working with Files – Exception Handling – String Manipulations.

Text Books

1. E. Balagurusamy, "**Programming in ANSI C**", Tata McGraw-Hill Publishing Company Ltd.
2. E. Balagurusamy, "**Object Oriented Programming with C++**", 5th Edition, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2011.

Reference Books

1. Ashok N. Kamthane, "**Programming with ANSI and TURBO C**", Pearson Education, 2004.
2. Herbert Schildt, "**C++ The Complete Reference**", 5th Edition, McGraw Hill Education, 2012.

VALUE AND LIFE ORIENTED EDUCATION

SEMESTER – I **Course Code : U15VL1:1/U15VL1:2**
Credits: 2 **No. of Hrs/Week : 2**

Objectives:

- *To understand Indian culture and heritage and envisage a transformed India*
- *To have a better insight of self-worth*
- *To equip to face challenges and march towards implementation of personal goals*
- *To forge and nurture healthy relationships*
- *To appreciate and maintain the sanctity of marriage*

UNIT 1

Shaping "Incredible India"

Glorious past – cultural heritage and values - Present scenario – Indian constitution with respect to human values – Shaping new India

UNIT 2

Human Values Development and Transformation of Self

Principles and values – Values of concern-three dimensions – self, interpersonal and social activities – Strategizing values – Self-identity – Self-discovery and Self-acceptance – Self-esteem – Personality development.

UNIT 3

Life Enrichment Skills

Purpose for life – mission and vision – Goal setting- characteristics of goals - Time management – levels of time management – categories of stress – factors leading to stress - stress management

UNIT 4

Dynamics of Interpersonal Relationships

Building relationships- types of interpersonal relationship – Hints towards improving relationships - conflict management in relationship – emotional management

UNIT 5

Gender, Human Sexuality and Marriage

Gender concepts – gender sensitivity – human sexuality – sexually transmitted diseases - marriage – purpose – complementary responsibilities and commitment – building a happy home (do's and don'ts)

Text Book

1. **" Human Values"**, All India Association for Christian Higher Education (AIACHE), New Delhi.

ENGLISH LANGUAGE LAB – I
(Listening, Speaking and Reading)

SEMESTER – I **Course Code : U18ITEP1**
Credits: 2 **No. of Hrs/Week 2**

Objectives: *To obtain practical training to enhance the listening, reading and speaking skills.*

1. Tenses and Connected Speech Listening
2. Speech Sounds and Intonations
3. Spoken English in day-to-day practical context
4. Loud and Silent Reading
5. Presentations
6. Discussions
7. Conversations and Role Plays

MATHEMATICS FOR COMPETITIVE EXAMINATIONS - 1

SEMESTER – I **Course Code : U18IT1P1**
Credits: 2 **No. of Hrs 30**

Objective : *To acquire arithmetic skills required to face competitive examinations.*

Unit 1
Numbers - HCF & LCM – Decimal Fractions – Simplification.

Unit 2
Square roots and Cube roots - Percentage – Average – Ratio and Proportion - Partnership.

Unit 3
Profit and Loss - Time and Work- Pipes and Cisterns - Time and Distance

Unit 4
Problems on Trains – Problems on Boats and Streams - Problems on Numbers - Problems on ages.

Unit 5
Simple interest – Compound interest Area - Volume & Surface Areas.

Text Book
1. R.S. Aggarwal, **"Objective Arithmetic"**, S. Chand & Company Ltd., New Delhi, 2003.

PC SOFTWARE PACKAGES LAB

SEMESTER :I **COURSE CODE: U18IT1P3**
CREDITS : 4 **HOURS/WEEK : 4**

Objectives: *To acquire hands on training to effectively use MS-Office tools such as MS-Word, MS-Powerpoint and MS-Excel.*

MS – WORD

1. Creating document, Cutting, Copying, Pasting text.
2. Manipulating Font Type, Font Size, Font Color.
3. Using Auto Shapes.
4. Working with Table Background Color, Border Color, Border Style.
5. Modifying Table Style, Caption.
6. Merging, Splitting Columns, Inserting, Deleting Rows, Columns.
7. Working with Paragraph Columns, Drop Cap, Indentation and Underlining Styles.
8. Inserting Pictures, Page Borders and Shading, Clip Art.
9. Working with Mail Merge.
10. Using Water mark, Header and Footer.
11. Working with Smart Art.
12. Employing Excel chart in Ms Word.
13. Using Bullets and Numbering.
14. Implementing Document Password.
15. Setting Page Orientation and Margins.

MS – EXCEL

1. Creating, Opening, Saving Worksheets.
2. Formatting Cells.
3. Preparation of Student Mark List.
4. Manipulating IF Function.
5. Electricity Bill Preparation.
6. Perform Sorting: (Ascending, Descending, Custom.)
7. Splitting Text into Cell.
8. Data Filtering.
9. Data Validation.
10. Data Consolidation.
11. Salary Bill Preparation.
12. Working with Functions
13. Usage of Dropdown Controls
14. Usage of Line, Column and Pie Charts
15. Importing and Exporting Text Files, Removing Duplicates

MS – POWER POINT

1. Creating, Opening and Saving Power Point Presentations.
2. Employing Header and Footer, Slide Number, Pictures
3. Performing Translations and Animations
4. Creating Presentation as Slide Show and Video
5. Working with Flow Charts and Symbols
6. Usage of Action and Link Buttons
7. Creating Master Slide
8. Employing Smart Art
9. Employing Themes and Variants
10. Using Outline View
11. Applying Shapes; Callouts, Stars and Banners
12. Working with Equation and Symbols
13. Using various types of Charts.
14. Working with Tables
15. Working with Colors and Shapes

C AND C++ PROGRAMMING LAB

SEMESTER – I **Course Code: U18IT1P3**
Credits: 4 **No. of Hrs/Week 6**
Objectives: *To acquire Programming experience with the facilities available in C and C++.*

Programming Lab

1. Develop C programs using Operators
2. Create C programs employing Mathematical functions
3. Write a C program to perform Type Conversion
4. Write a C program that performs Formatted Input / Output Operations
5. Develop C programs employing different types of If statements
6. Create C programs using Switch Statement
7. Write a C program using Conditional Operator
8. Write a C program using Go to Statement
9. Write a C program using While Statement
10. Write a C program using Do-While Statement
11. Develop C programs employing For statements
12. Develop C programs employing Arrays
13. Create a C program to implement String Manipulations
14. Develop C programs employing Functions
15. Create a C program to implement Recursion
16. Develop C programs employing Structures
17. Develop C programs employing Arrays of Structures
18. Develop C programs employing Structures within Structures
19. Develop a C program employing Union
20. Develop a C program employing Chain of Pointers
21. Develop a C program employing Array of Pointers
22. Develop C programs employing Input / Output Operations on Files
23. Develop C programs employing Random Operations on Files
24. Write a C program using Command Line Arguments
25. Develop C programs employing Dynamic Memory Allocation Statements
26. Develop C programs employing Macros
27. Write a C program using Control Directives

C++ Lab

1. Write a C++ program using Classes and Objects
2. Create a C++ program using Constructors and Destructors
3. Write a C++ program to perfor Function and Operator Overloading
4. Develop a C++ program to implement the use of Inheritance
5. Write a C++ program Implementing Polymorphism
6. Develop a program in C++ Using Abstract Classes
7. Develop a C++ program using Pointers to Derived Classes
8. Create a C++ program employing Virtual Functions.
9. Develop a C++ program using Encapsulation.
10. Create a C++ program to implement File Operations
11. Develop a C++ program to perform String Manipulations
12. Create a C++ program to perform Exception Handling

INAIYAMUM TAMILUM

,izaKk; jkpOk;

SEMESTER-II **Course Code : U18ITT02**
CREDITS: 4 **No. of Hrs/Week 2**

myF – 1 **6 Hours**

,izak; mwpKfk; - ,izaj;jpd; tuyhWk; tsh;r;rp epiyAk; - ,izag; gad;ghLk; ,d;iwa tho;tpaYk; - jkpo; ,iza tuyhW - ,izaj;jpy; jkpopd; jlk;.

myF – 2 **6 Hours**

jkpopy; jfty; ghpkhw;wk; - kpd;dQ;ry; cUthf;fKk; mjd; gad;ghLfSk; - kpd;dQ;rypd; cs;slf;fk; - ,iza ,aq;Fjsq;fs; - ,izaj;jpy; jfty; cyhTjy;> jfty; NjLjy; - jkpo;j; NjLnghwpfs; - ,izaj;jpy; juTfisg; gjptpwf;Fjy;> gjpNtw;Wjy;.

myF - 3 **6 Hours**

tpf;fpg;gPbah mwpKfk; - tpf;fpg;gPbah ngah; fhuzk; - Njhw;wk; tsh;r;rp - jkpo; tpf;fpg;gPbah - tpf;fpg;gPbah fzf;F cUthf;fk; - tpf;fpg;gPbahtpy; jFe;j rhd;whjhuq;fSld; fl;Liu vOJjy; kw;Wk; GJg;gpj;jy; - tpf;fpg;gPbahtpd; cs;slf;ff; $Wfs; - cyf nkhopfspy; jkpo; tpf;fpg;gPbah ngWk; ,lk;.

myF - 4 **6 Hours**

tiyg;G+ mwpKfk; - mjd; tsh;r;rpAk; tifg;ghLk; - jkpo; tiyg;G+f;fs; - tiyg;G+ cUthf;fk; - tiyg;G+ njhlq;Ftjw;fhd mbg;gilfs; - tiyg;G+j; jiyg;Gk; KfthpAk; - gf;f tbtikg;Gj; njhpT - tiyg;G+tpd; cs;slf;ff; $Wfs; - tiyg;G+g; gjptpLif.

myF - 5 **6 Hours**

,izar; Nritfs; mwpKfKk; mjd; gad;ghLk; - tq;fpr; NritfSf;F tpz;zg;gpj;jy; - ,uapy; gazr;rPl;L Kd;gjpT nra;jy; - Nghl;bj; Njh;TfSf;F tpz;zg;gpj;jy; - Ntiy tha;g;G mYtyfg; gjpT kw;Wk; GJg;gpj;jy;.

<u>gl E}w;fs;;</u>

1. **Jiu kzpfz;ld;> - ‘,izaKk; jkpOk;”**
2. **Jiuaurd;> - ‘,izaKk; ,dpa jkpOk;”**
3. **Jiu kzpfz;ld;> - ‘jkpo;f; fzpdp ,izag; gad;ghLfs;;”**
4. **nghd;d itf;Nfh> - ‘,izaj; jkpo; tuyhW”**
5. **%. Godpag;gd;;> “,izaKk;; jkpOk;”**
6. **n[. tPuehjd;> - ‘,izaj;ij mwpNthk;”**
7. **,y. Re;juk;> - ‘fzpdpj; jkpo;”**
8. **Jiu kzpfz;ld;> - ‘,izaj;jpy; jkpo; tiyg;G+f;fs;”**

ENGLISH FOR COMMUNICATION – II

SEMESTER II **Course Code : U18ITE02**
Credits: 2 **No. of Hrs./ Week 30**

Objectives :

- *To acquire knowledge on English usage and discourse styles for use in day-to-day contexts.*
- *To develop the skills of thinking, evaluating and writing.*

UNIT 1
Soft Skills
Vocabulary Development
Written Communication

UNIT 2
Spoken Communication
Speeches
Presentations

UNIT 3
Meetings
Nonverbal Communication
Information Transfer

UNIT 4
Interview and Interviewing skills
Editing Skills
Reference Skills

UNIT 5
Assertive Skills
Adaptability Skills
Problem-Solving Skills

Text Books

1. Board of Editors, **"Synergy-Communication in English and Study Skills"**, Orient Blackswan. Pvt. Ltd., 2008.
2. G. M. Sundaravalli, A.S. Kamalakar, P. Kusuma Harinath, **"Communication and Soft Skills"**, Orient Blackswan Pvt. Ltd., 2015.
3. Bikram K. Das, **"Functional Grammar and Spoken and Written Communication in English"**, Orient Blackswan Pvt. Ltd., Kolkatta, 2006.

DATABASE MANAGEMENT SYSTEMS

SEMESTER : II **COURSE CODE : U18IT203**
CREDIT: 2 **HOURS/WEEK: 3**

Objective : *To understand the popular Relational Database System concepts and techniques.*

Unit 1: Introduction to Database System

What is Database Management Systems? - File Management Systems - Database Management Systems - File Management Systems Vs Database Management Systems - An Overview of Database Management Systems - Data Model

Unit 2: Relational Model

Relational Database Primer - Relational Database Characteristics - Database Integrity – Keys - Entity and Referential Integrity - Views.

Unit 3 : Database Design

Database Design - Design Consideration - Functional Dependency - Normalization and Normal Forms (1NF, 2NF, 3NF, 4NF, 5NF) - E/R Modeling.

Unit 4: Transaction

Recovery - Concurrency – problems – Locking – Deadlocks - Transaction serializability. - Database security: Data classification - Threats and Risk – Cryptography - Digital signature - Database control - Users and Database Privileges - Types of Privileges.

Unit 5 : Query Execution and Optimization

Query Processing – Using Indexes - Distributed Database - Distributed Database concepts: Database Architecture - Advantages of Distributed Database - Distributed Database Techniques - Distributed concurrency - Control and Recovery.

Text Book

Atul Kahate, **"Introduction to Database Management Systems"**, 1st Indian Reprint, Pearson Education, Delhi, 2004. (**Chapters:** 2, 3, 4, 6, 7, 8)

Reference Book

Abraham Silberchatz, Henry F. Korth and S. Sudharshan, **"Data Base System concepts"** Mc Graw Hill International – Fourth Edition.

DATA COMMUNICATION NETWORKS

SEMESTER : II **COURSE CODE : U18IT204**
CREDITS 2 **HOURS/WEEK : 3**

Objective: *To Understand the Characteristics, Specifications, Standards, Protocols and Techniques of the modern Computer based Communication Systems.*

UNIT 1: Introduction to Network and Communication Media
Introduction**:** History - Applications – Computer Network Topologies – Categories of Networks – Networks – Network Architecture – OSI Model – TCP/IP Architecture - Communication Media and Data Transmission**:** Analog and Digital Data Transmission – Modulation and Demodulation – Transmission Media – Wireless Communications – Data Transmission Basics - Transmission Modes – Interfacing – Multiplexing.

UNIT 2: Error Detection and Correction, Data Link Control and Routing Protocols
Error Detection and Correction: Types of Errors – Error Detection – Error Correction. - Data Link Control and Protocol Concepts: Flow Control – Error Control – Asynchronous Protocols – Synchronous Protocols – HDLC - Integrated Services and Routing Protocols: Integrated Services – ISDN Services – ISDN Topology – ISDN Protocols – ATM – Characteristics – Frame Relay – Comparison of ISDN, ATM and Frame Relay.

UNIT 3: LAN and WAN
LAN: Types of Network and Topology – LAN Transmission Equipment – Ethernet – Token bus – Token ring – Fibre Distributed Data Interface – Distributed Queue Dual Bus – LAN Operating Systems and Protocols – Ethernet Technologies. WAN: Transmission Methods – Carrier Types – Transmission Equipment – Design and Multicast Considerations –Protocols.

UNIT 4: Wireless LAN, Internetworking and TCP Reliable Transport Services
Wireless LAN: Applications – Requirements – Planning – Architecture – IEEE 802.12 – Protocol Layer – Physical Layer – Designing the Wireless LAN Layout – WAP Services - Internetworking: Principles – Routing – Internetwork Protocols – Shortcomings of IPv4 – IP Next Generation - TCP Reliable Transport Services: Transport Protocols – The Service TCP Provides to Applications – End-to-End Service and Datagrams – Transmission Control Protocol – User Datagram Protocol.

UNIT 5: Network Applications and Network Management
Network Applications: Client-Server Model – DNS – Telnet – File Transfer and Remote File Access – Electronic Mail – World Wide Web - Network Management: Goal of Network Management – Standards – Network Management Model – Infrastructure for Network Management – Simple Network Management Protocol.

Text Book

1. Brijendra Singh, **"Data Communications and Computer Networks"**, 2nd Edition, PHI, 2006.

Reference Books

1. William Stallings, **"Data and Computer Communications"**, 8th Edition, Pearson Education, 2007.
2. Behrouz A. Forouzan, **"Data Communications and Networking"**, 4th Edition, Tata McGraw Hill Publishing Company, 2006.

ENVIRONMENTAL STUDIES

SEMESTER – II **Course Code : U16EST21**
Credits: 2 **No. of Hrs 30**

Unit – I: The Multidisciplinary nature of Environmental Studies
Definition, Scope and Importance. Need for Public awareness

Unit – II : Nature Resources:
Renewable and Non-renewable resources
Forest resources : Use and over-exploitation, deforestation, case studies, Timber extraction, mining, dams and their effects on forests and tribal people. - **Water resources:** Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam benefits and problems.-**Mineral resources:** Use and exploitation, environmental effects of extracting and using mineral resources, case studies. -**Food resources:** World food problems, change4s caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity case studies.-**Energy resources:** Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case Studies.-**Land resources:** Land as a resource, land degradation, man induced landslides, soil erosion and desertification. - Role of an individual I conservation of natural resources. - Equitable use of resources of sustainable lifestyles.

Unit – III : Ecosystems: Ecosystems
Concept of an ecosystem, Structure of an ecosystem, producers, consumers, decomposers, energy flow in the ecosystem, ecological succession, food chains, food webs and ecological pyramids. - Introduction, types, characteristics features, structure and function of ecosystem: - Forest ecosystem, - Grassland ecosystem, - Desert ecosystem, - Aquatic ecosystems (Ponds, streams, lakes, rivers, oceans, estuaries).

Unit – IV : Biodiversity and its conservation:
Introduction-definition : Genetic, species and ecosystem diversity, Biogeographical classification of India, value of biodiversity: Consumptive use, productive use, social ethical, aesthetic and option values, Biodiversity at global, National and local level, India as a megadiversity nation, Hot-spots of biodiversity, Threats to biodiversity : habit los, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India, Conservation of biodiversity In-situ conservation of biodiversity.

Unit – V : Environmental Pollution:
Definition, Causes, effects and control measures of
a. Air Pollution b. Water Pollution c. Soil Pollution d. Marine Pollution
e. Noise Pollution f. Thermal Pollution g. Nuclear Hazards
Solid Waste Management: Causes, effects and control measures of urban and industrial wastes, role of an individual in prevention of pollution, pollution case studies.

Unit – VI: Social Issues and the Environment:
From unsustainable to sustainable development, Urban problems related to energy, water conservation, rain water harvesting, watershed management, resettlement and rehabilitation of people; its problems and concerns. Case studies, Environmental ethics: Issues and possible solutions, climate change, global warning, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies, wasteland reclamation, consumerism and waste products Environment Protection Act, Air (Prevention and Control of Pollution) Act, Forest (Conservation) Act, issues involved in enforcement of environmental legislation, public awareness.

Unit – VII: Human Population and the Environment:

Population growth, variation among nations, Population explosion-family welfare programme environment and human health, human rights, value education, HIV/AIDS, women and child welfare, role of information technology in environment and human health, case studies.

Unit – VIII: Field Work: Environmental Service Learning (ESL)

1. **Integrated learning:**
   Survey and Planning: Visit to a local area to document environmental assets-river/forest/grassland/hill/mountain, visit to a local polluted site -Urban/Rural/Industrial/Agricultural, study of common plants insects, birds, study of simple ecosystems-pond, river, hill slopes, etc.
2. **Service to the Community:** Action plan
3. **Student Voice:** Creating awareness and implementation of Action plan
4. **Civic Responsibility:** ESL activity of students and its effect on chosen community – Voice of the community
5. **Reflection:** Before, during and after the project – to draw links between social and personal aspects of the project and academic curriculum.

   The five elements of "Environmental Service Learning" incorporates – exploring/mapping local environments; making community partners; participating in local environmental service; reflecting on the learning which results from the service; and celebrate/communicating about environmental stewardship.

ENGLISH LANGUAGE LAB – 2
(Remedial Grammar and Writing Skills)

SEMESTER	**: II**	**COURSE CODE**	**: U18ITEP2**
CREDITS	**: 2**	**HOURS/WEEK**	**: 30**

Objectives : *To obtain practical training on English usage and discourse styles for use in day-to-day context and to initiate the skills of thinking, evaluating and writing.*

1. Types of Sentences
2. Tenses
3. Articles and Prepositions
4. Punctuations
5. Brainstorming and Gathering Information
6. Organizing Information and Writing the First Draft
7. Proof Reading
8. Descriptions
9. Narrations
10. Expositions
11. Persuasions
12. Essays
13. Paragraphs
14. Précis
15. Abstract
16. Leaving a Note
17. Preparing Agenda, Minutes etc.

MATHEMATICS FOR COMPETITIVE EXAMINATIONS - 2

SEMESTER	**: II**	**COURSE CODE**	**: U18IT2P4**
CREDITS	**: 2**	**HOURS/WEEK**	**: 30**

Objective : *To acquire arithmetic skills required to face competitive examinations.*

UNIT 1
Surds & Indices - Allegation or Mixture – True discount – Banker's discount

UNIT 2
Stocks & Shares - Calendar - Clocks - Races & Games of Skill

UNIT 3
Linear Equation in Two Variables - Quadratic Equations

UNIT 4
Arithmetic and Geometric Progressions (A.P. & G.P.) - Geometry - Polygons

UNIT 5
Number Series - Tabulation - Pie-Chart - Bar-Graphs - Line Graphs

Text Book

1. R.S. Aggarwal, **"Objective Arithmetic"** S. Chand & Company Ltd., New Delhi, 2003.

DBMS LAB

SEMESTER	**: II**	**COURSE CODE**	**: U18IT2P5**
CREDITS	**: 4**	**HOURS/WEEK**	**4**

Objective: *To obtain hands on experience in working with essential facilities available in popular RDBMS software.*

1. Creating updating and inserting into databases & simple queries.
2. Usage of select statement – for queries using
    i. AND, OR, NOT Operators, WHERE clause.
    ii. UNION, INTERESECTION, MINUS.
    iii. Sorting and grouping.
3. Form Nested queries using SOL
    i. Sub queries
    ii. Joins
4. Implementation of Built–in functions of SQL.
5. Creation of simple forms.
6. Use of indexes, creating views and querying in views.
7. Employing Cursors, triggers and stored procedures and functions.
8. Case studies: - Use forms for database manipulations and generate appropriate reports for the following
    i. Student evaluation systems.
    ii. Pay – roll system.
    iii. Income tax calculations
    iv. Seat reservation Problem
    v. Mark sheet Preparation.
9. Creating new users
10. Granting and Revoking of Privileges to the users

COMPUTER HARDWARE AND NETWORKING LAB

SEMESTER :II **COURSE CODE : U18IT2P6**
CREDITS 4 **HOURS/WEEK : 60**

Objective : *To acquire practical training in and Computer Hardware and Networking*

Computer Hardware:

- **Introduction to Computers and Operating Systems :** Evolution of Personal Computers – Types of Computers – Operating Systems: DOS, Unix, Windows & Linux (Basics only).
- **PC Accessories and Functions:** Monitors & Types (CRT, LCD, TFT & LED) – Peripherals (Keyboard, Mouse, Speaker, etc.) – CPU - Processor and Types - Motherboard and Types – BIOS – CMOS – I/O Ports: Serial – Parallel – USB – AGP – VGA – PCI/ISA Slots – Game Port – Sockets – Buses (IDE, SATA, SCSI) – FDD Connectors - Jumper Settings - DIMM Slots - Front Panel Connectors – Hard Disk and Types, SMPS – Optical Storage Devices - I/O Buses – Memory - RAM and ROM - Imaging and Printing Devices: Printer, Scanner and Plotter.
- **Assembling :** Setting up the Processor, Cooler Fan & RAM – Fixing the Motherboard & SMPS - Mounting the Cabinet – Connecting the Cards & Devices: FDD – HDD – CD Drive – SMPS – CMOS & BIOS Setup.
- **Installation :** Fdisk – Partitioning – Formatting – File Systems (FAT & NTFS) – Installation: Operating System – Drivers - Printers – Basic Software - Antivirus.
- **Troubleshooting :** BIOS Problem- Identification of source for Beep Sound - Display Problem - Booting Problem - Operating System Problems – Hardware Issues – Printer Issues - Error Messages.

Networking:

- **Components of the Computer Network : -** Familiarization with various Network devices, Connectors and Cables - Understanding the Layout of network - **Crimping & Punching -** Crimping practice with straight and cross CAT 5 cables - Punching practice in IO Box and patch panel - Crimping and making cables - **Cabling -** Create cabling in a lab with HUB/Switch and IO Boxes and patch panel. Fitting Switch Rack.
- **Installing & configure a Network -** Installing & Configuring a Peer-to-Peer - Network using Windows Software. - Connect computers using Bluetooth - **Configuration of Data Communication Equipment-** Connecting computers with Network with Drop cable and using Wi Fi configuration- Basic Programmable switch Configuration-Spanning Tree Protocol (STP) - Command Line Interface - IP Routing Process - Verifying Configuration
- **IP Addressing & TCP/IP -** IP Addressing technique(IP4/IP6) and Subnetting and Supernetting the network - Installation and Configuration of TCP/IP Protocol - Practice TCP/IP Utilities : PING, IPCONFIG, HOSTNAME, ROUTE, TRACERT etc. - **Other Network Protocols -** Working with SMTP, TELNET, FTP, HTTP, SNMP, LDAP etc. - Practice on configuring DHCP.
- **Sharing Resource & Internet connection -** Sharing Resource and Advance Sharing Setting - Installing Proxy Server - Exposure and using Internet. Setting E-mail accounts. Conferencing - Installing and Configuring Internet - Connection on a PC using Broadband or Dongle - **Network Protection and troubleshooting -** Setting up basic protection using public keys and MAC address filters. Integrate wired with wireless network. Power over Ethernet (PoE). Troubleshooting wired and wireless network.
- **Control & monitoring of network devices -** Setting up of basic collaboration tool like NetMeeting for activities like chat, application sharing, remote desktop access and control, VoIP. Setup, IP camera for basic surveillance scenario, logging and monitoring of devices / locations - Use Linux Network Tools to check / maintain / Manage Network – **Installing and configuring Windows Server -** Configure services like Active Directory, DNS and DHCP. Configuration of broadband modem and sharing internet connection.

PROGRAMMING WITH JAVA

SEMESTER – III **Course Code : U18IT305**
Credits: 3 **No. of Hrs/Week 6**

Objective : *To acquire programming experience and problem solving expertise with exposure to Object Oriented Programming techniques and other facilities available in JAVA.*

Unit 1

OOP and Java - Objects and Classes, - Encapsulation, - Inheritance, - Polymorphism, - Java Language, - The Primaries – Character Set, - Tokens, - Constants, - Variables, - Operators and Expressions, - Library Methods, - Strings, - I/O Streams, - Formatting the Output values, - Control Statements – If, - Switch, - Iterative Statements - While, - Do-While-For.

Unit 2

Single and Two dimensional Arrays, - Methods, General form, invoking, - method overloading, - recursion, - Classes and objects General form, creation, - constructors - constructor overloading, copy constructor, - 'this' keyword, - Static members, - finalize method, - Inner class and anonymous classes, - Inheritance – inheriting, - abstract classes and final classes, - Interfaces – structure, implementation, - Interface inheritance.

Unit 3

Packages– Package Hierarchy,- Import Statement,- Hiding the Classes,- Access Control Modifiers, - Applets – Life Cycle, - Applet Class, - Syntax of Applet Tag, - Methods in Graphics Class, - Threading, Life Cycle, Creating and Running, - Methods in Thread Class, - Priority Thread,- Synchronization,- Dead Lock,- Inter Thread Communication, - Applets Involving Threads.

Unit 4

Events, Listeners, - Event Handling Methods, - Inheritance of Control Classes, - Labels, - Button Control, - Check Box Control, - Radio Button, - Choice Control, - List Control, - Scroll Bars, - Layouts and Panel, - Windows and Frames, - Menus and Dialogs, - Mouse Events and Listeners, Adapter Class and Inner Class, - Exception Handling – Default Exception – User Defined Exception Handling, - Exception and Error Classes, - Catch Block Searching Pattern, Throw and Throws.

Unit 5

Networks, - Domain Names and Protocols, - Layers in Network Communication, - Ports, - TCP, Server - Socket Class, - Socket Class, - UDP Approach, - JDBC – Establishing Connection, - Creating Tables, - Enter Data, - Table Updating, - Use Of Prepared Statement, - Obtaining Metadata, - Using Transactions, - Files Creation, Reading/Writing Characters/Bytes/Primitive Data Types, - Random Access Files.

Text Book

1. Muthu C, **"Programming in Java"**, Thompson Learning, 2004.

Reference Books

1. Patrick Naughton& Hebert Schildt, **"The Complete Reference JAVA 2",** 3 ed,TMH, Delhi,
2. E. Balagursamy, **"Programming with Java – A Primer"**, Third Edition, Tata McGraw-Hill Publishing Company Limited, 2007

OPERATING SYSTEMS

SEMESTER : III **COURSE CODE : U18IT306**
CREDITS : 3 **HOURS/WEEK : 3**

Objective: *To know the concepts and functions of Operating Systems used in modern Computing Systems.*

Unit 1: Introduction to Operating System

Introduction to Operating System: - Overview of Operating System-The Evolution of Operating System-Types of Operating Systems-Functions of Operating System-Characteristics of Modern Operating System-Operating System Structure.

Unit 2: Process and Process Synchronization

Processes: Process Concept-Comparison of Process and Programs - Process States-Process Scheduling-Ready Queue vs. Device Queue-Operations on a Process-Cooperating Processes-Threads - Interprocess Communication. Process Synchronization: Racing Problem-Avoiding Racing Problem-Requirement for Critical Problem-Critical Section algorithms-OS tools for Process Synchronization-Classical Synchronization Problems-Monitors-Inter Process Communication for Message Communication.

Unit 3: Deadlock and CPU Scheduling

Deadlocks: Introduction-System Model-Deadlock Characteristics-Deadlock Detection-Deadlock Prevention-Deadlock Avoidance-Deadlock Recovery-Other methods of Deadlock Recovery. - CPU Scheduling: Schedulers-Scheduling Criteria-CPU Scheduling Algorithms-Multiple Processor Scheduling-Real time Scheduling-Performance Comparison.

Unit 4: Memory Management and Virtual Memory

Memory Management: Introduction-Logical versus Physical address space-Program Relocation-Logical Organization-Physical Organization-Dynamic Loading and Dynamic Linking-Memory Allocation Techniques. - Virtual Memory: Swapping-Demand Paging-Page Fault-Page Replacement Algorithms-Thrashing-Page replacement policies-Local and Global-Demand Segmentation-OS Software factors.

Unit 5: Information Management and Secondary Storage Structure

Information Management: Introduction-A Simple File System-File Access Methods-Directory Structure-File Protection-I-nodes-Free Space Management Techniques-Record Blocking. - Secondary Storage Structure: Introduction-Hard Disk Structure-Hard Disk Performance Parameter-Hard Disk Scheduling Algorithms-Swap Space Management-RAID and its level-Disk Space Allocation Methods-Stable Storage Implementation.

Text Book

1. S. Rajiv Chopra, **"Operating Systems – A Practical Approach"**, 2nd Edition, S. Chand & Company Pvt. Ltd., New Delhi, 2013.

Reference Books

1. Abraham Silberschatz, Peter B. Galvin, Greg Gange, "Operating System Concept", 9th Edition, Wiley India Pvt. Ltd., 2015.
2. Andrew S. Tanenbaum, Herbert Bos, "Modern Operating Systems", 4th Edition, Pearson Education, 2014.
3. William Stallings, "Operating Systems Internal and Design Principles", Sixth Edition, Pearsons Education, 2009.

DIGITAL COMPUTER FUNDAMENTALS

SEMESTER – III **Course Code : U18IT307**
Credits: 4 **No. of Hrs/Week 4**

Objectives : *To understand the building blocks of a Computer System*

Unit 1

Digital Principles: - Definition for Digital Signals – Digital Logic – **Number Systems and Codes: –** Binary Number System – Binary-to-Decimal Conversion – Decimal-to-Binary Conversion – Octal Numbers – Hexadecimal Numbers – ASCII Code – Excess-3 Code – Gray Code **- Digital Logic: -** Logic Gates – Universal Logic Gates – AND-OR-Invert Gates – Positive and Negative Logic.

Unit 2

Combinational Logic Circuits: - Boolean Laws and Theorems – SOP Method – Karnaugh Map – Pairs, Quads, Octets – Karnaugh Simplification – Don't Care Conditions – POS Method & Simplification – **Data Processing Circuits: -** Multiplexers – Demultiplexers – 1 of 16 Decoder – BCD to Decimal Decoder – Encoder.

Unit 3

Arithmetic Circuits: - Binary Addition – Binary Subtraction – Unsigned Binary Numbers – Sign Magnitude Numbers – 2's Complement Representation – 2's Complement Arithmetic – Arithmetic Building Blocks – The Adder-Subtractor **- Flip Flops: -**RS Flip Flops – Edge Triggered RS Flip Flop – D Flip Flop – JK Flip Flop –Master Slave Flip Flop

Unit 4

Registers: - Types of Registers – Serial In Serial Out – Serial In Parallel Out – Parallel in Serial Out – Parallel In Parallel Out – Universal Shift Register – Applications of Shift Registers – **Counters:** Asynchronous Counter –Synchronous Counters – Changing the Counter Modulus – Decade Counters– Presettable Counters.

Unit 5

D/A Coversion and A/D Conversion: - Variable, Resistor Networks **-** Binary Ladders – D/ A Converters – D/A Accuracy and Resolution – A/D Converter-Simultaneous Conversion – A/D Converter **-** Counter Method **-** Continuous A/D Conversion – A/D Techniques **-** Dual-slope A/D Conversion – A/D Accuracy and Resolution

Text Book

1. Donald P Leach, Albert Paul Malvino, Goutam Saha, **"Digital Principles and Applications"**, 7th Edition, TMH Publications, Delhi, 2011

PERSONAL EFFECTIVENESS

SEMESTER – III **Course Code : U18IT308**
Credits: 2 **No. of Hrs/Week 2**

Objectives : *To acquire skills that will help to be an effective individual.*

Unit 1 Independence

1 Being Proactive in roles and relationships in life.
2 Beginning with the End in Mind

Unit 2 Independence

3 Putting First Things First

Unit 3 Interdependence

4 Think Win-Win: Genuine feelings for mutually beneficial solutions or agreements in relationships.
5 Seek First to Understand, Then to be understood - Use empathic listening to be genuinely influenced by a person, who compels them to reciprocate the listening and take an open mind to being influenced by you.

Unit 4 Interdependence

6 Synergize - Combine the strengths of people through positive teamwork, so as to achieve goals that no one could have done alone.

Unit 5 Continuous improvements

7 Sharpen the Saw - Balance and renew your resources, energy, and health to create a sustainable, long-term, effective lifestyle. lt primarily emphasizes exercise for physical renewal, prayer(meditation, yoga, etc.) and good reading for mental renewal. It also mentions service to society for spiritual renewal.

Text Book

1. R. Stephen Covey, “Seven Habits of Highly effective people”, Simon and Schuster Inc., 1989, reprint 2013.

JAVA PROGRAMMING LAB

SEMESTER: III **Course Code : U18IT3P7**
Credits: 4 **No. of Hrs 60**

Objective: *To attain hands-on experience in Programming with the facilities available in JAVA.*

1. Develop Java Programs using Classes and Objects
2. Implement Java Programs using different types Inheritance
3. Develop Java Programs using Interfaces
4. Design and develop Packages in Java
5. Write Java Programs to handle Exceptions
6. Develop a Java Program to implement Multithreading
7. Write Java Programs to implement Collection Interfaces
8. Implement Applet Programming in Java
9. Develop Java programs applying the AWT concepts
10. Write Programs to implement the different concepts in swing concepts
11. Implement JDBC to handle databases in Java.

OPERATING SYSTEMS LAB

SEMESTER : 3 **COURSE CODE : U18IT3P8**
CREDITS : 4 **HOURS/WEEK : 4**

Objective : *To obtain hands on experience with LINUX Operating System and Shell Programming*

1. Execution of Simple Shell Commands
2. Usage of Directory Commands
3. Employing Vi Editor Commands
4. Searching a word in a file
5. Displaying the content of a file.
6. Displaying Login Greeting Script
7. Displaying the current date, time, username and current directory.
8. Shell Program to print the given number in reverse order.
9. Preparation of Mark list using shell programming
10. Menu driven shell program to create, sort and display a file.
11. Menu driven shell program to copy, edit, rename and delete a file.
12. Shell Program to Sort numbers in ascending and descending order.
13. Shell Program to Sort names in ascending and descending order.
14. User Creation in Linux
15. Group Creation in Linux
16. Menu driven shell program for the following – Passwd, pconfig, ping
17. Shell program to find the number of ordinary files and directory files in the current directory.
18. Shell program to accept the name of the directory as command line argument and display the listing in that directory. By default, the “Home” directory’s contents should be displayed.
19. Find the list of all running processes and redirect the output in a file.
20. Monitoring and managing system log information.

MULTIMEDIA LAB

SEMESTER – III **COURSE CODE: U18IT3P9**
Credits : 4 **HOURS/WEEK : 4**

Objective: *To obtain hands-on training required to handle various components of Multimedia such as text, graphics, animation, audio and video.*

1. Working with Text and Styles using Adobe Photoshop.
2. Creating shapes and painting in Adobe Photoshop (Using Drawing tool, Pen tool, Painting tools, and Brush tools).
3. Working with Image size and Resolution in Adobe Photoshop.
4. Working with Layers in Adobe Photoshop.
5. Transforming and Retouching Images using Adobe Photoshop (Cropping, Transforming objects, Clone stamping, Retouching).
6. Working with color Adjustments in Adobe Photoshop.
7. Creating Frame-by-Frame Animation & Tweened Animation–(motion tween and shape tween) using Macromedia Flash.
8. Working with textual effects in Macromedia Flash.
9. Creating buttons and working with scenes in Macromedia Flash.
10. Creating animation with sound using Macromedia Flash.
11. Recording, Editing and Mixing audio clips using Adobe Audition.
12. Capturing, Editing and Rendering video clips using Adobe Premier.

DATA STRUCTURES AND ALGORITHMS

SEMESTER: IV **COURSE CODE: U18IT409**
CREDITS : 3 **HOURS/WEEK: 3**

Objective : *To understand the popular Data Structures and Algorithms involved in Computing.*

Unit 1:Sequential Representation of Data Structures

Arrays and Sequential Representations – Ordered Lists – Stacks and Queues – Evaluation of Expressions – Multiple stacks and queues – Singly Linked Lists – Linked Stacks and Queues – Polynomial Addition – Doubly Linked Lists.

Unit 2:Tree Representation of Data Structures

Trees – Binary tree representations – Tree traversal – Threaded binary trees – Binary tree representation of trees – Set representations – decision trees – Game Trees and counting Binary Trees – Graphs and Representations – Traversals. – Activity Networks – Topological sort.

Unit 3:Algorithms conventions and sorting

Algorithms – Conventions – Writing Structured programs – Analyzing algorithms – Sorting – Heap sort – Binary Search – Finding the maximum and minimum – Merge sort – Quick sort – Selection Problem.

Unit 4:Greedy Method

Greedy Method: The general method – Optimal storage on tapes – Knapsack problem – Job sequencing with deadlines – Optimal merge patterns – Minimum spanning trees – Single source shortest paths.

Unit 5:Backtracking Method

Backtracking: The General method – 8-Queen's problem – Sum of subsets – Graph colouring – Hamiltonian cycles – Knapsack problem.

Note : *Theorems on correctness procedures and derivations of time complexity are not expected.*

Text Books

1. Ellis Horowitz and Sartaj Sahni, **"Fundamentals of Data Structures"**, Galgotia Publications., Delhi, Reprint 2001.
2. Ellis Horowitz and Sartaj Sahni, **"Fundamentals of Computer Algorithms"**, Galgotia Publications., Delhi, Reprint 2001.

Reference Books

1. Seymour Lipschutz, "Data Structure", Schaum's Outline, Tata McGrawHill Education Pvt. Ltd., 2005.
2. Samanta D., "Fundamentals of Data Structures for Students", Shroff Publishers and Distributers. Pvt. Ltd., Mumbai, 2015.
3. Alfred V. Aho, John E. Hopcroft, Jeffry D. Ullman, "The Design and Analysis of Computer Algorithms", Pearson Education, 2002.

.NET PROGRAMMING

SEMESTER – IV **Course Code : U18IT410**
Credits : 3 **No. of Hrs/Week 6**

Objective : *To acquire knowledge on Server Side Programming using .NET framework*

Unit 1: The .NET Platform and the Web

The Pathway to Web applications - The Web Client/Server model - Components of ASP.NET and the .NET Framework - Overview of Internet Information Server – Overview of ASP.NET - .NET Conmen Language Runtime and Class Library – Managed Components in .NET – Web Services - Language Independence in the .NET Frame Work – **Working with ASP.NET:** - The Features of ASP.NET – The Anatomy of ASP.NET Pages – Introducing Web Forms – VS.NET Web Applications and other IDE Basics – Separating Content and Code-the Code-Behind Feature-Application Configuration.

Unit 2: HTML Controls

Using HTML Controls – Using Web Controls – Web Controls for Displaying and Formatting Data – Web Control for Creating Buttons – Web Controls for Inputting Text – Web Control for Selecting Choices – Web Controls for Creating Lists – Miscellaneous Basic Controls – Creating a Simple ASP.NET Application – ASP.NET Page Directives.

Unit 3: ASP.NET Controls

ASP.NET Rich Controls - Validation Controls – Data List Controls – User Controls – ASP.NET Intrinsic Objects.

Unit 4: .NET Framework Class Library

Common Features of the .NET Framework Class Library – Using Data Collections – Handling File Input/Output and Directories – Using the Windows Events Log – Manipulating XML Data - Sending Internal Email.

Unit 5: Accessing Data with ADO .NET

Overview of Data access on the Web – ADO.NET: The Next Generation of Data Access – ADO.NET Programming Objects and Architecture – Working with Datasets and Data Table Objects – Maintaining Data Integrity with the Data Relation Classes.

Text Book

Matt J. Crouch ***"ASP.NET and VB.NET Web Programming"***, Pearson Education. 2010.

Reference Book

Matthew Mac Donald, ***"ASP.NET:-The Complete Reference"***, TMH, New Delhi, 2002.

COMPUTER ORGANIZATION AND ARCHITECTURE

SEMESTER : IV **Course Code : U18IT411**
Credits : 4 **No. of Hrs/Week 60**

Objectives : *To become familiar with the concepts and techniques involved in Computer Organization*

Unit 1

Basic Computer Organization and Design: - Instruction Codes – Computer Registers – Computer Instructions – Timing and Control – Instruction Cycle – Memory Reference Instructions – Input, Output and Interrupts – Complete Computer Description – Design of Accumulator Logic.

Unit 2

Programming the Basic Computer: – Introduction – Machine Language – Assembly Language – The Assembler – Program Loops – Programming Arithmetic and Logic Operations – Subroutines – Input-Output Programming **- Microprogrammed Control:** – Control Memory – Address Sequencing – Microprogram Example.

Unit 3

Central Processing Unit: - General Register Organization – Stack Organization – Instruction Formats – Addressing Modes – Data Transfer and Manipulations – Program Control – RISC.

Unit 4

Input – Output Organization: - Peripheral Devices – Input-Output Interface – Asynchronous Data Transfer – Modes of Transfer – Priority Interrupts –Direct Memory Access – I/O Processor – Serial Communication.

Unit 5

Memory Organization: – Memory Hierarchy – Main Memory – Auxiliary Memory – Associative Memory – Cache Memory – Virtual Memory – Memory Management Hardware.

Text Book

1. Morris Mano. M. **"Computer System Architecture"**, 3rd Edition, Pearsons Education, 2005.

PROFESSIONAL ETHICS AND CYBER LAWS

SEMESTER – IV **Course Code : U18IT412**
Credits : 2 **No. of Hrs/Week 3**

Objectives:

- *To understand professional ethics, human values and to appreciate the rights of others.*
- *To handle ethical dilemmas while discharging duties in professional life.*
- *To understand Cyber Laws and their implications.*

Unit 1

HUMAN VALUES - Morals, Values and Ethics – Integrity – Work Ethic – Honesty – Courage – Empathy – Self-Confidence - Computer Professional as expert witnesses and advisors - moral leadership - Respect for Others – Courage - Valuing Time – Co-operation – Commitment –Character – Spirituality.

Unit 2

Cyber Law : International Perspective **Section-A** : Electronic Data Interchange 1) EDI : Concept and legal Issues. 2) UNCITRAL Model Law. 3) Electronic Signature Laws of Major Countries 4) Cryptography Laws 5) Cyber Laws of Major Countries- **Section–B :** Law of Intellectual Property-1) Copy Right Act. 2) Trade and Merchandise Act 3) Patent Act 4) Domain Name Disputes 5) Cyber-Squatting 6) Important Case Laws.

Unit 3

Cyber Security - Introduction to Cyber Security, Implementing Hardware Based Security, Software Based Firewalls, Security Standards, Assessing Threat Levels, Forming an Incident Response Team, Reporting Cyber crime, Operating System Attacks, Application Attacks, Reverse Engineering & Cracking Techniques and Financial Frauds

Unit 4

Module IV: Cyber Crimes & Legal Framework Cyber Crimes against Individuals, Institution and State· Hacking - Digital Forgery - Cyber Stalking/Harassment - Cyber Pornography - Identity Theft & Fraud - Cyber terrorism - Cyber Defamation - Different offences under IT Act, 2000. – Technology - Need for Cyber Law - Cyber Jurisprudence at International and Indian Level

Unit 5

Module II: Cyber Law - International Perspectives UN & International Telecommunication Union (ITU) Initiatives Council of Europe-Budapest Convention on Cybercrime-Asia-Pacific Economic Cooperation (APEC) - Organization for Economic Co-operation and Development (OECD) World Bank Commonwealth of Nations

Text Books

1. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2000.
2. Vakul Sharma, Handbook of Cyber Laws", Macmillan India Ltd, New Delhi, 2002.

Reference Books

1. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003.
2. Kamlesh N. & Murali D. Tiwari(Ed), IT and Indian Legal System, Macmillan India Ltd, New Delhi
3. K.L.James, The Internet: A User's Guide (2003), Prentice Hall of India, New Delhi
4. Chris Reed, Internet Law-Text and Materials, 2nd edn, Universal Law Publishing Co., 2005, New Delhi
5. S. V. Joga Rao, Computer Contract & IT Laws (in 2 Vols.), 2005 Prolific Law Publications, New Delhi
6. T. Ramappa, Legal Issues in Electronic Commerce, Macmillan India Ltd, New Delhi.
7. Indian Law Institute, Legal Dimensions of Cyber Space, New Delhi.
8. Pankaj Jain & Sangeet Rai Pandey, Copyright and Trademark Laws relating to Computers, Eastern Book Co, New Delhi.
9. Farouq Ahmed, Cyber Law in India, Pioneer Books, 2001.
10. S. V. Joga Rao, Law of Cyber Crimes and Information Technology Law, Wadhwa & Co, Nagpur, 2000.

DATA STRUCTURE AND ALGORITHMS LAB

SEMESTER: IV **COURSE CODE: U18ITP10**
CREDITS : 4 **HOURS/WEEK: 4**

Objective: *To acquire programming expertise in handling popular Data Structures & Algorithms.*

1. Develop programs to handle Single Dimensional Array
2. Develop programs to handle Multi-Dimensional Array
3. Create programs to implement Queue Operations.
4. Create programs to implement Stack Operation
5. Create programs to implement Single Linked List
6. Create programs to implement Doubly Linked Lists.
7. Create a program to implement Tree Traversals.
8. Write a program to perform Heap Sort
9. Write a program to perform Quick Sort.
10. Write a program to perform Merge Sort.
11. Write a program to perform Bubble Sort
12. Write a program to perform Selection Sort
13. Write a program to perform Linear search.
14. Write a program to perform Binary search.
15. Create a program to implement Knapsack Algorithm
16. Create a program to implement the Spanning Tree Algorithm
17. Create a program to implement the Single Source Shortest Path Algorithm

B. Voc. [Information Technology]
SEMESTER – IV (NSQF Level : 6)

.NET PROGRAMMING LAB

SEMESTER – IV **Course Code : U18ITP11**
Credits : 4 **No. of Hrs/Week 6**

Objective : *To obtain hands on experience in writing server side programs using ASP.NET*

1. Design ASP.NET Web form using Web Server controls to enter job seeker's details.

2. Create an ASP.NET Web form using web control to enter Email Registration form.

3. Apply appropriate validation techniques in Email registration form using validation controls.

4. Write an ASP.NET application to retrieve form data & display it in the client browser in table format.

5. Create a Web application to store the details of the books available for sale in XML format.

6. Create a Web application using ADO.Net that uses which performs basic data manipulations: (i)Insertion (ii) Updating (iii) Deletion (iv)Selection

7. Create an application using Data grid control to access information's form table in SQL Server.

8. Create a login form using Mobile Control.

9. Write an ASP.NET application for registering in on-line course of Bharathidasan University.

10. Develop a Portal for our College.

11. Display a "HELLO" message using Web Services.

B. Voc. [Information Technology]
SEMESTER – IV (NSQF Level : 6)

WEB DEVELOPMENT LAB

SEMESTER – IV **Course Code : U18ITP12**
Credits : 4 **No. of Hrs/Week 6**

Objective *: To acquire hands on training in programming for the world wide web.*

1. Create a web page employing the Basic Tags
2. Design a web page using different Heading Styles
3. Employ different types of Text Formatting
4. Design a web page with Tables
5. Create a web page with Hyperlinks
6. Create a web page with Images
7. Design a web page involving Image Maps
8. Design a web page employing Lists
9. Create a web page with Frames
10. Design a web page employing Cascaded Style Sheets
11. Create a Registration Form
12. Create a Website for Shopping Mall
13. Using Java Script perform Arithmetic Operations in a web page
14. Develop a Calculator Using Java Script
15. Perform Form Validations Using Java Script.

MOBILE COMPUTING TECHNOLOGIES

SEMESTER – V **Course Code : U18IT513**
Credits : 4 **No. of Hrs/Week 6**

Objectives :

- *To impart knowledge on the working of mobile communication systems*
- *To acquire expertise in application development for Mobile Computing systems.*

Unit 1: Basics of Communication Technologies

Types of Telecommunication Networks – Components of a Wireless Communication System – Architecture of Mobile Telecommunication Systems – Wireless Networking Standards – WLAN – Bluetooth Technology – **Introduction to Mobile Computing and Wireless Networking :** Mobile Computing – Mobile Computing Vs. Wireless Networking – Characteristics of Mobile Computing - Structure of Mobile Computing Applications – Cellular Mobile Communication – GSM – GPRS – UMTS.

Unit 2: MAC Protocols

Properties – Issues – Taxonomy –Assignment Schemes – MAC Protocols for Ad Hoc Networks. - **Mobile Internet Protocol :** – Mobile IP – Packet Delivery – Overview – Desirable Features – Key Mechanism – Route Optimization – DHCP - **Mobile Transport Layer :** Overview of TCP/IP –Terminologies – Architecture – Operations – Application Layer Protocols of TCP – Adaptation of TCP Window – Improvement in TCP Performance.

Unit 3: Operating Systems for Mobile Computing

Mobile OS Responsibilities – Basic Concepts – Special Constraints and Requirements – Commercial Mobile OSs – Comparative Study of Mobile OSs – OS for Sensor Networks – **Mobile Application Development Protocols : -** Mobile Devices as Web Clients – WAP – J2ME – Android SDK.

Unit 4: Getting Started with Android

Activities, Fragments and Intents – Android User Interface – Designing User Interface with views – Displaying Pictures and Menus with Views – Data Persistence.

Unit 5: Content Providers

Messaging – Location Based Services – Networking – Developing Android Services – Publishing Android Applications.

Text Books

1. Prasant Kumar Pattnaik, Rajib Mall, "Fundamentals of Mobile Computing", PHI Learning
2. Wei Meng Lee, "Beginning Android 4 Application Development", Wiley India Pvt. Ltd.., 2012.

Reference Books

1. Ashok K Talukder, Hasan Ahmed, Roopa R Yavagal, "Mobile Computing", 2nd Edition, Tata McGraw Hill Publishing Company Limited, 2010.
2. Jochen Schiller, "Mobile Communications", Pearsons Education, 2008.
3. Reto Meir, "Professional Android 4 Application Development", Wiley India Pvt. Ltd., 2012
4. Pradeep Kotari, "Android Application Development Black Book", Dreamtech Press, 2014.

B. Voc. [Information Technology]
SEMESTER – V (NSQF Level : 7)

MICROPROCESSOR AND ITS APPLICATIONS

SEMESTER – V **Course Code : U18IT514**
Credits : 3 **No. of Hrs/Week 4**

Objective : *To understand the structure, architecture and applications of microprocessors.*

Unit 1: Introduction

Word Length – Evolution of Microprocessors and Digital Computers –CPU – Memory – Busses – Processing Speed – **Microprocessor Architecture:-** Introduction–Intel 8085– Instruction Cycle– Timing Diagram- **Instruction Set of Intel 8085:-** Introduction– Instruction and Data Formats– Addressing Modes–Status Flags–Symbols & Abbreviations–Intel 8085 Instructions.

Unit 2: Assembly Language Programs

Introduction – Addition and Subtraction (8 and 16-bits) – Decimal Addition and Subtraction – One's and Two's Complements (8 and 16) – Shifting and Masking – Largest and Smallest Numbers – Ascending and Descending Order – Sum of a Series – Multiplication and Division – Multi-byte Addition and Subtraction – Square-Root of a number – Block Transfer

Unit 3: Peripheral Devices and their Interfacing

Introduction – Address Space Partitioning – Memory and I/O Interfacing – Data Transfer Schemes – Interrupts of Intel 8085 – Interfacing Devices and I/O Devices – I/O Ports – Programmable DMA Controller – Programmable Interrupt Controller – Programmable Communication Interface – Programmable Counter/Interval Timer.

Unit 4: Microprocessor Applications

Introduction – Delay subroutines – 7 Segment LED Display – Frequency Measurement – Measurement of Voltage and Current – Resistance Measurement –Water Level Indicator – Traffic Control.

Unit 5: Other Microprocessors

Introduction – Intel 8086 – Classification of Intel 8086 Instructions – Binary - Addresses of Intel 8086 Registers – Description of Intel 8086 Instructions - Intel 8088 – Intel 80186 - Intel 80286 – Intel 80386 – Intel 80486 – Intel Pentium I, II, III and IV Processors.

Text Book

1. B Ram, "Fundamentals of Microprocessors and Microcomputers", 5th Revised and Enlarged Edition, Dhanpat Rai Publications (P) Ltd., New Delhi, 2003.

B. Voc. [Information Technology]
SEMESTER – V (NSQF Level : 7)

PRINCIPLES OF MARKETING

SEMESTER – V	**Course Code : U18IT515**
Credits : 2	**No. of Hrs./Week : 3**

Objectives:

1. *To understand the basic principles of Marketing*
2. *To acquire skills for effective promotion of concepts, commodities and services.*

Unit-1

Marketing function - Marketing concept - Marketing Management System Objectives and its interfaces with other functions in the organization.

Unit 2

Marketing Environment – Demographic, Economic, Physical, Technological, Political- Marketing segmentation, targeting and positioning.

Unit 3

Consumer markets and buying behaviour- (terms).

Unit 4

Concept of Marketing Mix. - Four P's of Marketing, -Marketing Strategies – Concept of Product Life Cycle- New Product Development Process – Pricing Decisions.

Unit 5

Introduction to service marketing: Types of service – Difference between goods & service – problems in service, Bank, Insurance, BPO – Handling complaints – Quality of service..

Text Books

1. Philip Kotler, Kevin Lane Keller, "Marketing Management" 15th Edn., Pearson Education. 2015.
2. Rajan Saxena, "Marketing Management", Tata McGraw Hill Education Pvt. Ltd., 2009

Reference Books

1. V. S. Ramasamy, S. Namakumari, "Marketing management", 4th Edition, OM Books, 2010.
2. William J Stanton, Michael J Etzel, Bruce J Walker, "Fundamentals of Marketing" McGraw Hill, International Edition, 1994.

SOFTWARE ENGINEERING

SEMESTER: V **COURSE CODE: U18IT5:1**
CREDITS : 3 **HOURS/WEEK: 3**

Objective: *To understand the principles and practices used in Software Development.*

Unit 1: Planning a Software Project
Introduction: Definitions – Size factors – Quality and Productivity Factors – Managerial Issues – Planning a Software Project: Introduction – Defining the Problem – Developing a Solution Strategy – Planning and Development Process – Planning an Organizational Structure.

Unit 2:Software Cost Estimation and Software Requirement Definition
Software Cost Estimation: Software Cost Factors – software Cost Estimation Techniques – Staffing Level Estimation – Estimating Software Maintenance Costs – Software Requirement Definition: Software Requirement Specification – Formal Specification Techniques – Languages and Processors for Requirements.

Unit 3:Software Design
Software Design: Fundamental Design Concepts – Modules and Modularization Criteria – Design Notations – Design Techniques – Detailed Design Considerations – Real Time and Distributed Systems – Test Plans – Milestones, Walkthroughs and Inspections – Design Guidelines.

Unit 4:Implementation Issues and Modern Programming Language Features
Implementation Issues: Structured Coding Techniques – Coding Style – Standards and Guidelines Documentation Guidelines. Modern Programming Language Features: User-Defined Data Types - Data Abstraction – Exception Handling – Concurrency Mechanisms.

Unit 5:Verification and Validation Techniques and Software Maintenance
Verification and Validation Techniques: Quality Assurance – Walkthroughs and Inspections – Static Analysis – Symbolic Execution – Unit Testing and Debugging – System Testing – Formal Verification – Software Maintenance: Enhancing Maintainability During Development – Managerial Aspects – Configuration Management – Source Code Metrics.

Text Book
1. Richard Fairley, “Software Engineering Concepts”, Tata McGraw-Hill Education, 2008.

Reference Books
1. Ian Sommerville, “Software Engineering”, 6th Edition, Pearson Education, Delhi, 2005.
2. Douglas Bell, “Software Engineering for Students-A Programming Approach”, 4th Edition, Pearson Education, Delhi 2007.

SOFTWARE PROJECT MANAGEMENT

SEMESTER: V **COURSE CODE : U18IT5:2**
CREDITS : 3 **HOURS/WEEK : 3**

Objective: *To know the basics of Software Project Management, responsibilities of Software Project Manager and Risk Management.*

Unit 1:Introduction to Software Project Management

Introduction to Software Project Management Project Definition – Contract Management – Activities Covered By Software Project Management – Overview of Project Planning – Stepwise Project Planning.

Unit 2:Project Evaluation

Project Evaluation: Strategic Assessment – Technical Assessment – Cost Benefit Analysis–Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation.

Unit 3:Activity Planning and Risk Management

Activity Planning Objectives – Project Schedule – Sequencing and Scheduling Activities –Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity on Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning And Control.

Unit 4:Monitoring and Control

Monitoring and Control: Creating Framework – Collecting The Data – Visualizing Progress – Cost Monitoring – Earned Value – Priortizing Monitoring – Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types Of Contract – Stages In Contract Placement – Typical Terms Of A Contract – Contract Management – Acceptance.

Unit 5:Managing People And Organizing Teams

Managing People And Organizing Teams :Introduction – Understanding Behavior – Organizational Behaviour: A Background – Selecting The Right Person For The Job – Instruction In The Best Methods – Motivation – The Oldman – Hackman Job Characteristics Model – Working In Groups – Becoming A Team –Decision Making – Leadership – Organizational Structures – Stress –Health And Safety – Case Studies.

Text Book

1. Bob Hughes, Mike Cotterell, "Software Project Management", 4th edition. TMH, 2009

Reference Books

1. Walker Royce, "Software Project Management", Pearson Education, 1998.
2. Pankaj Jalote, "Software Project Management in Practice", Pearson Education, 2002.

SOFTWARE TESTING

SEMESTER: V **COURSE CODE : U18IT5:2**
CREDITS : 3 **HOURS/WEEK : 3**

Objectives: *To acquire knowledge on the principles and practices used in Software Testing*

Unit 1:Software Development Life Cycle Models
Software Development Life Cycle Models: – Phases of Software Project – Quality, Quality Assurance and Quality control – Testing, Verification & Validation – Process Model – Life Cycle Models - White Box Testing: What is White Box Testing? – Static Testing – Structural Testing – Challenges - Black Box Testing: What is Black Box Testing? – Why Black Box Testing? – When to do Black Box Testing? – How to do Black Box Testing?

Unit 2:Integration Testing, System Testing and Acceptance Testing
Integration Testing: What is Integration Testing? – Integration Testing as a Type of Testing – Integration Testing as a Phase of Testing – Scenario testing – Defect Bash - System and Acceptance Testing: Overview – Why System Testing? – Functional Vs Non Functional Testing – Functional System Testing – Non Functional Testing – Acceptance Testing – Summary of Testing Phases.

Unit 3:Performance Testing and Regression Testing
Performance Testing: Factors governing Performance Testing – Methodology for Performance Testing – Tools for Performance Testing – Process for Performance Testing - Regression Testing: – What is Regression Testing – Types of Regression Testing – When to do Regression Testing – How to do Regression Testing – Best Practices in Regression Testing.

Unit 4:Internationalization (I_{18}n) Testing, Ad hoc Testing and Usability and Accessibility Testing
Internationalization (I_{18}n) Testing: - Primer – Test Phases – Enabling Testing – Locale Testing – Validation – Language Testing – Localization Testing – Tools – Challenges and Issues – Ad hoc Testing: - Overview – Buddy Testing – Pair Testing – Exploratory Testing – Iterative Testing – Agile and Extreme Testing – Defect Seeding – Usability and Accessibility Testing: - What is Usability Testing? – Approach – When to do Usability Testing? – How to Achieve Usability? – Quality Factors – Aesthetics Testing – Accessibility Testing – Tools – Lab Setup – Test Roles

Unit 5:Test Planning, Management, Execution and Reporting
Test Planning, Management, Execution and Reporting: - Test Planning -Test Management – Test Process – Test Reporting – Best Practices - Software Test Automation: What is Test Automation – Terms used in Automation – Skills Needed for Automation – What to Automate, Scope of Automation – Design & Architecture for Automation – Generic Requirement for Test Tool Framework – Process model for Automation – Selecting a Test tool – Automation for Extreme Programming Model – Challenges in Automation.

Text Book
1. Srinivasan Desikan, Gopalaswamy Ramesh, "Software Testing – Principle & Practices", Pearson Education, New Delhi, 2006.

Reference Books
1. Ron Patton, "Software Testing", 2nd Edition, Pearson Education, New Delhi, 2006.
2. William E. Perry, "Effective Methods for Software Testing", 3rd Ed., Wiley India, 2006.
3. Renu Rajani, Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", TMH Publishing Company Limited, New Delhi, 2004.

MOBILE APPLICATION DEVELOPMENT LAB

SEMESTER – V **Course Code : U18ITP13**
Credits : 6 **No. of Hrs 6**

Objective: *To obtain hands-on experience in Mobile Application Development for Android devices.*

1. Create a simple application that displays a text “Hello World” with text and background color.
2. Create sample application for login module.
3. Create an application that will change the color of the screen based on selected options from the menu.
4. Create an application that will display toast (Message).
5. Create an application to change the image displayed on the screen using radio button.
6. Create an application to demonstrate alert dialog box.
7. Create an application to demonstrate countdown timer.
8. Create an application to animate a bitmap.
9. Create an application to demonstrate a simple video view.
10. Create an application to pick contacts using Intent.
11. Create an application to play a media file from the menu card.
12. Create an application to generate a new contact using Intent.
13. Create an application to make database operations.

SEMESTER – V (NSQF Level : 7)

ASSEMBLY LANGUAGE PROGRAMMING LAB

SEMESTER – V **Course Code : U18ITP14**
Credits : 6 **No. of Hrs/Week : 6**

Objectives : *To obtain hands on training in Assembly Language Programming*

1. Addition of two 8-bit numbers with 8-bit sum
2. Addition of two 8-bit numbers with 16-bit sum
3. Subtraction of two 8-bit numbers
4. Decimal Addition of two 8-bit numbers with 16-bit sum
5. Addition of two 16-bit numbers with a sum of 16 bits or more.
6. Decimal Subtraction of two 8-bit numbers using 9's Complement.
7. Find the 2's Complement of an 8-bit number
8. Find the 2's Complement of a 16-bit number
9. Shifting an 8-bit number by 2-bit positions
10. Shifting a 16-bit number by 2-bit positions
11. Delay Subroutine with a single 8-bit register.
12. Delay Subroutine with a 16-bit register pair.
13. Delay Subroutine with multiple registers
14. Finding Square from a look-up table.
15. Finding the larger of two numbers.
16. Finding the smaller of two numbers.
17. Finding the largest number in a data array
18. Finding the smallest number in a data array.
19. Arrange a set of numbers in Ascending Order.
20. Arrange a set of numbers in Descending Order.
21. Sum of a series of 8-bit binary numbers with 16-bit sum
22. Sum of a series of 8-bit decimal numbers with 16-bit sum
23. Multi-Byte Binary Addition
24. Multi-Byte Decimal Addition
25. Multiplication of two 8-bit numbers with 16-bit product.
26. Division of two 8-bit numbers.

PROGRAMMING WITH PHP AND MYSQL

SEMESTER – VI **COURSE CODE : U18IT616**
CREDITS : 3 **HOURS/WEEK : 4**

Objectives : *To understand the Client and Server side Web Programming with PHP & MySQL.*

UNIT 1: Introduction to PHP
Incorporating PHP Within HTML - Examples -The Structure of PHP. Expressions and Control Flow in PHP: Expressions - Operators - Conditionals – Looping - Implicit and Explicit Casting - PHP Dynamic Linking.

UNIT 2 : PHP Functions and Objects
PHP Functions - Including and Requiring Files - PHP Version Compatibility - PHP Objects. PHP Arrays: Basic Access -The foreach...as Loop- Multidimensional Arrays -Using Array Functions. Practical PHP:Using printf - Date and Time Functions - File Handling

UNIT 3:Introduction to MySQL
MySQL Basics - Summary of Database Terms Accessing MySQL via the Command Line – Indexes - MySQL Functions - Accessing MySQL via phpMyAdmin. Accessing MySQL Using PHP: Querying a MySQL Database with PHP - A Practical Example - Practical MySQL - Creating a Table - Preventing Hacking Attempts - Using mysql Procedurally. Form Handling: Building Forms - Retrieving Submitted Data - An Example Program - What's New in HTML5? - Features Awaiting Full Implementation.

UNIT 4 :Cookies, Sessions, and Authentication
Using Cookies in PHP - HTTP Authentication - Using Sessions. Exploring JavaScript :Using Comments - Semicolons - Variables - Operators - Variable Typing -Functions - Global Variables - Local Variables- The Document Object Model -About document.write. Expressions and Control Flow in JavaScript: Expressions - Literals and Variables - Operators - The with Statement - Using onerror -Using try...catch –Conditionals - Looping -Explicit Casting

UNIT 5 :JavaScript Functions, Objects, and Arrays
JavaScript Functions - JavaScript Objects - JavaScript Arrays. JavaScript and PHP Validation and Error Handling: Validating User Input with JavaScript - Regular Expressions - Redisplaying a Form After PHP Validation. Using Ajax: What Is Ajax? - Using XMLHttpRequest

Text Book
1. Robin Nixon., "Learning PHP, MySQL and JavaScript ", O'reilly Publishers , 2009.

Reference Book
1. Huge E Williams and David Lane , "Web Database Applications with PHP and MySQL" , O'reilly Publishers, 2007.

INFORMATION SECURITY

SEMESTER: VI **COURSE CODE: U18IT617**
CREDITS : 3 **HOURS/WEEK: 3**

Objective: *To understand the principles and practices of Internet based Information Security Systems.*

Unit 1: Information Security and Cryptography

Need for Security – Security Approaches – Principles of Security – Types of Attacks – Cryptography:-Introduction–Plain Text & Cipher Text–Substitution Techniques–Transposition Techniques–Encryption & Decryption–Symmetric & Asymmetric Cryptography–Steganography.

Unit 2: Symmetric and Asymmetric Key Algorithm

Symmetric Key Algorithms:-Algorithm Types and Modes– Overview–DES–IDEA–RC4–RC5– AES–Asymmetric Key Algorithms:-Overview–RSA Algorithm–Symmetric and Asymmetric Key Cryptography.

Unit 3: Digital Signature, Digital Signature and Public Key Infrastructure

Digital Signatures: - Introduction – Message Digests – MD5 – SHA – SHA-512 – Message Authentication Code – HMAC - Digital Signature Techniques – Digital Certificates and Public Key Infra Structure: - Digital Certificates – Private Key Management – The PKIX model – Public Key Cryptography Standards

Unit 4: Internet Security Protocol and User Authentication and Kerberos

Internet Security Protocols: - Basic Concepts – SSL - TLS – SHTTP – TSP – Secure Electronic Transactions (SET)– Electronic Money – Email Security – WAP Security – GSM Security – User Authentication and Kerberos: - Authentication Basics – Passwords – Authentication Tokens – Certificate Based Authentication – Biometric Authentication – Kerberos – Key Distribution Centre – Security Handshake Pitfalls – Single Sign On Approaches.

Unit 5:Cryptography in JAVA, .NET and OS, Network Security and Firewall and VPN

Cryptography in JAVA, .NET and OS:- Cryptographic Solution in Java – Microsoft .NET Framework – Cryptographic Toolkits – Security and OS – Database Security – Network Security, Firewalls and VPN: - Firewalls – IP Security – Virtual Private Networks – Intrusion.

Text Book

1. Atul Kahate, “Cryptography and Network Security”, 2nd Edition, 6th Reprint, TMH Publications, New Delhi, 2009.

Reference Books

1. William Stallings, “Cryptography and Network Security: Principles and Practices”, Fourth Edition, Pearson Education, 2005.
2. Charlie kaufman, Radia Perlman, Mike Speciner, “Network Security – Private Communication in a Public World”, 2nd Edition, PHI Publications, 2002.

SEMESTER – VI (NSQF Level : 7)

ENTREPRENEURIAL DEVELOPMENT

SEMESTER – VI	**Course Code : U18IT618**
Credits : 2	**No. of Hrs./Week : 2**

Objectives : *To understand the principles for developing Entrepreneurial Skills*

Unit 1

Definition of Entrepreneur – Importance of Entrepreneurship in underdeveloped Economics – Constraints in underdeveloped Countries to Entrepreneurship – Sociological and Psychological factors of Entrepreneurship Achievement - Motivation and Methods of improving a person.

Unit 2

Why and How to be a Entrepreneur? - Factors to consider when selecting a project and its location – Technical Feasibility, Market Feasibility, Importance of market survey and how to do it.

Unit 3

Economic Feasibility – Planning the project – Essentials of a project report of a business – Counseling facilities available for technical training and project formulation - Choosing the scale of business.

Unit 4

Managerial skills required by entrepreneurs and methods of acquiring them – Role of management consultant – Different types of credit required by a firm, seed capital, venture capital, fixed capital, working capital, packing and export credit, and sources of these. Benefits of leasing.

Unit 5

Problems faced by rural Women Entrepreneurs – Emerging Trend – SHG's and KVIC's suitable for Handicapped Persons – Problems of Family Business – Prevention of Industrial Pollution of air and water around the business unit – causes and prevention of industrial sickness, Emerging trends in IT industry, BPOs / ITES/STPs.

Text Book

1. P. Saravanavel, "Entrepreneurship Development Principles, Policies and Programmes", Ess Pee Kay Publishing House, Chennai, 1997.

Reference Books

1. Vasanth Desai, "Dynamics of Entrepreneurial Development", Himalaya Publishing House, 2011.
2. S B Srivastavan, "A practical guide to Industrial Entrepreneur", Sultan Chand & Sons, 1981.
3. Gupta, Srinivasan, "Entrepreneur Development", Sultan Chand & Sons, 2014.

WEB SERVICE TECHNOLOGIES

SEMESTER – V **COURSE CODE : U18IT6:1**
CREDITS : 3 **HOURS/WEEK : 3**

Objective : *To know the concepts and applications associated with Web Services.*

Unit 1: Introduction and XML Fundamentals

Overview of web services – SOAP, WSDL, UDDI – Importance of Web Services – Web services and enterprises – XML Fundamentals: The Lingua Franca of Web Services - XML Documents - XML Namespaces - XML Schema - Processing XML.

Unit 2 :SOAP and WSDL

The SOAP Model – SOAP – SOAP Messages – SOAP Encoding – SPOAP RPC – Using Alternate SOAP Encodings – Document, RPC, Literal, Encoded – SOAP Web Services and the REST Architecture – Looking Back to SOAP 1.1 - WSDL – Using SOAP and WSDL .

Unit 3 : UDDI and Conversations

UDDI at a glance – UDDI Business Registry – UDDI under the covers – Accessing UDDI – How UDDI is Playing Out. Conversations: -Overview–Web Services Conversation Language–WSCL Interface Components– Relationship Between WSCL and WSDL.

Unit 4:Workflow and Transactions

Business Process Management–Workflows and Workflow Management System – Business Processing Language for Web Services (BPEL) Transactions: - ACID Transactions – Distributed Transactions and Two Phase Commit – Dealing with Heuristic Outcomes – Scaling Transactions to Web Services.

Unit 5 : Transactions,Security and real world Application

OASIS Business Transaction Protocol - Other Web Service Transaction Protocols.
Security: Everyday Security Basics - Security Is An End-to-End Process - Web Service Security Issues - Types of Security Attacks and Threats - Web Services Security Roadmap - WS-Security. Real World Web Service Application Development-Foundations: - Enterprise Procurement – System Functionality and Architecture – Running the EPS Application.

Text Book

1. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services – An Architect's Guide", Pearson Education, 2004.

Reference Book

1. Frank. P. Coyle, "XML, Web Services and The Data Revolution", Pearson Education, 2002.

OPEN SOURCE TECHNOLOGIES

SEMESTER – V **COURSE CODE : U18IT6:2**
CREDITS : 3 **HOURS/WEEK : 3**

Objective : *To acquire knowledge on Open Source Technologies involving Linux, Apache, MySQL and Perl.*

Unit 1 :Introduction and Linux
Open Source Software – Web Explained - Working – Security – Linux: - Overview – Basic UNIX

Unit 2:Apache Web Server
Introduction – Starting, Stopping and Restarting Apache – Configuration – Securing Apache – Web Site Creation – Apache Log Files.

Unit 3 :Perl and MySQL
Introduction – Perl Documentation – Perl Syntax Rules – Introduction to Object Oriented Programming – MySQL: - Introduction – Commands - SHOW DATABASES - CREATE DATABASES – USE – CREATE TABLE – SHOW TABLES – DESCRIBE – INSERT – SELECT – UPDATE – DELETE – Administrative Details – Database Independent Interface – Table Joins – Loading and Dumping Database.

Unit 4 :Website META Language, Common Gateway Interface and mod-Perl
Introduction – Installation – Basics – Creating a Template – Other Helpful Includes – Diversion – A Better Template – Configuring WML with .wmlrc – MACROS-Creating Custom Tags – Programming Code – eperl – Project Creation – Common Gateway Interface: - Introduction – Apache Configuration – First CGI Program – Introduction of CGI.pm – CGI.pm HTML Shortcuts – Information Received by the CGI Program - Form Widget Methods – CGI Security Considerations – die() function – mod-Perl: - Introduction – Configuration – Turning CGIs into mod-perl Programs – Pure mod-perl Programming.

Unit 5 :Server Side Includes,Embperl and Mason
Introduction – Security Considerations – Embperl (HTML::Embperl): – Introduction – Installation – Apache Configuration – Example Program – Embperl Commands – Posted Data and %fdat – Other Embperl Variables - Embperl Project – Mason (HTML::Mason): – Introduction – Installation – Apache Configuration – Example Program – Inline Perl Sections – Handling Posted Data with % ARGS and <%args> - Mason Components – Mason Project

Text Book

1. James Lee and Brent Ware,**"Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP"**, Dorling Kindersley(India) Pvt. Ltd, 2009.

Reference Book

1. Eric Rosebrock, Eric Filson, **"Setting up LAMP: Getting Linux, Apache, MySQL, and PHP and working Together"**, Published by John Wiley and Sons, 2004.

DISTRIBUTED COMPUTING TECHNOLOGIES

SEMESTER – V **COURSE CODE :U18IT6:2**
CREDITS :3 **HOURS/WEEK : 3**

Objective: *To understand the facilities and technologies available for Distributed Computing.*

Unit 1: Characterization of Distributed Systems

Examples – Resource Sharing and the Web – Challenges – System Models – Architectural and Fundamental Models – Networking and Internetworking – Types of Networks – Network Principles – Internet Protocols – Case Studies: Etherent, WiFi, Bluetooth.

Unit 2 :Interprocess Communication

The API for the Internet Protocols – External Data Representation and Marshalling – Client– Server Communication – Group Communication – Case Study – Distributed Objects and Remote Invocation – Communication between Distributed Objects – Remote Procedure Call – Events and Notifications– Case Study: Java RMI

Unit 3 : The OS Layer

Protection – Processes and Threads – Communication and Invocation – OS Architecture – Security – Security Techniques – Cryptographic Algorithms – Digital Signatures – Cryptography Pragmatics – Case Studies – Distributed File Systems – File Service Architecture – Sun Network File System.

Unit 4 :Name Services

Name Services – Domain Name System – Discovery Services – Case Study: Global Name Service , X.500 Directory Service – Clocks , Events and Process States – Synchronizing Physical Clocks – Logical Time and Logical Clocks – Global States – Distributed Debugging – Distributed Mutual Exclusion – Elections – Multicast Communication.

Unit 5 :Transactions

Nested Transactions – Locks – Optimistic Concurrency Control – Timestamp Ordering – Comparison – Flat and Nested Distributed Transactions – Atomic Commit Protocols – Concurrency Control in Distributed Transactions – Distributed Deadlocks – Transaction Recovery – Replication and Distributed Multimedia Systems.

Text Book

1. George Coulouris, Jean Dollimore, Tim Kindberg, **"Distributed Systems Concepts and Design"**, 4th Edition, Pearson Education, 2009.

Reference Book

1. Albert Fleishman, **"Distributed Systems Software Design and Implementation"**, Springer Verlag, 2004.

2. M. L .Liu, **"Distributed Computing Principles and Applications"**, Pearson Education, 2004.

PHP AND MYSQL PROGRAMMING LAB

SEMESTER – V **COURSE CODE : U18ITP15**
CREDITS :6 **HOURS/WEEK : 6**

Objectives : *To obtain hands-on training in Web Programming with PHP & MySQL.*

1. Write a PHP program to compute the number of days in a month.
2. Write a PHP program for sorting numbers.
3. Write a PHP program for sorting names.
4. Write a PHP function to reverse an integer and a string.
5. Write a PHP function to test given character is lower or upper case
6. Write a PHP program to search a word in a given text
7. Write a PHP program to check if a given number is Palindrome.
8. Write a PHP program to test 10 string functions
9. Develop a Home page for College
10. Develop a program and check File System functions, Network functions, Date and time functions.
11. Develop a program and check message passing mechanisms between pages.
12. Write a program and check Regular Expression, HTML functions, Hashing functions.
13. Write a program to download a file from the server.
14. Develop a web page for user registration with suitable validations
15. Write a program to store the current date and time in a COOKIE and display the 'Last Visited' date and time on the web page.
16. Write a program to store page views count in SESSION, to increment the count on each refresh and to show the count on the web page.
17. Write a PHP program to maintain student records using files
18. Write an Inventory program to demonstrate Insertion, Updation and Deletion of rows in MYSQL tables.
19. Write a PHP program using forms to display Employee records stored in MySQL.
20. Develop a college application form using the MYSQL table.

INFORMATION SECURITY LAB

SEMESTER: VI **COURSE CODE: U18ITP16**
CREDITS : 6 **HOURS/WEEK: 6**

Objectives: *To acquire experience in securing information in store or on move.*

1. Capturing internet address of a local host using Java Program
2. Capturing internet address of a remote host using Java Program
3. Write a Java Program to find network ports using port scanner
4. Write a Java Program to implement finger client
5. Implement ping programming using Java.
6. Implement peer to peer communication using UDP
7. Implement socket program for UDP Echo Client and EchoServer
8. Implement Client Server Communication Using TCP
9. Implement Client Server Application for chat
10. Write a Java Program to implement multicasting on a network
11. Write a Java Program to implement Client Server Communication using object stream.
12. Write a Java Program to implement Client Server Communication using byte stream
13. Implement Cyclic Redundancy Check to detect errors
14. Write a Java Program to perform Message passing using Message Window
15. Write a Java Program to perform Message Passing using Group Window
16. Write a Java Program to implement the Online test for a Single Client
17. Write a Java Program to implement Caesar Cipher technique
18. Write a Java Program to Implement the Monoalphabetic Cipher
19. Write a Java Program to implement Transposition Cipher
20. Write a Java Program to implement Substitution Cipher
21. Write a Java Program to implement Product Cipher
22. Write a Java Program to implement Diffie Hellman Key Exchange Algorithm
23. Write a Java Program to implement RSA Algorithm
24. Write a Java Program to implement basic One Time Password