DIPLOMA IN ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTER ENGINEERING

Course Code : 1052

SEMESTER PATTERN

N – SCHEME

IMPLEMENTED FROM 2020 - 2021

CURRICULUM DEVELOPMENT CENTRE

CHENNAI-600 025, TAMIL NADU

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING/TECHNOLOGY SYLLABUS (II / III YEAR)

N Scheme

(Implemented from Academic Year 2020-21 onwards)

Chairperson

Tmt.G.Laxmi Priya, I.A.S

Director, Directorate of Technical Education,

Chennai – 25

Co- ordinator

Tmt P.Saradha M.E

Principal

Government Polytechnic College, Krishnagiri

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DIPLOMA COURSES IN ENGINEERING/TECHNOLOGY

(SEMESTER SYSTEM)

(Implemented from 2020 - 2021)

N – SCHEME

R E G U L A T I O N S*

**Applicable to the Diploma Courses other than Diploma in Hotel Management & Catering Technology.*

1. Description of the Course:

a. Full Time (3 years)

The Course for the Full Time Diploma in Engineering shall extend over a period of three academic years, consisting of 6 semesters* and the First Year is common to all Engineering Branches.

b. Sandwich (3½ years)

The Course for the Sandwich Diploma in Engineering shall extend over a period of three and half academic years, consisting of 7 semesters* and the First Year is common to all Engineering Branches. The subjects of three years full time diploma course being regrouped for academic convenience.

During 4^{th} and/or during 7^{th}semester the students undergo industrial training for six months / one year. Industrial training examination will be conducted after completion of every 6 months of industrial training.

c. Part Time (4 years)

The course for the Part Time Diploma in Engineering shall extend over a period of 4 academic years containing of 8 semesters*, the subjects of 3 year full time diploma courses being regrouped for academic convenience.

**** Each Semester will have 16 weeks duration of study with 35 hrs. / Week for Regular Diploma Courses and 18 hrs. / Week for Part-Time Diploma Courses.***

The Curriculum for all the 6 Semesters of Diploma courses (Engineering & Special Diploma Courses viz. Textile Technology, Leather Technology, Printing Technology, Chemical Technology etc.) have been revised and revised curriculum is applicable for the candidates admitted from 2020 — 2021 academic year onwards.

2. Condition for Admission:

Condition for admission to the Diploma courses shall be required to have passed in The S.S.L.C Examination of the Board of Secondary Education, Tamil Nadu.

(Or)

The Anglo Indian High School Examination with eligibility for Higher Secondary Course in Tamil Nadu.

(Or)

The Matriculation Examination of Tamil Nadu.

(Or)

Any other Examinations recognized as equivalent to the above by the Board of Secondary Education, Tamil Nadu.

Note: In addition, at the time of admission the candidate will have to satisfy certain minimum requirements, which may be prescribed from time to time.

3. Admission to Second year (Lateral Entry):

A pass in HSC (academic) or (vocational) courses mentioned in the Higher Secondary Schools in Tamil Nadu affiliated to the Tamil Nadu Higher Secondary Board with eligibility for University Courses of study or equivalent examination & Should have studied the following subjects.

A pass in 2 Years ITI with appropriate Trade or Equivalent examination.

Sl. No	Courses	H.Sc Academic	H.Sc Vocational		Industrial Training Institutes Courses
		Subjects Studied	Subjects Studied		
			Related subjects	Vocational subjects	
1.	All the Regular and Sandwich Diploma Courses	Physics and Chemistry as compulsory along with Mathematics / Biology	Maths / Physics / Chemistry	Related Vocational Subjects Theory& Practical	2 years course to be passed with appropriate Trade
2.	Diploma Course in Commercial Practice	English & Accountancy English & Elements of Economics English & Elements of Commerce	English & Accountancy, English & Elements of Economics, English & Management Principles & Techniques, English & Typewriting	Accountancy & Auditing, Banking, Business Management, Co-operative Management, International Trade, Marketing & Salesmanship, Insurance & Material Management, Office Secretary ship.	-

- For the Diploma Courses related with Engineering/Technology, the related / equivalentsubjects prescribed along with Practicals may also be taken for arriving the eligibility.
- Branch will be allotted according to merit through counseling by the respective Principal as per communal reservation.
- For admission to the Textile Technology, Leather Technology, Printing Technology, Chemical Technology and Commercial Practice Diploma courses the candidates studied the related subjects will be given first preference.

- *Candidates who have studied Commerce Subjects are not eligible for Engineering Diploma Courses.*

4. Age Limit: No Age limit.

5. Medium of Instruction: English

6. Eligibility for the Award of Diploma:

No candidate shall be eligible for the Diploma unless he/she has undergone the prescribed course of study for a period of not less than 3 academic years in any institution affiliated to the State Board of Technical Education and Training, Tamil Nadu, when joined in First Year and two years if joined under Lateral Entry scheme in the second year and passed the prescribed examination.The minimum and maximum period for completion of Diploma Courses are as given below:

Diploma Course	Minimum Period	Maximum Period
Full Time	3 Years	6 Years
Full Time (Lateral Entry)	2 Years	5 Years
Sandwich	3½ Years	6½ Years
Part Time	4 Years	7 Years

This will come into effect from N Scheme onwards i.e. from the academic year2020-2021.

7. Subjects of Study and Curriculum outline:

The subjects of study shall be in accordance with the syllabus prescribed from time to time, both in theory and practical subjects.

The curriculum outline is given in Annexure – I.

8. Examinations:

Board Examinations in all subjects of all the semesters under the scheme of examinations will be conducted at the end of each semester.

The internal assessment marks for all the subjects will be awarded on the basis of continuous internal assessment earned during the semester concerned. For each subject 25 marks are allotted for internal assessment. Board Examinations are conducted for 100 marks and reduced to 75.

The total marks for result are 75 + 25 = 100 Marks.

9. Continuous Internal Assessment:

A. For Theory Subjects:

The Internal Assessment marks for a total of 25 marks, which are to be distributed as follows:

i) Subject Attendance **5 Marks**

(Award of marks for subject attendance to each subject Theory/Practical will be as per the range given below)

80%	-	83%	1 Mark
84%	-	87%	2 Marks
88%	-	91%	3 Marks
92%	-	95%	4 Marks
96%	-	100%	5 Marks

ii) Test # **10 Marks**

2 Tests each of 2 hours duration for a total of 50 marks are to be conducted. Average of these two test marks will be taken and the marks to be reduced to:	05 Marks
The Test – III is to be the Model Examination covering all the five units and the marks obtained will be reduced to:	05 Marks

TEST	UNITS	WHEN TO CONDUCT	MARKS	DURATION
Test I	Unit – I & II	End of 6th week	50	2 Hrs
Test II	Unit – III & IV	End of 12th week	50	2 Hrs

Test III	**Model Examination:** Covering all the 5 Units. (Board Examinations-question paper-pattern).	End of 16th week	100	3 Hrs

From the Academic Year 2020 – 2021 onwards.

Question Paper Pattern for the Test - I and Test – II is as follows. The tests should be conducted by proper schedule. Retest marks should not be considered for internal assessment.

Without Choice:

Part A Type questions:	6 Questions × 1 mark	06 marks
Part B Type questions:	7 Questions × 2 marks	14 marks
Part C Type questions:	2 Questions × 15 marks	30 marks
	Total	**50 marks**

iii) Assignment **5 Marks**

For each subject Three Assignments are to be given each for 20 marks and the average marks scored should be reduced for 5 marks.

iv) Seminar Presentation **5 Marks**

The students have to select the topics either from their subjects or general subjects which will help to improve their grasping capacity as well as their capacity to express the subject in hand. The students will be allowed to prepare the material for the given topic using the library hour and they will be permitted to present seminar (For First and Second Year, the students will be permitted to present the seminar as a group not exceeding six members and each member of the group should participate in the presentation. For the Third Year, the students should present the seminar individually.) The seminar presentation is mandatory for all theory subjects and carries 5 marks for each theory subject. The respective subject faculty may suggest topics to the students and will evaluate the submitted materials and seminar presentation.

(2 ½ marks for the material submitted in writing and 2 ½ marks for the seminar presentation). For each subject minimum of two seminars are to be given and the average marks scored should be reduced to 5 marks.

All Test Papers, Assignment Papers / Notebooks and the seminar presentation written material after getting the signature with date from the students must be kept in safe custody in the department for verification and audit. It should be preserved for one semester after publication of Board Exam results and produced to the flying squad and the inspection team at the time of inspection/verification.

B. <u>For Practical Subjects:</u>

The Internal Assessment mark for a total of 25 marks which are to be distributed asfollows:-

a) Attendance : **5 Marks**

(Award of marks same as theory subjects)

b) Procedure/ observation and tabulation/
Other Practical related Work : **10 Marks**

c) Record writing : **10 Marks**

TOTAL : **25 Marks**

- *All the Experiments/Exercises indicated in the syllabus should be completed and the same to be given for final Board examinations.*
- The observation note book / manual should be maintained for 10 marks. The observation note book / manual with sketches, circuits, program, reading and calculation written by the students manually depends upon the practical subject during practical classes should be evaluated properly during the practical class hours with date.
- The Record work for every completed exercise should be submitted in the subsequent practical classes and marks should be awarded for 10 marks for each exercise as per the above allocation.
- At the end of the Semester, the average marks of all the exercises should be calculated for 20 marks (including Observation and Record writing) and the marks

awarded for attendance is to be added to arrive at the internal assessment mark for Practical. (20+5=25 marks)

- Only regular students, appearing first time have to submit the duly signed bonafide record note book/file during the Practical Board Examinations.

All the marks awarded for Assignments, Tests, Seminar presentation and Attendance should be entered periodically in the Personal Theory Log Book of the staff, who is handling the theory subject.

The marks awarded for Observation, Record work and Attendance should be entered periodically in the Personal Practical Log Book of the staff, who is handling the practical subject.

10.Communication Skill Practical, Computer Application Practical and PhysicalEducation:

The Communication Skill Practical and Computer Application Practical with more emphasis are being introduced in First Year. Much Stress is given to increase the Communication skill and ICT skill of students. As per the recommendation of MHRD and under Fit India scheme, the Physical education is introduced to encourage students to remain healthy and fit by including physical activities and sports.

11. Project Work and Internship:

The students of all the Diploma Courses have to do a Project Work as part of the Curriculum and in partial fulfillment for the award of Diploma by the State Board of Technical Education and Training, Tamil Nadu. In order to encourage students to do worthwhile and innovative projects, every year prizes are awarded for the best three projects i.e. institution wise, region wise and state wise. **The Project work must be reviewed twice in the same semester. The project work is approved during the V semester by the properly constituted committee with guidelines.**

a) Internal assessment mark for Project Work & Internship:

Project Review I	. . .	**10 marks**
Project Review II	. . .	**10 marks**
Attendance	. . .	**05 marks** (Award of marks same as theory subject pattern)
Total	. . .	**25 marks**

Proper record should be maintained for the two Project Reviews and preserved for one semester after the publication of Board Exams results. It should be produced to the flying squad and the inspection team at the time of inspection/verification.

b) Allocation of Marks for Project Work & Internship in Board Examinations:

Demonstration/Presentation	25 marks
Report	25 marks
Viva Voce	30 marks
Internship Report	20 marks
Total	**100* marks**

*Examination will be conducted for 100 marks and will be converted to 75 marks.

c) Internship Report:

The internship training for a period of two weeks shall be undergone by every candidate at the end of IV / V semester during vacation. The certificate shall be produced along with the internship report for evaluation. The evaluation of internship training shall be done along with final year “Project Work & Internship” for 20 marks. The internship shall be undertaken in any industry / Government or Private certified agencies which are in social sector / Govt. Skill Centres / Institutions / Schemes.

A neatly prepared PROJECT REPORT as per the format has to be submitted by individual student during the Project Work & Internship Board examination.

12. Scheme of Examinations:

The Scheme of examinations for subjects is given in Annexure - II.

13. Criteria for Pass:

1. No candidate shall be eligible for the award of Diploma unless he/she has undergone the prescribed course of study successfully in an institution approved by AICTE and affiliated to the State Board of Technical Education & Training, Tamil Nadu and pass all the subjects prescribed in the curriculum.

2. A candidate shall be declared to have passed the examination in a subject if he/she secures not less than *40% in theory subjects* and *50% in practical subjects* out of the total prescribed maximum marks including both the Internal Assessment and the Board Examinations marks put together, subject to the condition that he/she secures at least a minimum of 4*0 marks out of 100 marks in the Board Theory Examinations and a minimum of 50 marks out of 100 marks in the Board Practical Examinations.*

14. Classification of successful candidates:

Classification of candidates who will pass out the final examinations from April 2023 onwards (Joined first year in 2020 -2021) will be done as specified below.

First Class with Superlative Distinction:

A candidate will be declared to have passed in **First Class with Superlative Distinction** if he/she secures not less than 75% of the marks in all the subjects and passes all the semesters in the first appearance itself and passes all subjects within the stipulated period of study 2 / 3 / 3½ / 4 years [Full time(lateral entry)/Full Time/Sandwich/Part Time] without any break in study.

First Class with Distinction:

A candidate will be declared to have passed in **First Class with Distinction** if he/she secures not less than 75% of the aggregate marks in all the semesters put together and passes all the semesters except the I and II semester in the first appearance itself and passes all subjects within the stipulated period of study 2 / 3 / 3½ / 4 years [Full time(lateral entry)/Full Time/Sandwich/Part Time] without any break in study.

First Class:

A candidate will be declared to have passed in **First Class** if he/she secures not less than 60% of the aggregate marks in all the semesters put together and passes all the subjects within the stipulated period of study 2 / 3 / 3½ / 4 years [Full time(lateral entry)/Full Time/Sandwich/Part Time] without any break in study.

Second Class:

All other successful candidates will be declared to have passed in **Second Class.**

The above classifications are also applicable for the Sandwich / Part-Time students who pass out Final Examination from October 2023 /April 2024 onwards (both joined First Year in 2020 -2021)

15. Duration of a period in the Class Time Table:

The duration of each period of instruction is 1 hour and the total period of instruction hours excluding interval and lunch break in a day should be uniformly maintained as 7 hours corresponding to 7 periods of instruction (Theory & Practical).

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ANNEXURE – I

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU

1052 : DIPLOMA IN COMPUTER ENGINEERING SYLLABUS

N-SCHEME

(To be implemented from the year 2020-21 onwards)

CURRICULUM OUTLINE

III SEMESTER

Col No	SUBJECT CODE	SUBJECT	HOURS PER WEEK		
			THEORY	PRACTICAL	TOTAL
1	4052310	Basics of Electrical and Electronics Engineering	5		5
2	4052320	Operating System	5		5
3	4052330	C Programming and Data structures	6		6
4	4052340	Electrical and Electronics Engineering Practical		4	4
5	4052350	Linux Practical		4	4
6	4052360	C Programming and Data Structures Practical		4	4
7	4052370	E Publishing Practical		4	4
			16	16	32
		Physical Education			2
		Library			1
	Total				35

Col No	SUBJECT CODE	SUBJECT	HOURS PER WEEK		
			THEORY	PRACTICAL	TOTAL
1	4052410	Computer Architecture	5		5
2	4052420	Web design and Programming	5		5
3	4052430	Object Oriented Programming with Java	5		5
4	4052440	RDBMS	5		5
5	4052450	Web design and Programming Practical		4	4
6	4052460	Java Programming Practical		4	4
7	4052470	RDBMS Practical		4	4
			20	12	32
		Physical Education			2
		Library			1
	Total				35

VSEMESTER

Col No	SUBJECT CODE	SUBJECT	HOURS PER WEEK		
			THEORY	PRACTICAL	TOTAL
1	4052510	Python Programming	5		5
2	4052520	Cloud Computing and Internet of Things	6		6
3		**Elective Theory-I**	5		5
	4052531	Component Based Technology			
	4052532	Artificial Intelligence and Data analytics			
	4052533	Mobile Computing			
4	4052540	Python Programming Practical		4	4
5	4052550	Cloud Computing and Internet of Things Practical		4	4
6		**Elective Practical-I**		4	4
	4052561	Component Based Technology Practical			
	4052562	Data analytics using Python Practical			
	4052563	Mobile Computing Practical			
7	4052570	Entrepreneurship and Startup		4	4
			16	16	32
		Physical Education			2
		Library			1
	Total				35

VI SEMESTER

Col No	SUBJECT CODE	SUBJECT	HOURSPERWEEK		
			THEORY	PRACTICAL	TOTAL
1	4052610	Computer Hardware and Servicing	6		6
2	4052620	Computer Networks and Security	5		5
3		**Elective Theory-II**	5		5
	4052631	Software Engineering			
	4052632	Multimedia Systems			
	4052633	Data science and Big Data			
4	4052640	Computer Hardware and Networking Practical		6	6
5		**Elective Practical - II**		4	4
	4052651	Software Engineering Practical			
	4052652	Multimedia Systems Practical			
	4052653	Data Science and Big Data Practical			
6	4052660	Project work and Internship		6	6
			16	16	32
		Physical Education			2
		Library			1
	Total				35

ANNEXURE – II

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU

1052 : DIPLOMA IN COMPUTER ENGINEERING SYLLABUS

N-SCHEME

(To be implemented from the year 2020-21 onwards)

SCHEME OF EXAMINATION

III SEMESTER

Col No	CODE	SUBJECT	Examination Marks			Minimum for Pass	Duration
			Internal	External *	Total		
1	4052310	Basics of Electrical and Electronics Engineering	25	100	100	40	3
2	4052320	Operating System	25	100	100	40	3
3	4052330	C Programming and Data structures	25	100	100	40	3
4	4052340	Electrical and Electronics Engineering Practical	25	100	100	50	3
5	4052350	Linux Practical	25	100	100	50	3
6	4052360	C Programming and Data Structures Practical	25	100	100	50	3
7	4052370	E Publishing Practical	25	100	100	50	3

IV SEMESTER

Col No	CODE	SUBJECT	Examination Marks			Minimum for Pass	Duration
			Internal	External *	Total		
1	4052410	Computer Architecture	25	100	100	40	3
2	4052420	Web design and Programming	25	100	100	40	3
3	4052430	Object Oriented Programming with Java	25	100	100	40	3
4	4052440	RDBMS	25	100	100	40	3
5	4052450	Web design and Programming Practical	25	100	100	50	3
6	4052460	Java Programming Practical	25	100	100	50	3
7	4052470	RDBMS Practical	25	100	100	50	3

V SEMESTER

Col No	CODE	SUBJECT	Examination Marks			Minimum for Pass	Duration
			Internal	External *	Total		
1	4052510	Python Programming	25	100	100	40	3
2	4052520	Cloud Computing and Internet of Things	25	100	100	40	3
3		**Elective Theory-I**					
	4052531	Component Based Technology	25	100	100	40	3
	4052532	Artificial Intelligence and Data analytics	25	100	100	40	3
	4052533	Mobile Computing	25	100	100	40	3
4	4052540	Python Programming Practical	25	100	100	50	3
5	4052550	Cloud Computing and Internet of Things Practical	25	100	100	50	3
6		**Elective Practical-I**					
	4052561	Component Based Technology Practical	25	100	100	50	3
	4052562	Data analytics using Python Practical	25	100	100	50	3
	4052563	Mobile Computing Practical	25	100	100	50	3
7	4052570	Entrepreneurship and Startup	25	100	100	50	3

VI SEMESTER

Col No	SUBJECT CODE	SUBJECT	Examination Marks			Minimum	Duration
			Internal	External *	Total	For pass	
1	4052610	Computer Hardware and Servicing	25	100	100	40	3
2	4052620	Computer Networks and Security	25	100	100	40	3
3		**Elective Theory-II**					
	4052631	Software Engineering	25	100	100	40	3
	4052632	Multimedia Systems	25	100	100	40	3
	4052633	Data science and Big Data	25	100	100	40	3
4	4052640	Computer Hardware and Networking Practical	25	100	100	50	3
5		**Elective Practical - II**					
	4052651	Software Engineering Practical	25	100	100	50	3
	4052652	Multimedia Systems Practical	25	100	100	50	3
	4052653	Data Science and Big Data Practical	25	100	100	50	3
6	4052660	Project work and Internship	25	100	100	50	3

***Board Examination conducted for 100 Marks and converted to 75 Marks**

LIST OF EQUIVALENT PAPERS OF M SCHEME TO N-SCHEME

M SCHEME		N SCHEME	
III SEMESTER			
SUB CODE	**SUBJECT**	**SUBCODE**	**SUBJECT**
35231	Basics of Electrical & Electronics Engineering	4052310	Basics of Electrical & Electronics Engineering
35232	Operating systems	4052320	Operating systems
35233	C Programming	4052330	C Programming and Data Structures
35234	Electrical and Electronics Practical	4052340	Electrical and Electronics Practical
35235	Linux Practical	4052350	Linux Practical
35236	C Programming Practical	4052360	C Programming and Data Structures Practical
35237	Computer Application Practical	40002	Computer Application Practical
IV SEMESTER			
35241	Computer Architecture	4052410	Computer Architecture
35242	Computer Networks and Security	4052620	Computer Networks and Security **(W.e.f. Apr 2023 onwards)**
35243	Object Oriented Programming with Java	4052430	Object Oriented Programming with Java
35244	Data structures using C	4052330	C Programming and Data Structures
35245	Java Programming Practical	4052460	Java Programming Practical
35246	Data structures using C Practical	4052360	C Programming and Data Structures Practical
30002	Life and Employability Skill Practical	40001	Communication Skill Practical

LIST OF EQUIVALENT PAPERS OF M SCHEME TO N-SCHEME

M SCHEME		N SCHEME	
VSEMESTER			
35251	Web Programming	4052420	Web Design and Programming
35252	Relational Database Management system	4052440	Relational Database Management system
35253	Component Based Technology	4052531	Component Based Technology
35271	Software Engineering	4052631	Software Engineering
35272	Cloud Computing	4052520	Cloud Computing and Internet of Things
35255	Web Programming practical	4052450	Web Design and Programming practical
35256	Relational Database Management system practical	4052470	Relational Database Management system practical
35257	Component Based Technology practical	4052561	Component Based Technology practical
VI SEMESTER			
35261	Computer Hardware and Servicing	4052610	Computer Hardware and Servicing
35262	Mobile Computing	4052533	Mobile Computing
35281	Multimedia Systems	4052632	Multimedia Systems
35282	Open source software	4052510	Python Programming
35264	Computer Servicing and Networking Practical	4052640	Computer Hardware and Networking Practical
35265	Mobile Computing Practical	4052563	Mobile Computing Practical
35283	Multimedia Systems Practical	4052652	Multimedia Systems Practical
35284	Open source software Practical	4052540	Python Programming practical
35267	Project work		No Equivalent

DIPLOMA IN COMPUTER ENGINEERING

II YEAR

N – SCHEME

III SEMESTER

4052310– Basics of Electrical and Electronics Engineering

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052: Diploma in Computer Engineering

Subject Code : 4052310

Semester :III

Subject Title : Basics of Electrical and Electronics Engineering

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 Weeks

Subject	Instructions		Examination			
	Hours /Week	Hours/ Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Basics of Electrical and Electronics Engineering	5	80	25	100*	100	3Hrs

***Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

Topics and Allocation of Hours

Unit	Topic	Hours
I	AC FUNDAMENTALS,BATTERIES AND UPS	13
II	TRANSFORMER AND SPECIAL MOTORS	12
III	SEMICONDUCTOR DEVICES	16
IV	BOOLEAN ALGEBRA, LOGIC GATES AND COMBINATIONAL SYSTEMS	16
V	SEQUENTIAL LOGIC SYSTEM	16
Test and Model Exam		7
TOTAL		**80**

RATIONALE:

Diploma Engineers from all branches of engineering are expected to have some basic knowledge of electrical and electronics engineering. Also the technicians working in different engineering fields have to deal with various types of electrical equipments. Various types of electronic circuits are used in different electrical equipments. Hence it is necessary to study electric circuits, different types of electrical machines and electronic devices their principles and working characteristics. The basic concepts studied in this subject will be very useful for understanding of higher level subjects in further study.

OBJECTIVES:

On completion of the following units of syllabus contents, the students must be able to

- Understand the AC fundamentals
- Understand the working principle of UPS
- Know about servomotors
- Familiarize with semiconductor devices, rectifier circuits, transistors and its applications
- Use Binary ,Octal and Hexadecimal numbers
- Define logic gates
- Significance of Boolean algebra in digital circuits
- Understand the working principles of sequential and combinational logic circuits
- Define Flip-flops and describe behavior of various flip-flops
- Know about Synchronous and Asynchronous counters
- Know about the function of shift registers

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the topics	Hours
I	**AC FUNDAMENTALS, BATTERIES AND UPS** **1.1 AC Fundamental** Difference between AC and DC - Advantages of AC over DC Wave form of sinusoidal A.C. Cycle—Generation of single phase A.C. by elementary alternator - Definition of cycle, frequency, time period, amplitude, peak value, average value and rms value – Define peak factorand form factor -Concept of phase , phase difference and phase angle.Single phase and 3 phase (Definition) - Meaning of lagging and leading sine wave- Advantages of three phase over single phase	4
	1.2 Batteries Classification of cells- Construction of Lead acid cell— Methods of charging –Care and Maintenance of Lead acid battery– Indications ofa fully charge battery—Maintenance free batteries.	3
	1.3 UPS Need for UPS - Online and Offline UPS – Definition – Block Diagram –Explanation of each block– Merits and demerits of online and offline UPS–Need of heat sink-Specification and ratings– Maintenance of UPS including batteries.	3
	1.4 Switches Basics of switches used - Ratings of switches used for a system Installation – Ratings and types of wires used – necessity of MCB, ELCB.	3
II	**TRANSFORMER AND SPECIAL MOTORS** **2.1 Single Phase transformer** Working Principle and Construction of transformer – Brief description of each part – Function and materials used – emf equation of transformer(No derivation) — Voltage and current ratio of a transformer – Efficiency - Losses in a transformer - Auto transformer - Applications — Step up and Step down transformer (Definition only)	5

	2.2. Special Motors Stepper Motor: Definition - Working principle - Types and applications –Servo motors: Definition - Working principle - Types and applications – Factors to be considered for selecting a motor for a particular application. **2.3.Electrical Safety:** Electric shock – need for earthing - types of earthing, fuses- need –types of fuses	5 2
III	**SEMICONDUCTOR DEVICES** **3.1 Diodes** PN Junction diode– Barrier Voltage, Depletion Region — Forward biased and Reverse biased Junction — Working principle – forward /Reverse characteristics of PN Junction diode - Applications of diode — Zener Diode: Construction-Characteristics (Forward and Reverse)– Avalanche and Zener break down - Applications of Zener diode. Light Emitting Diodes-operation, construction and characteristics. LDR: Principle of operation and Characteristics. Photo Diode–Principle of operation (concept only)	8
	3.2 Rectifiers Definition – Need of Rectification – Circuit diagram, Operation, i/p and o/pWaveforms of Half wave - Full wave- Bridge rectifiers (without filters) - Uses of filters in rectifier circuit — Ripple factor, Efficiency and PIV (No derivation) – Comparison	4
	3.3 Bipolar JunctionTransistor Definition- Principle of NPN and PNP transistor- Symbol - Transistor terminals - Operating principle (NPN transistor only) -Configurations of transistor.	4
IV	**BOOLEAN ALGEBRA, LOGIC GATES COMBINATIONAL SYSTEM** **4.1 Number representation** Decimal, Binary, Octal and Hexadecimal number Systems-Conversion of number from one number system to another (without decimal point) -	4

	BCD CODE –– ASCII Codes - Parity bit –– Use of a parity bit ––Odd parity and Even parity	
	4.2 Logic gates Positive and Negative logic System- Definition, Truth table, Symbol and Logical equations of AND–OR-NOT–EXOR-EXNOR (Only 2-inputs) gates– Universal gates-NAND-NOR–Symbol and truth table.	4
	4.3 Boolean Algebra Basic laws of Boolean algebra – Demorgan's Theorem and proofs –Duality theorem - Simplification of logical equations using Boolean laws -De-Morgan's theorem–Two and three variable Karnaugh map	3
	4.4 Arithmetic Circuits Half Adder and full adder-Truth table, Circuit diagram–Half subtractor and Full subtractor- Truth table, Circuit diagram.	3
	4.5 Combinational logic circuits Parity generator and checker -Multiplexer – De multiplexer – Encoder - Decoder (Definition and Basic Circuits only)	2
V	**SEQUENTIAL LOGIC SYSTEM** **5.1 Flip flops** Basic principle of operation - S-R, D flip-flop – Operation and truth table- Race Condition – JK flip flop–T flip flop– Toggling- Edge Triggered Flip-flop – Level Triggered flip flop - JK Master Slave flip flop.	6
	5.2 Counters Need-Types of counters - 4bit Asynchronous counter- Mod N counter-Decade Counter -4bit Synchronous counter-Distinguish between Synchronous and Asynchronous counter-Application of counters	5
	5.3 Registers Shift register-Block diagram representation and wave form of serial in, Serial Out, Serial in Parallel out, Parallel in-parallel out Applications of Shift Registers.	5

TEXTBOOKS

S.No	Title	Author	Publisher	Year of Publishing / Edition
1	Electrical Technology Vol I andII	.B.L.Theraja	S.Chand &Co, NewDelhi	Multiple Colour Revised FirstEdition,2012
2	Modern Digital Electronics	R.P.Jain	Tata Mc- Graw Hill, NewDelhi	Third Reprint2010
3	Principles of Digital Electronics	K.Meena	PHI learning Private Ltd	2009

REFERENCE BOOKS

S.No	Title	Author	Publisher	Year of Publishing/ Edition
1.	Digital Electronics and Logic Design	Jaydeep Chakravarthy	University Press, Hyderabad	First Edition 2012
2.	Basic Electrical Engineering	V.N.Mittle	Tata Mc-GrawHill, NewDelhi	First Edition
3.	Basic Electrical and Electronics Engineering	R.Muthu subramanian R.Salivajanan	Tata Mc-GrawHill, NewDelhi	Seventh Reprint2011
4.	Principles of Electronics	V.K.Mehta	S.Chand &Co, NewDelhi	Second Edition
5.	Digital Electronics	G.K.Kharate	Oxford University Press	2010

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

II YEAR

N – SCHEME

III SEMESTER

4052320 – Operating System

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052320

Semester : III

Subject Title : Operating System

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester:16 weeks

Subject	Instructions		Examination			
	Hours /Week	Hours/ Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Operating System	5	80	25	100*	100	3Hrs

*** Examinations will be conducted for 100marks and it will be reduced to 75 marks.**

Topics and Allocation of Hours

Unit	Topic	Hrs.
I	Introduction to Operating System	16
II	Process Management	17
III	Memory Management	13
IV	I/O and File Management, Security and Protection	13
V	Linux–Case study	14
Test and Model Exam		7
Total		**80**

RATIONALE:

Students have to be conversant with computer, its terminology and functioning. The heart of a computer is based around its Operating System. The processor deals with request coming from all directions asynchronously. The operating system has to deal with the problems of contention, resource management and both program and user data management, and provide a useful no-wait user interface. The course provides clear vision, understanding and working of Operating Systems.

OBJECTIVES:

On completion of the following units of syllabus contents, the students must be able to

- Understand the purpose, goals, functions and evolution of Operating Systems.
- Understand the concept of process, process states and their scheduling.
- Classify different types of schedulers and scheduling algorithms.
- Identify the significance of inter-process communication and synchronization.
- Know about the usage of semaphore in inter-process communication.
- Understand the condition for a dead lock, ways to prevent or recover from thedeadlock.
- Know about memory protection against unauthorized access and sharing.
- Compare and contrast paging and segmentation techniques.
- Define virtual memory and its underlying concepts.
- Describe page replacement policies and disk scheduling techniques.
- Describe the features and brief history of Linux
- Compare Unix and Linux
- Explain Linux architecture
- Describe the process management, memory management handled by LINUX
- Describe file management, device drivers handled by Linux
- Learn to manage accounts in Linux OS.
- Learn to write shell script.

DETAILED SYLLABUS

Contents:Theory

Unit	Name of theTopics	Hours
I	**INTRODUCTION TO OPERATINGSYSTEMS**	
	Basics of Operating Systems	**4**
	Definition–Types of Operating Systems: Mainframe, Desktop, Multiprocessor, Distributed, Clustered, Multiprogramming, Real time, Embedded and Timesharing, Mobile OS (Android, iOS).	
	Operating System Components	**4**
	Process Management component– Memory Management component - I/O Management component — File Management component-Protection System– Networking Management component– Command interpreter.	
	Operating System Services	
	Process Execution — I/O operations– File manipulations — Communications–Error detection and recovery–Resource allocation–Accounting–System Protection-System Calls–System call Execution.	**3**
	Operating System Structures	
	Simple structure, Layered, Monolithic, Microkernel Operating Systems – Hybrid Operating System – Views – User, System view –Concept of VirtualMachine–Booting.	**3**
	User Interface	
	Command Line Interface(CLI)based OS–DOS, Unix–Graphic User Interface (GUI) based OS–Windows, Linux–Difference between CLIand GUI.	**2**
II	**PROCESSMANAGEMENT**	
	2.1 Processes	**4**
	Definition–Process Relationship-Process states–Process State transitions Process Control Block–Context switching–Threads – Concept of multithreads –Benefits of threads–Types of threads.	

	2.2.Process Scheduling Definition–Scheduling objectives–Types of Schedulers–Scheduling criteria – CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time (Definition only)–Scheduling algorithms – Preemptive and Non – pre emptive - FCFS – SJF –SRT–PS–RR-MQ-Multiprocessor scheduling– Types-Performance evaluation of the scheduling. **2.3.Inter-process Communication and Synchronization** Definition – Shared Memory System – Message passing–Critical section –Mutual Exclusion-Semaphores. **2.4Deadlocks** Definition –Deadlock characteristics–Deadlock Prevention–Deadlock Avoidance –Deadlock detection and Recovery.	**6** **4** **3**
III	**MEMORYMANAGEMENT** **Basic Memory Management** Definition – Logical and Physical address map – Memory allocation – Contiguous Memory allocation – Partition allocation -Single, Fixed and Variable partition–Internal and External fragmentation and Compaction –Swapping - Paging – Principle of operation – Page allocation – Hardware support for paging – Protection and sharing – Disadvantages of paging. **Virtual Memory** Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault , Working Set , Dirty page/Dirty bit – Demand paging, Segmentation **Page Replacement Algorithms** Optimal (OPT), First In First Out (FIFO), Second Chance (SC), Not Recently Used (NRU) and Least Recently Used (LRU), Advantages and Disadvantages of Virtual Machine.	**6** **4** **3**

IV	**I/O AND FILEMANAGEMENT** **Disk Management** Disk Structure – Physical structure, Logical structure, Disk formatting, Disk Scheduling and its algorithms, RAID structure of disk, RAID levels0-6. **File Management** File concept – File attributes – Name, Identifier, Type, Location, Size, Time, Date, user identification–File Operations-File system structure–Byte sequence, Record sequence and Tree-based Directory Structure–Single level, Two levels, Tree structured Directory. **Access Methods** Sequential, Random access – File allocation methods – Contiguous, Linked, Indexed. **Security and Protection** Security threats–Security Policies and mechanisms–Authentications	**4** **4** **2** **3**
V	**Linux–Case study** **5.1.Introduction** History of Linux – Features of Linux – Components of Linux system – Userspace – Kernel space - Linux Architecture - Popular Flavors of Linux- FSF/GNU-Linux Desktop: GNOME- KDE. **File System** Second extended file system – ext2 – Virtual File System – Different typesof files - File Management — File Security — 3 levels — Mounting file system– Unmounting **Managing Accounts** Types of accounts–Root, System, User–Manage Users and Groups – Create, Modify, Delete a Group – Create, Modify, Delete an account.	**6** **4** **2**

	5.4Shell Programming Linux shell — Types — Graphical, Command Line — Characteristics of Various shells — Bash, Csh / Tcsh, Zsh, Fish — Shell Prompt — Shell scripting–Need for Shell script– Shell script advantages and disadvantages–Script example.	**2**

REFERENCE BOOKS

- "Operating System Internal and Design Principles", William Stallings, Pearson Education, 7th Edition
- "Operating System, Principles & Design", Pal Chaudhury, PHILearning, FirstEdition
- "Operating System",RohitKhuranaITLESE,VikasPublishingLtd,FirstEdition2011
- "Operating System concepts", Abraham Siberschatz Galvin, Gagne, WileyPublishers,9thEdition
- "Operating Systems", Harvey M. Deiteland Paul J.Deitel, David R.Choffnes, PearsonEducation, NewDelhi, Third Edition,2007

Learning Websites

https://en.wikipedia.org/wiki/Operting_system
https://computer.howstuffworks.com/operating-system.htm
https://www.tutorialspoint.com/operating_system/index.htm
https://www.geeksforgeeks.org/operating-systems/
https://codescracker.com/operating-system/
https://www.computerhope.com/os.htm

Shell Script Programs Website links

http://www.codepoc.io/blog/unix
https://books.google.co.in

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

II YEAR

N – SCHEME

III SEMESTER

4052330 – C Programming and Data Structures

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 452330

Semester : III

Subject title : C Programming and Data Structures

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per Semester: 16 weeks

Subject	Instructions		Examination			
	Hours /Week	Hours/ Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
C Programming and Data Structures	6	96	25	100*	100	3Hrs

***Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

Topics and Allocation of Hours

Unit	Topics	Hours
I	PROGRAM DEVELOPMENT & INTRODUCTION TO C	18
II	DECISION MAKING, ARRAYS , STRINGS, FUNCTIONS	18
III	STRUCTURES, UNIONS AND POINTERS	17
IV	INTRODUCTION TO DATA STRUCTURES, STACK, QUEUES	17
V	LINKED LIST, TREES, SORTING, SEARCHING	19
	Test and Model Exam	7
	TOTAL	**96**

RATIONALE:

C' is the most widely used computer language, which is being taught as a core course. C is general purpose structural language that is powerful, efficient and compact, which combines features of high level language and low-level language. It is closer to both

Man and Machine. Due to this inherent flexibility and tolerance it is suitable for different development environments. Due to these powerful features, C has not lost its importance and popularity in recently developed and advanced software industry. C can also be used for system level programming and it is still considered as first priority programming language. This course covers the basic concepts of C. This course will act as "Programming concept developer" for students. It will also act as "Backbone" for subjects like OOPS, Visual Basic, Windows Programming, JAVA etc.

Data structures are the techniques of designing the basic algorithms for real-life projects. In the present era, it is very essential to develop programs and organize data in such a way that it solves a complex problem efficiently. Understanding of data structures is essential and this facilitates to acquire sound knowledge of the insight of hardware requirement to any problem base. The practice and assimilation of data structure techniques is essential for programming.

OBJECTIVES:

At the end of the Course, the Students will able to

- Define Program, Algorithm and flow chart
- List down and Explain various program development steps
- Write down algorithm and flow chart for simple problems.
- Describe the concepts of Constants, Variables, Data types and operators.
- Develop programs using input and output operations.
- Use of command line arguments.
- Explain compiler controlled directives.
- Understand the structure and usage of different looping and branching statements.
- Define arrays and string handling functions.
- Explain user-defined functions, structures and union.
- Define pointers and using the concept of Pointers.
- Define Linear and non-linear data structures.
- List and discuss the different types of linear data structures.
- Define a tree and the different terms related with trees.
- Write the algorithm for different types of sorting and searching.

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topics	Hours
I	**PROGRAM DEVELOPMENT & INTRODUCTION TO C** **1.1Program** Program Definition - Program development cycle – Algorithm –flowchart – symbols, importance & advantage of flow chart.	3
	1.2 Introduction to C History of C - Features of C Language - Structure of a C program – Execution of C Program : Compiling, Link and Run a program — Diagrammatic representation of program execution process.	3
	1.3 Variables, Constants & Data types C character set – Tokens – Constants - Keywords – identifiers and Variables - Data types and storage – Data type Qualifiers – Declaration of variables – Assigning values to variables – Escape sequences - Defining symbolic constants	5
	1.4 C operators Arithmetic, Logical, Assignment, Relational, Increment and Decrement, Conditional, Bitwise, Special Operator precedence and Associativity. C expressions – Arithmetic expressions, Evaluation of expressions- Type cast operator.	5 .
	1.5 I/O statements Formatted input, formatted output, Unformatted I/O statements	2
II	**DECISION MAKING, ARRAYS , STRINGS, FUNCTIONS** **2.1 Control Statements** Simple if statement – if-else, else-if-ladder statements, switch statement, Looping Statements — while, do _ while and for loop, go to, continue and break statements.	5
	2.2 Arrays Definition – Array element and subscript - Declaration – Initialization of one dimension array elements - Two dimensional arrays – initialization of elements.	4

	2.3 Strings Introduction – Declaring and Initializing string variables, Reading strings , Writing strings, String handling functions — strlen() , strcpy(), strcmp(), strcat() and strrev() functions.	3
	2.4.Built in Functions Declaration and definition of function. Math functions – Console I/O functions – Standard I/O functions – Character Oriented functions .	3
	2.5.User defined functions Defining functions & Needs, Scope and Life time of Variables, Function call, return values, Recursion.	3
III	**STRUCTURES, UNIONS AND POINTERS** **3.1 Structures and Unions** Structure Definition – Variable declaration – initialization – Accessing and giving values to structures, Structures within structures, Arrays within structures. Unions: Declaration – initialization. Difference between Union and Structure.	7
	3.2 Pointers Introduction – Advantages of pointers – Accessing the address of a variable – Declaring and Initializing pointers – Accessing a variable through its pointer –Pointer Expressions.	4
	3.3 Dynamic memory allocation Advantages – malloc(), calloc(), realloc() and free() functions.	2
	3.4 Command line arguments : Introduction – argv and argc arguments .	4
IV	**INTRODUCTION TO DATA STRUCTURES, STACK, QUEUES** **4.1 Introduction to Data Structures** Introduction - Data and Information - Elementary data structure organization - Types of data structures - Primitive and Non Primitive data structures, Operations on data structures: Traversing, Inserting, Deleting, Searching, Sorting, Merging, Different Approaches to designing an algorithm: Top-Down	8 .

	approach, Bottom-up approach (Definition and examples only)	
	4.2 Definition of a Stack Operations on Stack (PUSH & POP) - Implementation of stack through arrays -Polish notations — Conversion of infix to postfixexpression,	5
	4.3 Queues Definition – Representation of Queue using arrays – Circular Queue, Dequeue (Definition and Examples only)	4
V	**LINKED LIST, TREES, SORTING, SEARCHING** **5.1 Terminologies** Node, Address, Pointer, Information, Null Pointer, Empty list -. Type of lists : Singly linked list , Doubly linked list, Circular list - Representation of singly linked lists in Memory-Difference between Linked & sequential List — Advantages and Disadvantages of Linked list. (Concepts only, no implementations)	6
	5.2. Trees Terminologies: Degree of a node, degree of a tree, level of a node, leaf node, Depth / Height of a tree, In-degree & out-Degree, siblings. In order traversal, Preorder traversal, Post order traversal. (Concepts only, no implementations)	6
	5.3. Sorting Introduction, Types of sorting - Bubble sort , Quick Sort - Examples.	3 .
	5.4 Searching Definition – Algorithms and “C” programs for Linear search and Binary search.	3

TEXT BOOKS:

Sl.No	TITLE	AUTHOR	PUBLISHER
1.	Programming in ANSI C	Prof. E. Balagurusamy	Tata Mc-Graw Hill, New Delhi, 4th Edition

REFERENCE BOOKS:

S.No	TITLE	AUTHOR	PUBLISHER
1.	A Text Book on C	E. Karthikeyan	PHI Private Limited, New Delhi
2.	Programming with C	Byron Gottfried.	Schaum Series -TMGH
3.	Programming and Problem solving using C	ISRD Group, Lucknow	Tata Mc-GrawHill, NewDelhi
4.	Let us C	Yashavent Kanethar	BPB Publication, 2005, New Delhi
5.	Introduction to Data structures with applications.	Trembley and Sorenson	Tata Mc-GrawHill, NewDelhi
6.	Fundamentals of Data structures in C	Horowitz , sahni Anderson- freed	University Press, Hyderabad
7.	Introduction to Data structures	Bhagat Singh	TMGH, New Delhi
8.	Data Structures and Algorithms	G.A. Vijayalakshmi Pai	TMGH, New Delhi

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

II YEAR

N – SCHEME

III SEMESTER

4052340 – Electrical and Electronics Engineering Practical

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052340

Semester : III

Subject title : Electrical and Electronics Engineering Practical

TEACHING& SCHEME OF EXAMINATION

No. of weeks per Semester: 16 Weeks

Subject	Instructions		Examination			
	Hours / Week	Hours/ Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Electrical and Electronics Engineering Practical	4	64	25	100*	100	3Hrs

*** Examinations will be conducted for 100 Marks and it will be reduced to75marks.**

RATIONALE:

Diploma Engineers from all branches of engineering are expected to have some practical knowledge of electrical and electronics engineering. Also the technicians working in different engineering fields have to deal with various types of electrical equipments. Various types of electronic circuits are used in different electrical equipments. Hence it is necessary to have practice with electric circuits, different types of electronic devices to know the principles and working characteristics.

OBJECTIVES

On completion of the following practical contents the students must be able to

- Verify Power supply of SMPS
- Find the efficiency and voltage regulation of a single phase transformer
- Study the characteristics of PN junction diode and Zener Diode
- Function of Rectifier circuit
- Test the performance of Light devices
- Know about the function of a Transistor
- How to construct different logic functions using universal gates
- Realize the combinational circuits and sequentialcircuits

DETAILED SYLLABUS

Contents:Practical

LAB EXERCISES

1	A	Checking of power supply in SMPS
	B	Construct the circuit and draw the graph for different stages of Bridge rectifier with filter using CRO.
2		Construct the circuit and draw the forward characteristics of PN junctionDiode and find input resistance.
3		Construct the circuit and draw the reverse characteristics of Zener Diodeand find breakdown voltage.
4		Construct the circuit and draw the VI characteristics of LED
5		Construct the circuit and draw the characteristics of LDR
6		Construct CE configuration circuit and draw the input characteristics and also find input resistance.
7		Construct CE configuration circuit and draw the output characteristics and also find output resistance.

8	A	Verify the truth tables of NAND,AND,NOR,OR,NOT,XOR using IC's
	B	Realization of basic gates using either NAND or NOR gate.
9		Construct and verify Half adder and Half Subtractor
10		Construct and verify the truth table of Full adder
11		Construct and verify the truth table of Full subtractor
12		Verify the truth tables of RS,D,T and JKFF
13		Construct and test the parity generator and checker function using IC74180
14		Construct and test the 4bit Ripple counter(IC7493)
15		Construct and test decade counter(IC7490)

BOARDEXAMINATION

DETAILED ALLOCATION OF MARKS

SCHEME OF VALUATION	
Writing any one Experiment (CIRCUIT DIAGRAM, TABULAR COLUMN, TRUTH TABLE / EQUATION / FORMULA)	45 Marks
Construction	40 Marks
Result	10 Marks
VIVA–VOCE	05 Marks
Total	100 Marks

LIST OF EQUIPMENTS / COMPONENTS REQUIRED
(for a batch of 30 students)

S.No	Name of the Equipments	Range	Required Nos
1	Ammeter	(0-50)ma	6
2	Voltmeter	(0-20)V,(0-1v)	6
3	Power supply	0-30V	6
4	Digital Trainer Kit		6
5	Bread Board		6
6	Fixed dual power supply	0-15V	2
7	Signal generator	1MHz	2
8	CRO Dual Trace	30MHz	6

COMPONENTS

S.No	Name of the components	
1	Resistors	1150Ω,1KΩ,2.2KΩ,10KΩ,220Ω
2	Capacitor	10µF, 4.7µF
3	PN Diode	IN4007
4	Zener Diode	Z11.1
5	Transistor	SL100,CL100
6	IC7400, IC7402, IC7404, IC7408,IC7432,IC7486	
7	Ic74180,IC74153,IC7476,IC7474	
8	IC7490,IC7493,IC7495	

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

II YEAR

N – SCHEME

III SEMESTER

4052350 – Linux Practical

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052350

Semester : III

Subject title : Linux Practical

TEACHING &SCHEME OF EXAMINATION

No. of weeks per Semester :16 Weeks

Subject	Instructions		Examination			
	Hours /Week	Hours/ Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Linux Practical	4	64	25	100*	100	3Hrs.

*** Examinations will be conducted for 100 Marks and it will be reduced to 75marks.**

RATIONALE:

• Linux is an open-source Operating System which offer a variety of functions, programs or applications and Linux software to choose from, to the users, most of them are free. It has a good graphical user interface (GUI) and almost all the functionality that other proprietary OS offer.

• This practical enables to learn the commands used to perform various operations in a Linux system and write shell scripts for various functions. One of the top practical uses for Linux is web application development.

OBJECTIVES:

On completion of the following exercises ,the students must be able to

- Login and logoff Procedures
- Use of General purpose commands
- Explain the use of simple filters and advanced filters.

- Know the details of process status
- Use Various communication Commands
- Search patterns
- Use of shell scripts and define the elements of the shell script
- Write shell script for various problems.

DETAILEDSYLLABUS

Contents:Practical

Units	Topics	Hours
I	**Basics of Linux OS:** Entering and Exiting from a Linux system –User Accounts- General understanding of various application programs–Different shells	2
II	**Linux Commands:** Learn the syntax and usage of : Directory Management Commands-File Management Commands-General Purpose Commands-Simple Filters–Advanced Filters-Communication Commands-Check the Process Status-Process Management Commands-Search Patterns- Exercises.	28
III	**Text Editor:** File operations(New, Open, Close, Save, Save and Exit, Print) –Text Editing operations (Inserting, deleting, finding, replacing, copying and moving).	2
IV	**ShellScripts:** Use of shellscripts –Numerical operations-Looping–Swapping Technique-String operations–Using Command line arguments – Filters – Date Functions – Relational operations-Logical operations-Boolean operations-Basic arithmetic operations – Case statement – Search Directory or File -Exercises.	32

LAB EXERCISES

Contents:Practical

PART–A LINUX COMMANDS	
Write down the syntax and usage of the following exercise with all options. **Check the commands with the system**	
1	Usage of Directory Management commands: ls, cd, pwd, mkdir, rmdir
2	Usage of File Management commands :cat, chmod, cp, mv, rm, more
3	Use the General Purpose commands: wc, cal, date, who, tty, ln
4	Using the Simple filters: pr, head, tail, cut, paste, nl ,sort
5	Advanced filters: Search for a pattern using grep, egrep, fgrep, uniq Communication Commands: write, wall
6	Check the details of process name, PID, status using ps command. Process Management commands:&,nohup, kill, nice
7	Device pattern using meta character to match each of the following situation: All three character filenames. All filenames that contains the characters ‘a ‘or ‘b ‘or’ c.’ All filenames beginning with a particular string. All filenames beginning with ‘ca’ and ending with two digits. All filenames beginning with ‘s ‘and having ‘a’ at somewhere.
PART– BSHELL SCRIPTS	
1	Write a shell script that accepts a numerical value N. Then display the Decrementing value of N till it reaches 0.
2	Write a shell script to search a string and display it.
3	Write a shell script that takes three command line arguments. The first argument is the name of the destination file and the other two arguments are Names of files to be placed in the destination file.

4	Write a shell script to print contents of file from given line number to next given Number of lines.
5	Write a shell script that print out date information in this order: time, day of The week, day number, year– that is like this.21:18:00 IST Mon16 Aug2021
6	Develop a Basic math Calculator using case statement
7	Write a shell script that represents a multiple choice question, gets the user's Answer and report back whether the answer is right, wrong or not one of the choices.
8	Write a shell script that takes a command line argument and reports on Whether it is a directory, a file or something else.

BOARD EXAMINATION

DETAILED ALLOCATION OF MARKS

SCHEME OF VALUATION	
Correctness of Commands in Part-A	20 Marks
Execution of Commands in Part-A	20 Marks
Writing program in Part-B	20 Marks
Execution of program in Part-B	25 Marks
Printed Output (Part–A)	5 Marks
Printed Output (Part–B)	5 Marks
VIVA– VOCE	5 Marks
TOTAL	**100 Marks**

HARDWARE AND SOFTWARE REQUIREMENTS

Minimum Hardware Requirements:

Desktop Computers:30 Nos

Laser Printer:1No.

Minimum Software Requirements:

Operating System :Any Linux Based GUI Operating System

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

II YEAR

N – SCHEME

III SEMESTER

4052360 – C Programming and Data Structures Practical

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052360

Semester : III

Subject title : C Programming and Data Structures Practical

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per Semester: 16 weeks

Subject	Instructions		Examination			
			Marks			Duration
	Hours / Week	Hours / Semester	Internal Assessment	Board Examinations	Total	
C Programming and Data Structures Practical	4	64	25	100*	100	3Hrs.

*** Examinations will be conducted for 100 marks and it will be reduced to75 marks.**

RATIONALE:

As 'C' is the most widely used computer language in software industry to provide the hands on experience on writing C programs and on implementation of linear and non-linear data structure, this course is introduced. The knowledge of ' C' language and data structures will be reinforced by practical exercises during the course of study. This course will help students to develop the capability of selecting a particular data structure.

OBJECTIVES:

At the end of the Course, the Students will able to

- Analyze the given problem.
- Think the logic to solve the given problem.
- Describe the concepts of constants, variables, data types and operators.
- Develop programs using input and output operations.
- Write programs using command line arguments.
- Write programs using compiler control directives.
- Write programs using different looping and branching statements.
- Write programs based on arrays.
- Write Programs using string handling functions.
- Write programs using user-defined functions, Structures and Union.
- Write programs using the concept of Pointers.
- Understand the use of arrays
- Implement linear data structure algorithms using C language.
- Implement non - linear data structure algorithms using C language.
- Write programs for traversing a binary tree.
- Write programs for searching and sorting.

DETAILED SYLLABUS

Contents:Practical

PART – A

1. Write a simple C Program
   a. Print your Name and Address
   b. Find Simple interest and Compound interest.
2. Write a C program to swap two variable's using
   (i) third variable and (ii) without using a third variable.
3. Write a program to find the largest number between given three numbers.
4. Write a program to print all prime numbers from 1 to N.
5. Write a program to prepare the total marks for N students by reading the Reg.No,Name, Mark1 to Mark6 by using array of structures.
6. Write a program using the function power (a,b) to calculate the value of a raised to b.
7. Write a program to find the length of the given string using pointers.
8. Write a program to find factorial of a number using recursion.

PART – B

9. Write a program in 'C' to create a singly linked list containing at least five elements.Make necessary assumptions.
10. Write a "C" program to perform operations in stack using array.
11. Write a "C" program to convert an infix expression into post fix expression.
12. Write a "C" program to perform operations in queue using array.
13. Write a "C" program to add two 3 x 3 matrices and display the result in Matrix form.
14. Write a "C" program to read 10 elements and sort the above numbers using bubble sort.
15. Write a "C" Program for binary searching.

BOARD EXAMINATION

DETAILED ALLOCATION OF MARKS

SCHEME OF VALUATION	
Writing any one program from PART – A	20 Marks
Writing any one program from PART – B	25 Marks
Executing program (PART – A)	20 Marks
Executing program (PART – B)	20 Marks
Result with printout (PART – A)	05 Marks
Result with printout (PART – B)	05 Marks
VIVA – VOCE	05 Marks
Total	**100 Marks**

HARDWARE REQUIREMENT

Desktop Computers - 30 No's

Laser Printer - 1 No

SOFTWARE REQUIREMENT

C – Compiler with Editor.

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

II YEAR

N- SCHEME

III SEMESTER

4052370 – E Publishing Practical

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052370

Semester : III

Subject title : E PUBLISHING PRACTICAL

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per Semester: 16 Weeks

Subject	Instructions		Examination			
	Hours /Week	Hours/ Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
E PUBLISHING PRACTICAL	4	64	25	100*	100	3Hrs.

***Board Examination Conducted for 100 Marks and Converted To 75 Marks**

RATIONALE:

This course will enable the students to familiarize with the features and use of application packages such as CorelDraw, Photoshop and Adobe indesign. This subject will develop skills in handling the above packages to develop software for-publishing. It makes the students exactly suitable for DTP industry.

OBJECTIVES:

On completion of the following exercises, the students must be able to

- Learn all tools and options in CorelDraw.
- Create designs like Bit Notice, Notebook Wrapper, Invitation and Calendar in CorelDraw or any open source software.
- Learn all tools and options in Photo Shop.
- Create designs using layers, tools, text effects and filters in Photoshop or any equivalent open source software.
- Learn to use character styles, paragraph styles, text effects and text framein Adobe In design or any equivalent open source software
- Create master page, multipage document and monthly calendar in Adobe Indesign.

DETAILED SYLLABUS

Contents:Practical

LAB EXERCISES

PART-A

1. Create a Bit Notice with specified height and width with various text styles.
2. Create a design using all basic tools and make changes using shape tool.
3. Create a notebook wrapper design using fountain filling and pattern filling tools.
4. Create an invitation using arrange menu commands like transformations, align and distribute and order.
5. Create a calendar with the help of Grid Tool, Power clip and import commands.
6. Create a simple logo using text tool, rectangle tool and ellipse tool.
7. Transform one object into another object using blend tool.

PART-B

1. Create a design by using the various Selection Tools, cutting and pasting the images.
2. Using multiple layers, create a design with the use of masking various images.
3. Create a design by the use of text tools and apply text effects.
4. Change the color of an image by the use of selective coloring method.
5. Create a design by applying the various filtering effects.
6. Create a simple layout and master page by using master page palette andCharacter Styles.
7. Create a multipage document by using character, paragraph, auto flow and text commands.
8. Create a stylish monthly calendar sheet by using table and its formatting commands.

BOARD EXAMINATION

DETAILED ALLOCATION OF MARKS

SCHEME OF VALUATION	
Procedure Writing – One Question from PART - A	20 Marks
Procedure Writing – One Question from PART - B	25 Marks
Executing Exercise (PART – A)	20 Marks
Executing Exercise (PART – B)	20 Marks
Result(Part – A)	5 Marks
Result(Part – B)	5 Marks
VIVA - VOCE	5 Marks
TOTAL	**100 Marks**

HARDWARE REQUIREMENTS

Desktop Computers	.....	30 Nos
Laser printer	.....	1 No
Scanner	.....	1 No

SOFTWARE REQUIREMENTS

Any Open Source Software

- GIMP
- Scribus
- Inkscape
- Krita
- Pinta
- Shotwell or any equivalent open source software.[or]
- Corel draw, Photoshop, Adobe indesign**.(optional)**

[Open source software usage is recommended than proprietary for doing lab exercises]

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

II YEAR

N SCHEME

IV SEMESTER

4052410 – Computer Architecture

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052410

Semester : IV

Subject Title : Computer Architecture

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Computer Architecture	5	80	25	100*	100	3 Hrs

*** Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

Topics and Allocation of Hours

UNIT	Topic	Hrs.
I	Register Transfer Logic and CPU	17
II	Input – Output Organization	14
III	Memory Organization	16
IV	Microprocessors, Pipelining and Vector Processing	14
V	Architecture and Concepts of Advanced Processors	12
Test and Model Exam		7
Total		**80**

RATIONALE

- Computer Architecture is concerned with the structure and behavior of the various functional modules of the computer and their interaction. This course provides the necessary understanding of the hardware operation of digital computers.

OBJECTIVES

On completion of the following units of syllabus contents, the students must be able to

- Know the fundamental blocks of computer
- Realize the function of I/O in different operation modes
- Use of I/O processor
- Know about different memory types and their operations
- Study about the fundamental blocks of CPU
- Know about the computer arithmetic
- Study the different processors

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topics	Hours
I	**REGISTER TRANSFER LOGIC AND CPU**	
	Register transfer Register Transfer Language – Inter Register transfer – Control function-Bus transfer-Memory transfer.	**3**
	Micro operations and ALU Arithmetic micro operations-Binary adder, subtractor, incrementer, 4bit arithmetic circuit, Logic micro operations- one stage of logic circuit-applications, shift micro operations- 4 bit combinational circuit shifter-one stage of ALU.	**7**
	Central processing unit Components of CPU- General register organization, bus system-register set with common ALU-memory stack - stack limits- Processor Organization - Instruction format(3,2,1,0 address instructions) — Addressing modes, Various addressing modes — RISC and CISC Architecture, Characteristics.	**4**
	Control unit Structure of control unit–Fetch cycle, Indirect cycle, Execute cycle, Interrupt cycle, Instruction cycle - Types of control unit — Hardwired,Micro-programmed control.	**3**

II	**INPUT – OUTPUT ORGANIZATION**	
	Input Output Interface Need for I/O interface, I/O bus and interface, I/O commands, Example of I/O interface, I/O Bus versus memory bus, Isolated I/O versus Memory mapped I/O.	**3**
	Asynchronous data transfer Strobe control, Handshaking, Asynchronous serial transfer, Asynchronous communication interface.	**4**
	Modes of transfer Programmed I/O, Interrupt initiated I/O-vectored interrupt, non-vectored interrupt, Priority interrupt, Interrupt controller ,DMA –DMA controller, DMA transfer.	**4**
	I/O Processor CPU-IOP communication, Data Communication Processor - Serial and Parallel communication.	**3**
III	**MEMORY ORGANIZATION**	
	Memory types Sequential Access memory, Random Access memory, CPU registers, Main memory, Secondary memory, Cache memory - Memory Hierarchy – Characteristics, Design, Advantages of Memory Hierarchy.	**2**
	Main Memory ROM, Types of ROM, RAM - SRAM, DRAM, Chips — ROM, RAM - Memory address map, Memory connection to CPU.	**3**
	Secondary Memory Magnetic disk- Structure**,** Storage capacity**,** Optical disks, USB drives, Solid State Drives, SD cards.	**3**
	Cache Need for cache memory, Operational principle, Cache initialization, Different mapping techniques, Writing into cache.	**2**
	Memory Management Virtual memory concept- Virtual address, Physical address, Memory table for mapping a virtual address, Address mapping using pages, Associative memory page table, Page replacement techniques.	**4**

	3.6 Memory Management Hardware Segmented-Page mapping, Memory protection.	**2**
IV	**MICROPROCESSORS,PIPELINING AND VECTOR PROCESSING** **Microprocessor** Block diagram of 8086-registers: segment registers, address: effective address, flag registers and application of microprocessor. **Parallel processing** Types of parallel processing systems - Parallel organizations. **Pipe Lining** **I**nstruction pipeline, Arithmetic pipeline, RISC pipeline, Super pipelining, Super scalar processors. **Vector Processing** Vector Processing, Array Processing – Example of SIMD arrayprocessor.	 **3** **4** **4** **3**
V	**ARCHITECTURE AND CONCEPTS OF ADVANCED PROCESSORS** **Symmetric Multiprocessors** Organizations, a mainframe. **Multithreading and clusters** Implicit and Explicit multi threading, Cluster configuration. **NUMA and Vector** NUMA organizations and approaches to vector computation. **Multi Core** Multicore organization, Advantages and disadvantages of multicore processing.	 **2** **3** **3** **4**

Reference Books

1. "Computer System Architecture", M.Morris Mano, Prentice –Hall of India Pvt Limited,Revised Third Edition.
2. "Computer Organization And Architecture Designing For Performance", William Stallings, Pearson Publications, Eighth Edition.
3. "Computer Organization and Design: The Hardware/Software Interface", David A. Patterson and John L.Hennessey, Morgan Kauffman / Elsevier, Fifth Edition, 2014.
4. "Computer Architecture and Organization", John P. Hayes, Tata Mc Graw Hill, ThirdEdition
5. Computer Organization and Embedded Systems", Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Naraig Manjikian, Sixth Edition, Tata McGraw Hill, 2012.

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

II YEAR

N – SCHEME

IV SEMESTER

4052420 – Web Design and Programming

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052420

Semester : IV

Subject Title : Web Design and Programming

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Web Design and Programming	5	80	25	100*	100	3 Hrs.

*** Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

Topics and Allocation of Hours

UNIT	Topic	Hrs.
I	Internet, HTML and Advanced HTML	15
II	Frames, Forms and CSS	14
III	JavaScript	15
IV	PHP	15
V	PHP Programming and MySQL	14
Test and Model Exam		7
Total		**80**

RATIONALE:

The main objective of the of this subject is to introduce the students to the building blocks of Internet and Web Design & Programming using HTML, CSS, Java Script, PHP and MySQL. The subject will impart knowledge to design web pages, dynamic and interactive web si tes with client-side and server-side scripting. After completion the students will be able to independently design and develop web sites.

OBJECTIVES: On successful completion of the course, the students will be able to.

- To impart knowledge on Internet and basics of networking concepts.
- To impart basic knowledge on web development.
- Develop simple components in web pages using CSS.
- To impart knowledge for validations and event handlers using JavaScript.
- To provide the basic knowledge about PHP and web services.
- To impart PHP scripting ideas and importance in web development.
- Write PHP Programs with MySQL database.

DETAILED SYLLABUS

Contents : Theory

Unit	Name of the Topics	Hours
I	**INTERNET, HTML AND ADVANCED HTML**	
	Internet	5
	History of the Internet - Basics of Networking Concepts – WAN, LAN,TCP/IP, UDP, FTP, Telnet, SMTP, Ports - World Wide Web – HTTP,SMTP, POP3, MIME, Understanding roles of Web Browsers –Concepts of Web Servers.	
	HTML	5
	Introduction - Basic Tags of HTML - HTML Tag - TITLE Tag – BODY Tag - Formatting of Text: Headers - Formatting Tags: BOLD, ITALICS,UNDERLINE, PARAGRAPH, TT, STRIKETHROUGH, EM, BR and HR tags - PRE Tag - FONT Tag – Special Characters - Working withImages - META Tag.	
	Advanced HTML	5
	Difference between HTML & HTML5 - New elements in HTML5 - Links - Anchor tag — Lists - Unordered Lists - Ordered Lists — Definition Lists; Tables - TABLE, TR and TD Tags - Colspan and Rowspan	
II	**FRAMES, FORMS AND CSS**	
	Frames Frameset – FRAME Tag – Frame inside other frames – NOFRAMESTag.	2
	Forms	
	FORM and INPUT Tag — Textbox - Radio Button — Checkbox — SELECT Tag and Pull Down Lists: Hidden - Submit and Reset; Some Special Tags: COLGROUP - TBODY, TFOOT - _blank, _self, _parent, _top – IFRAME – LABEL - Attribute for <SELECT> - TEXTAREA..	3
	CSS	
	Introduction – Features – Style Sheet basics - Working with CSS files – Syntax - Types of Style Sheets - Inline Styles - Embedded	4

	Styles - External or Linked Styles - What is CSS3? Animation – Borders – Backgrounds – Fonts –Multiple columns – Text effects. **Formatting Text and Fonts** Font Families Font Size Kerning, Leading and Indenting - Formatting Colors and Backgrounds: The Color Attribute - The Background Attribute - Background Colors and Images. Exploring CSS Class and ID Attributes: Defining the CSS Class Attribute – Defining the CSS ID Attribute - Dynamic effects with CSS - Lists- Tables – Forms – Simple Examples using above properties.	5
III	**JAVASCRIPT** **3.1 JavaScript Basics** Need of scripting languages — Variables and Data Types: Declaring Variables — Life span of variables - Data Types - Operators: Assignment, comparison, computational and logical operators - Control Structures: Conditional Statements — Loop Statements: for, while, for in, break and continue statements.	5
	3.2 Object-Based Programming and Message boxes Functions - Executing Deferred Scripts - objects: Document object Model, Predefined objects, Array object, History object, Location object - Dialog Boxes - Alert Boxes - Confirm Boxes - Prompt Boxes.	5
	3.3 JavaScript with HTML Events - Event Handlers: onLoad and onUnload – onFocus and onBlur – onError - Forms: Forms Array – Form element properties -Introduction to jQuery – Features of jQuery - jQuery example.	5
IV	**PHP**	
	Introduction A Brief Introduction to Apache, MySQL, PHP and Open Source - Server-Side Web Scripting.	4
	PHP PHP Structure and Syntax - Integrating HTML with PHP - Syntax and Variables - Constants and Variables - Passing Variables between	5

	Pages — if Statements - if and else — switch case - for loop — for eachloop. **Includes** Includes and Functions for Efficient Code - Strings – Arrays and Array Functions - Sessions and Cookies – Sample Programs - Alternates to Incrementing/Decrementing Values.	6
V	**PHP PRGRAMMING AND MYSQL** **PHP with MYSQL** MySQL Syntax and Commands - Connecting to the MySQL Server — Data types - Functions - Querying the Database - SELECT, LogicalOperators — MySQL Programs. **Form Elements** Processing the Form - FORM Element - Tables to Display Data – Edit, Update and Delete data. **Hands on Experiments** Creating a Simple Shopping - Cart Script – Mini Project.	3 3 8

Reference Books

1. "Douglas E. Comer" "The Internet Book", Prentice Hall.
2. "Terry Felke-Morris" "Web Development and Design Foundations with HTML5", Pearson.
3. "Thomas A. Powell, Fritz Schneider" "HTML & CSS: The Complete Reference", Tata McGras-Hill.
4. "Thomas Powell, Fritz Schneider" "Java Script: The Complete Reference", Tata McGras-Hill.
5. "Timothy Boronczyk, Elizabeth Naramore, Jason Gerner, Yann Le Scouarnec, Jeremy Stolz, Michael K. Glass" "Beginning PHP6, Apache, MySQL, Web Development", Wrox Publications.

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

II YEAR

N – SCHEME

IV SEMESTER

4052430 – Object Oriented Programming with Java

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052430

Semester : IV

Subject Title : Object Oriented Programming with Java

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Object Oriented Programming with Java	5	80	25	100*	100	3 Hrs.

*** Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

Topics and Allocation of Hours

UNIT	Topic	Hrs.
I	Fundamentals of OOPs & Java	15
II	Control Structures, Arrays, Vectors and Strings	13
III	Classes, Interfaces and Packages	15
IV	Exception Handling, Multithreading and Files	15
V	Applets, Graphics Programming and AWT Controls	15
	Test and Model Exam	7
	Total	**80**

RATIONALE:

This course explains the fundamental ideas behind the object oriented approach to programming. Knowledge of java helps to create the latest innovations in programming. Like the successful computer languages that came before, java is the blend of the best elements of its rich heritage combined with the innovative concepts required by its unique environment. This subject is designed to give you exposure to basic concepts of object oriented technology. This subject will help in learning to write programs in java.

OBJECTIVES:

On completion of the following units of syllabus contents, the students must be able to

- Understand the basic concepts and applications of Object Oriented Programming.
- Know the history & features Java.
- Use of control structures in Java Program.
- Use of Arrays and Vectors in Java Program.
- Demonstrate the use of string and String Buffers.
- Define Class with the attributes and methods.
- Know the types of inheritances.
- Define and Implement Interfaces.
- Create and access packages.
- Handle the errors using exceptions.
- Creating own exceptions
- Understand the concepts of multithreading.
- Develop multithreaded programs in Java.
- Develop File programs
- Develop simple Applets.
- Use of Graphics, Color & Font class
- List the types of AWT Components and types of eventlisteners.

Unit	Name of the Topics	Hours
I	**FUNDAMENTALS OF OOPS & JAVA** **Basics of OOPs** Introduction to Object Oriented Programming - Basic concepts of Object Oriented Programming –Objects and Classes — Data abstraction and Encapsulation, Inheritance, Polymorphism, Dynamic binding, Message communication — Application of OOPs. **Introduction to Java** History of Java — Java features — Java Environment — JDK — API- Types of Java program – Creating and Executing a Java program – Java Tokens: Keywords, Character set, Identifiers, Literals, Separator – Java Virtual Machine (JVM) – Comments in Java program. **Elements** Constants – Variables – Data types – Type casting – Scope of variables – Operators - Types – Expressions – Evaluation of Expressions.	4 6 5
II	**CONTROL STRUCTURES, ARRAYS, VECTORS AND STRINGS** **Decision making and Branching** Decision making: Simple if statement – if – else statement – Nesting if –else — else if Ladder — switch statement, Looping: While loop — do — While loop - for loop – break – labeled loop – continue Statement. **Arrays & Vectors** Arrays: One Dimensional Array – Creating an array – Array processing –Multidimensional Array, Vectors: Definition- Creation - Methods **Strings** String Class – Creation – Methods, String Buffer Class -- Creation - Methods– Difference between String and String Buffer.	5 4 4
III	**CLASSES, INTERFACES AND PACKAGES** **3.1 Class and object** Defining a class — Creating objects — Accessing class members– Constructors – Method overloading – Static members – Nesting of Methods – this keyword – Command line argument.	6

	Inheritance Definition –Types -- Single Inheritance — Multilevel Inheritance — Hierarchical Inheritance – Overriding methods – Final variables and methods — Final classes — Final methods - Abstract methods and classes – Visibility Control: Public , Private, friendly and protected. Interfaces: Multiple Inheritance -- Defining interface – Extending interface - Implementing Interface. **Package** Java API Packages — System Packages — Naming Conventions — Creating & Accessing a Package — Adding Class to a Package — Hiding Classes.	6 3
IV	**EXCEPTION HANDLING, MULTITHREADING AND FILES** **Exception Handling** Types of Errors – Exception -- Advantages of Exception Handling – Basics of Exception Handling – try blocks – throwing an exception –catching an exception – finally statement – built in exceptions, creatingown exception sub classes. **Multithreading** Introduction — Life cycle of a Thread — Thread Methods — Creating Threads – Extending Thread class -- Implementing Runnable interface - Thread Priority – Thread Scheduling. **FILES** File — Streams — Advantages — The stream classes — Byte stream classes –Character stream classes – Random Access files.	6 4 5
V	**APPLETS, GRAPHICS PROGRAMMING AND AWT CONTROLS** **Applets** Introduction – Applet Life cycle – Creating & Executing an Applet –Applet tags in HTML – Parameter tag. **Graphics programming** Graphics class –Lines -- Rectangles – Circles – Arcs -- Polygon – Fillingobjects – Color class - Selecting a color - Font class - Selecting a font -Drawing Bar charts.	5 5

	5.3 AWT Components and Event Handlers Abstract window tool kit – AWT Controls – Labels – Text Field – Buttons - Checkboxes – Choice – Scrollbars – Event handling: Events, Eventsources, Event Listeners, Input Events – Layout Managers – Menus.	5

References:

1. "E. Balagurusamy ", "Programming with Java", Tata Mc-Graw Hill, New Delhi.
2. "Herbert schildt ", "Java - The complete reference", Tata Mc graw Hill, New Delhi.
3. "Java 2,J2SE1.4 Complete", BPB Publications.

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

II YEAR

N – SCHEME

IV SEMESTER

4052440 – Relational Database Management System

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052440

Semester : IV

Subject Title : Relational Database Management System

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Relational Database Management System	5	80	25	100*	100	3 Hrs.

*** Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

Topics and Allocation of Hours

UNIT	Topic	Hrs.
I	Concepts of Databases and Data Modeling	15
II	Relational Data model & MYSQL Administration	15
III	Interactive MYSQL	15
IV	MYSQL Performance Tuning	14
V	Stored Program Concepts & Development	14
Test and Model Exam		7
Total		**80**

RATIONALE

The Database Management system is a collection of programs that enables to store, modify and extract information from a database. The primary resource that fuels knowledge power is the database. Organizations are employing mechanisms to effectively manage and utilize the data stored in the databases. Relational Database Management System has been developed to harness the information stored in the database.

The major objectives of this subject are to provide a strong formal foundation in Database Concepts, technology and practice to the students to enhance them into well informed application developers. After learning this subject, the students will be able to understand the designing of RDBMS and can use any RDBMS package as a backend for database applications.

OBJECTIVES:

On completion subject, the students must be able to

- Describe data, database, database management systems and database models.
- To make the students to understand the concept of relational model and constraints.
- To make the students to understand the concept of Client/Server technology, Data warehousing, Data mining and Big Data.
- State CODD's rules.
- Understand Normalization and explain different types of normal form.
- To know DDL, DML, DCL and all related commands.
- Write logical and conditional statement for database query.
- Works with Procedures and functions.
- Create and use Cursors and Triggers.

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topics	Hours
I	**CONCEPTS OF DATABASES AND DATA MODELING**	
	Basic Concepts Data, Databases, Database Management System – Components of Database – Data Dictionary – Architecture: Overall Architecture of DBMS, Three level architecture.	4
	Data Models Types of Database models: Hierarchical Database Model, Network Database Model and Relational Database Model. E-R model: Entities - Attributes – Relationships – E-R diagram – Samples.	3
	Database Administrator Server / Client and distributed concept — DBA tasks — DBA Tools/Utilities – Database Maintenance – Backup & Recovery.	3
	Advanced Concepts Introduction to Data warehousing and Data mining – Applications – Data marts. Big Data: Definition — Characteristics — Various Technologies used – Applications – Overview of NoSQL: Difference between RDBMS and NoSQL – Tools used in Big Data, Scalability, and Understanding storage architecture.	5
II	**RELATIONAL DATA MODEL & MYSQL ADMINISTRATION**	
	Relational data model CODD's rules – components of DBMS – Table Structure – Records, rows, tuples, attributes. Keys: Primary key, foreign key, composite key. Meta data – Data Dictionary – Data Integrity – Data constraints and validation – Types of constraints – Difference between SQL and MySQL.	5
	Normalization Benefits – Normal forms: 1st Normal form, 2nd Normal form, 3rd Normal form.	3
	MySQL Installation Install, Configure and test the MySQL server on Microsoft Windows.	3

	2.4 Working with MySQL Admin Creating (CREATE cmd), Selecting (USE cmd) and Describing database (DESC cmd) – SHOW cmd – backing up databases.	4
III	**INTERACTIVE MYSQL**	
	Introduction to MySQL MySQL data types - Data Definition Commands – Data ManipulationCommands – Data retrieval commands.	4
	MySQL Operators and Expressions Types of Operators – Arithmetic, Comparison and logical operators –Pattern matching – Import and Export of data.	2
	Built-in Functions Single row functions – Aggregate functions – Conversion functions.	3
	Querying the table Selecting rows using Where, Order by, group by & Having clauses.Sub-queries – correlated sub-queries.	3
	Flow control IF(), IF NULL(), CASE, LOOP, LEAVE, ITERATE, REPEAT, WHILE	3
IV	**MYSQL PERFORMANCE TUNING**	
	Indexes and sequences Index types, Creating of an Index: Simple and Composite Index, Dropping Index. Sequences: creating, altering and dropping sequences.	3
	Views Introduction – Advantages of views – Creating, Updating and Deletingviews.	3
	Joins & Unions Joins – definition - Types of Joins: natural join, inner join, self join, outer join. Unions: Types: Union, Union All, Union Distinct – order byand Limit handling.	4
	User and Transaction management Creating, deleting, renaming users grant & revoke commands – Transaction command: commit, rollback and save points.	4

V	**STORED PROGRAM CONCEPTS & DEVELOPMENT**	
	MySQL Procedures & Functions Creating – Executing and Deleting stored procedures – Creating –Executing and Deleting stored functions – Advantages.	3
	MySQL Trigger & Cursor Use of Trigger — Creating Trigger — Types of Triggers — Cursor:Creation and Deletion.	3
	MySQL and Web Need for own MySQL programs – MySQL Application ProgrammingInterfaces.	3
	MySQL with PHP Database connections — Managing Database connections— Performing Queries – Closing Connections.	5

Reference Books

1. "Abraham Silberschatz, Henry F.Forth, S.Sudarshan", "Database System Concepts",Mc Graw Hill Education. Seventh Edition.
2. "Joel Murach", "Murach's MySQL", Mike Murach & Associates, Inc. 3rd Edition.
3. "Vikram Vaswami", "The Complete Reference MySQL".
4. "Paul DuBois", "MySQL Developers library", Addison Wesley (4th Edition).

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

II YEAR

N – SCHEME

IV SEMESTER

4052450 – Web Design and Programming Practical

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052450

Semester : IV

Subject Title : Web Design and Programming Practical

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Web Design and Programming Practical	4	64	25	100*	100	3 Hrs.

*** Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

RATIONALE:

The main objective of the of this practical subject is to introduce the students to build a complete site, with the writing of a single web page in Web Design & Programming Practical using HTML, CSS, Java Script, PHP and MYSQL. The subject will impart knowledge to design web pages, dynamic and interactive web sites with client-side and server-side scripting. After completion the students will be able to independently design and develop web sites and web applications.

OBJECTIVES:

By introducing the Web design and Programming Practical, it is intended to:

- Develop to build a complete website using HTML.
- Create web pages using Advanced HTML and CSS.
- Practice to include JavaScript for form validations.

- Develop and run sample programs using PHP script.
- Develop a simple web application using server side PHP script and MySQL.

DETAILED SYLLABUS

Contents: Practical

PART – A

1. Design a HTML page describing your profile in one paragraph. Design in such a way that it has a heading, a horizontal rule, three links and your photo. Also, write three HTML documents for the links. Include facilities for forward, backward and HOME.
2. Design a HTML page about computer languages. List the language. Each Language's name is a link. Prepare separate HTML documents for each language and call them in the appropriate link.
3. Design a single page website for your polytechnic containing a description of the courses offered. It should also contain some general information about the college such as its history, the campus, and its unique features and so on. The site should be colored and each section should have a different color.
4. Develop a web page using CSS to create a time table for the class using different border style.
5. Write a Java script code that converts the entered text to uppercase.
6. Write a Java script code to validate the username and password. The username and password are stored in variables.
7. Write a Java Script code using frames and Events (When a cursor moves over anobject it should display the specification of the object in another frame).
8. Create a site containing banner advertisement at the top of the page. The ads arechanged every 10 or 15 seconds.
9. Write jQuery Program for Count the number of milliseconds between the two click events on a paragraph.
10. Write jQuery Program for Disable/enable the form submit button & Blink the text.

PART – B

11. Write a PHP program to implement at least 05 string functions with description
12. Create a PHP script which display the capital and country name from the given array.Sort the list by the name of the country.
13. Write a PHP program to implement Date and Time Functions.
14. Write a PHP script to display table with implementing Form Processing Controls of Insert and Delete data from data base.
15. Create a simple shopping - cart script using PHP and MySQL.

BOARD EXAMINATION

NOTE:
Students should write one program from **PART A** and one program from **PART B.**

DETAILLED ALLOCATION OF MARKS

Writing answer for any one program from PART – A	20 Marks
Writing answer for any one program from PART – B	25 Marks
Executing program – PART – A	20 Marks
Executing program – PART – B	20 Marks
Result with printout – PART – A	5 Marks
Result with printout – PART – B	5 Marks
VIVA – VOCE	5 Marks
TOTAL	100 Marks

LIST OF EQUIPMENTS

Hardware Requirement

1. Desktop Computers – 30 Nos.
2. Laser Printer – 1 No.

Software Requirement

1. Notepad / Notepad++ / Dreamweaver
2. Apache XAMPP
3. Any Browser

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

II YEAR

N – SCHEME

IV SEMESTER

4052460 – Java Programming Practical

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052460

Semester : IV

Subject Title : Java Programming Practical

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Java Programming Practical	4	64	25	100*	100	3 Hrs.

*** Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

RATIONALE:

- To understand various concepts of JAVA and to familiarize Java environmentto create, debug and run Java programs.

OBJECTIVES:

- Develop programs using different operators and expressions.
- Develop programs using Iterative statements.
- Develop programs using arrays
- Develop applications using Vectors.

- Create classes and objects with constructors
- Solve problems using inheritance
- Handle exception arising in programs.
- Use multithreading in programs
- Develop programs using File/ Create Applet programs
- Develop programs using Graphics & Color classes
- Use GUI components to develop GUI applications

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DETAILED SYLLABUS

Contents: Practical

PART - A

1. Write a program to read the temperature in Celsius and convert into Fahrenheit.
2. Write a program to read 2 integers and find the largest number using conditional operator.
3. Write a program to read an integer and find the factorial of a number.
4. Write a program to implement Vector class and its methods.
5. Write a program to read a string and check whether it is palindrome or not.
6. Write a program to create a class with following data members
    1. register number 2. Name
    3. Marks in 3 subjects and member functions
    1. parameterised constructor – to assign values to members
    2. method to find total mark
    3. method to display register number, name, total mark Create 3 objects from the above class and use the members
7. Write a program that accepts radius of a circle from command line and display its area.

PART - B

8. Write a program to implement multilevel inheritance.
9. Write a program to create a own exception subclass that throws exception if the given number is not in a range of numbers.
10. Write a program that creates three threads. First thread displays “Good Morning” everyone second, the second thread displays “Hello” every two seconds and the third thread displays “Welcome” every three seconds.

11. Write a program to create a file using Byte stream or Character stream class.12.Write a program to demonstrate Mouse events.
13. Write a program to display basic shapes using Graphics class and fill them using Color class
14. Write a program to create a simple calculator to perform addition, subtraction, multiplication and division using button, label and text field.

BOARD EXAMINATION

NOTE:
Students should write one program from **PART A** and one program from **PART B.**

DETAILLED ALLOCATION OF MARKS

SCHEME OF VALUATION	
Writing answer for any one program from PART – A	20 Marks
Execution (Part A)	20 Marks
Result with Print out (Part A)	5 Marks
Writing answer for any one program from PART – B	25 Marks
Execution (Part – B)	20 Marks
Result with Print out (Part – B)	5 Marks
Viva voce	5 Marks
TOTAL	**100 Marks**

LIST OF EQUIPMENTS

HARDWARE

1. Desktop Computers – 30 Nos
2. Laser Printer – 1 No

SOFTWARE

1. Any Text Editor
2. JDK 1.7 or above
3. Java enabled Browser

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

II YEAR

N – SCHEME

IV SEMESTER

4052470 – Relational Database Management System Practical

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052470

Semester : IV

Subject Title : Relational Database Management System Practical

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Relational Database Management Systems Practical	4	64	25	100*	100	3 Hrs.

*** Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

RATIONALE:

The main objective of this practical subject is to provide basic and advanced concepts of MySQL. MySQL is a relational database management system based on the Structured Query Language, which is the popular language for accessing and managing records in the database. MySQL is open-source and free software under the GNU license. This practical includes all topics of MySQL database that provide for how to manage database and manipulate data with the help of various SQL queries.

OBJECTIVES:

On Completion of the following exercise, the students must be able to

- How to install, configure and connect to MySQL server and MySQL workbench inWindows.
- Understand basic concepts of how a database stores information via tables.

- Understand SQL syntax used with MySQL.
- Learn how to retrieve and manipulate data from on or more tables.
- Learn how to filter data based upon multiple conditions.
- Understand the advantages of stored functions and procedures.
- Learn way of connecting to MySQL through PHP, and how to create tables, enter data, select data, change data, and delete data. Connect to SQL server and other data sources.

DETAILED SYLLABUS

Contents: Practical

PART – A

1. Install, configure and connect to MySQL server and MySQL workbench in windows.Create a database, backup and restore the database.
2. To study Basic MySQL commands (create database, create table, use, drop, insert)and execute the following queries using these commands:
    - Create a database named ‘employee’.
    - Use the database ‘employee’ and create a table ‘emp’ with attributes ‘ename’, ‘ecity’, ‘salary’, ‘enumber’, ‘eaddress’, ‘deptname’.
    - Create another table ‘Company’ with attributes ‘cname’, ‘ccity’, ‘empnumber’in the database ‘employee’.
3. To study the viewing commands (select, update) and execute the following queries using these commands:
    - Find the names of all employees who live in Chennai.
    - Increase the salary of all employees by Rs.5,000.
    - Change the company city to Chennai where the company name is ‘TCS’.
4. To study the commands that involve compound conditions (and, or, in, not in, between, not between, like, not like) and execute the following queries using thesecommands:
    - Find the names of all employees who live in ‘Chennai’ and whose salary isbetween Rs.20,000 to Rs.30,000.
    - Find the names of all employees whose names begin with either letter ‘A’ or ‘B’.
    - Find the company names where the company city is ‘Chennai’ and thenumber of employees is not between 5000 and 10,000.
    - Find the names of all companies that do not end with letter ‘A’

5. a) Create a database ‘polytechnic_collee’. Create 2 users namely ‘staff’ and ‘student’.
    - Grant all privileges to the user ‘staff’ and grant only ‘create’ privilege to‘student’ user and verify the same.
    - Revoke all privileges to the 2 users and verify the same.

    b) Implement the following transactions control statements.

    i) Commit ii) Rollback iii) Save point
6. Create table ‘author’ with the following structure

    author_id

    author_name

    address

    mobile

    book_title

    pages

    published_on

    i) Insert 4 books published by 3 authors each. (12 records)

    ii) Fetch all the rows and observe how the data duplicated.

    iii) Apply 1st and 2nd normal forms to fix it.
7. To study the commands for views and execute the following queries using thesecommands:
    - Create a view having ename and ecity
    - In the above view change the ecity to ‘Chennai’ where ename is ‘John’.
    - Create a view having attributes from both the tables.
    - Update the above view and increase the salary of all employees of ITdepartment by Rs.1000.
8. Create a library table with proper fields. Create another table called library1 and insert rows from library table.

    Hint:

    CREATE TABLE new_table LIKE original_table;

    INSERT INTO new_table SELECT * FROM original_table;

PART – B

9. Create a table to store the details of a customer in a Bank. Do some transactions likewithdrawal, deposit. Find the Balance amount(Credit Limit). Based on customer’s credit limit, write a program using **IF** or **CASE** flow control statements to find the customer levels namely SILVER, GOLD or PLATINUM.

If the Credit limit is

- greater than 50K, then the customer level is PLATINUM
- less than 50K and greater than 10K, then the customer level is GOLD
- less than 10K, then the customer level is SILVER

10. Create two tables with the following structure.

a) users - table name

user_id - UNSIGNED, INT, AUTO INCREMENT, PRIMARY KEY

username - VARCHAR (60)

password - VARCHAR (128)

email - VARCHAR (255)

b) users_profiles

user_id - FOREIGN KEY refers to user_id field of user table

first_name - VARCHAR(60)

last_name - VARCHAR(60)

mobile - VARCHAR(15)

i) SELECT all the users along with their profile details. (Hint: Use INNER JOIN)

ii) SELECT the users who do not have profiles (Hint: USE LEFT JOIN andexclude the rows generated with NULL values from joining table)

11. Create an employee database and create a stored procedure that accepts employee_Id as input and returns complete details of employee as output.

12. Create two tables with the following structure

Authors

author_id - INT

name VARCHAR (60)

titles_count INT -- holds the total number numbers of titles authored.

Titles

author_id - INT

name VARCHAR (512) -- name of the title

a. Create a trigger to update the titles count field of respective row in authors tableeach time a title gets inserted into titles table.

b. Create **log table** with the following structure

author_id — INT

name VARCHAR (512) -- name of the title

status VARCHAR(25) --- ADDITION,DELETION,UPDATION

and insert an entry in that table each time the tile is added, deleted or updated.Use a trigger to accomplish this.

13. Create a table containing phone number, user name, address of the phone user.Write a function to search the address using phone number.

14. Create a table to store the salary details of the employees in a company. Declare the cursor id to contain employee number, employee name and net salary. Use cursor toupdate the employee.

15. Write a program to connect PHP with MySQL and create a database using PHP MySQL.

BOARD EXAMINATION

NOTE:

Students should write one program from **PART A** and one program from **PART B.**

DETAILLED ALLOCATION OF MARKS

Writing answer for any one program from PART – A	20 Marks
Writing answer for any one program from PART – B	25 Marks
Executing program (PART – A)	20 Marks
Executing program (PART – B)	20 Marks
Result with printout (PART – A)	5 Marks
Result with printout (PART – B)	5 Marks
VIVA – VOCE	05 Marks
TOTAL	**100 Marks**

LIST OF EQUIPMENTS

HARDWARE

1. Desktop Computers – 30 Nos
2. Printer – 1 Nos

SOFTWARE

1. mysql 5.5.20

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

III YEAR

N – SCHEME

IV SEMESTER

4052510 – Python Programming

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052510

Semester : V

Subject title : Python Programming

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per Semester: 16 Weeks

Subject	Instructions		Examination			Duration
	Hours/ Week	Hours / semester	Internal Assessment	Board Examination	Total	
Python Programming	5 hrs	80 Hrs	25	100*	100	3 Hrs

***Examination will be conducted for 100 marks and it will be reduced to 75 marks.**

Topics and Allocation of Hours

Unit	Topic	Hours
I	INTRODUCTION	14
II	CONTROL STRUCTURE AND FUNCTIONS	15
III	STRINGS AND LISTS	14
IV	TUPLE, SET,DICTONARIES	15
V	FILES AND EXCEPTION HANDLING	15
TEST AND MODEL EXAM		7
TOTAL		80

RATIONALE:

To introduce the student to the basic features of industry standard programming language and impart skills to develop industry standard solutions to the problems. The python language is one of the most accessible programming languages available because it has simplified syntax and not complicated, which gives more emphasis on natural language. Due to its ease of learning and usage, python codes can be easily written and executed much faster than other programming languages. Python has several modules to write programs to solve Artificial Intelligence, Machine Learning, Data Analysis problems. Python is a cross-platform language used by many leading organizations such as Google and NASA.

OBJECTIVES:

On completion of the following units of syllabus contents, the students must be able to

- To read and write simple Python programs.
- To develop Python programs with conditionals and loops
- To define Strings in Python and operations on String.
- To define Python functions and call them.
- Decompose a Python program into functions.
- Represent compound data using Python lists, tuples, dictionaries.
- To use Python data structures –- lists, tuples, dictionaries.
- To do input/output with files in Python.
- To do exception handling in Python

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DETAILED SYLLABUS

Content: Theory

UNIT	Name of the Topics	Hours
I	**Introduction to Python** **Features of Python** - Installing and running Python - interpreter and Interactive mode - Identifiers - Reserved Keywords - Variables - Comments in Python **Data Types** – Numeric, String, List, Sets, Tuple, Dictionary, Boolean; Operators – Arithmetic, Relational, Assignment, Logical, Bitwise, Membership operator, identity operator. Statements and Expressions, String Operations; Boolean Expressions, Data Type Conversion, Type coercion; Input from keyboard - input function, raw_input function, Mutable and immutable Objects; Illustrative programs.	**4** **4** **5**
II	**Decision Making, Control structure and Functions** **Decision Making** – Simple if, if…else and if … elif statement;Control Statement - for loop, range(), while, break , continue, pass **Functions:** Built in functions-Mathematical functions , Date and Time, dir(), help() Functions; User defined functions-Return values, parameters and arguments, function calls, local and global scope, function composition, recursion, anonymous functions. Writing Scripts in Python; Illustrative programs.	**5** **5** **5**
III	**Strings and Lists** **Strings :**Strings in python, String functions and methods, string slicing, immutable property, string Traversal, Escape Characters, string formatting operators and functions. **Lists —** Creation of List, values and accessing elements, mutable property, Traversing a List, copying the list, altering values, deleting elements from list. Built-in List operators and built-in methods. Illustrative Programs	**5** **5** **4**

IV	**Tuples and Dictionaries**: **Tuples**-creating, accessing values, immutable property, assignment of tuples, returning tuples, tuples as arguments - variable length arguments - basic tuple operations, Built-in tuple functions. **Dictionaries:** Creating a Dictionary , accessing values, updating dictionary, deleting elements from dictionary; dictionary keys-Properties, operations in Dictionary, Built-in dictionary methods, Illustrative Programs.	**8** **7**
V	**Files and Exception Handling** **Files:** Text files, opening a file, closing a file, reading from a file and writing into a file, file opening modes, closing a file, File Object Attributes, File positions, renaming, deleting a file and files related methods. **Directory :**Directory methods – mkdir(), chdir(), getcwd(), rmdir(). **Exceptions in Python:** Definition - Built-in exceptions, Handling Exceptions-try…except, except with No Exception, except with Multiple Exceptions, try…finally; User defined exceptions. Illustrative programs	**7** **2** **6**

REFERENCES

S.No	Title	Author	Publisher	Year of Publishing Edition
1	Introduction to Computing and Problem Solving using Python	E.Balagurusamy	McGraw Hill Education(India) Pvt. Ltd.	1st Edition / 2016
2.	Learning Python Programming	Jeffrey Elkner, Allan B. Downey, Chris Meyers	Samurai Media Limited.	2016
3.	Taming Python By Programming	Jeeva Jose	Khanna Book Publishing Co(P) Ltd	2017 Reprinted 2019
4.	Python Programming	Ashok Namdev Kamthane and Amit Ashok Kamthane	McGraw HillEducation(India) Pvt. Ltd.	2018
5.	Learn and Practice Python programming	Swapnil Saurav	Eka Publishers	2nd Edition/ 2020
6.	Programming in Python	Dr.Pooja Sharma	BPB Publications	2017

Python Online Learning Resources:

https://www.learnpython.org

www.python.org ,

https://www.tutorialspoint.com/python

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

III YEAR

N – SCHEME

V SEMESTER

4052520 – Cloud Computing and Internet Of Things

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052520

Semester : V

Subject Title : Cloud Computing and Internet Of things.

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Cloud Computing and Internet Of things.	6	96	25	100*	100	3 Hrs.

*** Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

Topics and Allocation of Hours

UNIT	Topic	Hrs.
I	INTRODUCTION TO CLOUD COMPUTING	16
II	CLOUD COMPUTING ARCHITECTURE AND SERVICES	17
III	SECURITY IN THE CLOUD	16
IV	INTRODUCTION TO INTERNET OF THINGS	20
V	INTERNET OF THINGS PLATFORM: DESIGN AND DEVELOPMENT	20
Test and Model Exam		7
Total		**96**

RATIONALE:

The course aims to groom the students to enable them to work on current technology scenarios: in specific about the Cloud Computing as well as Internet of Things and prepare the students to keep pace with the changing face of technology and the requirements of the growing IT industry. The course curriculum has been designed keeping in view the emerging trends in advanced Cloud Computing as well as IoT and futuristic human resource requirements of the IT industry.

OBJECTIVES:

- To understand an overview of the basic concepts of cloud Computing;
- To understand the highlight and advantages of deploying cloud Computing;
- To know the practical adoption of a cloud deployment through real life case studies.
- To Know the Advantages and limitations of cloud Computing and List the benefits of cloud computing
- To understanding Cloud architecture
- To Know the Cloud services and benefits
- To address the security issues in cloud
- To assess the vision of IoT
- To understand the dynamic, self-configuring and inter-operable network of things
- To understand the design and development methodology for IoT domains.
- To build simple IoT systems using Raspberry Pi

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DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topics	Hours
I	**INTRODUCTION TO CLOUD COMPUTING**	
	Cloud computing overview – Origins of Cloud computing – Cloud components -Essential characteristics – on-demand self-service, Broad network access, Location independent resource pooling, Rapid elasticity, measured service	5
	Architectural influences — High-performance computing, utility and enterprise grid computing, Autonomic computing, Service consolidation, Horizontal scaling, Web services, High scalability architecture	6
	Cloud scenarios– Benefits - scalability, simplicity, vendors, security. Limitations – Sensitive information, Application development – Security concerns -privacy concern with a third party, security level of third party, security benefits. Regularity issues – Government policies	5
II	**CLOUD COMPUTING ARCHITECTURE & SERVICES**	
	Cloud architecture: Cloud delivery model – SPI framework, SPI evolution, SPI vs. traditional IT Model.	3
	Software as a Service (SaaS): SaaS service providers – Web Services – Web 2.0 – Web Operating system -Google App Engine, Salesforce.com and google platform – benefits – Operational benefits, Economic benefits – Evaluating SaaS	3
	Platform as a Service (PaaS): Cloud Plat form & Management — Computation& Storage - PaaS service providers — Right Scale — Salesforce.com – Rackspace - Force.com – services and benefits.	3
	Infrastructure as a Service (IaaS): IaaS service providers –Amazon EC2, GoGrid – Microsoft implementation and support – Amazon EC service level agreement – recent developments – benefits.	4
	Cloud deployment model: Public clouds – private clouds – community clouds – hybrid clouds - Advantages of Cloud computing.	4
III	**SECURITY IN THE CLOUD**	
	3.1 Understanding Cloud Security - Securing the Cloud - Security service boundary: CSA Cloud Reference Model - Securing Data — Brokered cloud storage access - Storage location and tenancy – Encryption	8

	3.2 Cloud Computing Security Challenges - Security Policy Implementation - Policy Types - Virtualization Security Management - Virtual Threat	8
IV	**INTRODUCTION TO INTERNET OF THINGS** Definition and characteristics of IOT - Physical design of IOT - Things in IOT- IOT Protocols- Logical Design of IOT - IOT functional blocks- IOT communication Models - IoT communication API's	7
	IOT enabling Technologies: Wireless sensor networks — Cloud Computing- Big Data Analytics- Communication protocols- embedded systems.	6
	IOT Levels and Deployment templates: IOT Level-1- IOT Level-2- IOT Level-3-IoT Level-4 - IOT Level-5- IOT Level-6	7
V	**IOT PLATFORMS : DESIGN AND DEVELOPMENT** Introduction- IOT Design and Methodology- Purpose and requirements specification- Process specification- Domain model specification- Information model specification- service Specification - IoT level specification- functional view specification -Operational view specification - Device and component integration- application development.	10
	What is an IOT device? - Basic Building blocks of an IoT Device - Exemplary Device: Raspberry Pi - About the Board - Linux on Raspberry Pi- Raspberry Pi Interfaces- Other IOT devices.	10

Reference Books

1	CLOUD SECURITY: A Comprehensive Guide to Secure Cloud Computing	Ronald L. Krutz Russell Dean Vines	Wiley Publishing, Inc
2	Cloud Computing A Practical Approach 2008 Edition	Cloud Computing A practical Approach	Tata McGrawHill
3.	Cloud Computing Bible	Barrie Sosinsky	Wiley Publishing, Inc
4	Internet of Things — A Hands on Approach	By Arshdeep Bahga and Vijay Madisetti	Universities Press, ISBN: 9788173719547
5	Designing the Internet of Things	Adrian McEwen & Hakim Cassimality	Wiley India, ISBN: 9788126556861

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

III YEAR

N – SCHEME

V SEMESTER

4052531 – Elective Theory I

Component Based Technology

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052531

Semester : V

Subject Title : Elective Theory – I Component Based Technology

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
			Marks			Duration
	Hours / Week	Hours / Semester	Internal Assessment	Board Examinations	Total	
Component Based Technology	**5**	**80**	**25**	**100***	**100**	**3 Hrs.**

*** Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

Topics and Allocation of Hours

UNIT	Topic	Hrs.
I	INTRODUCTION TO .NET FRAMEWORK AND C#.NET	15
II	APPLICATION DEVELOPMENT USING C#.NET	15
III	APPLICATION DEVELOPMENT USING ADO.NET	15
IV	INTRODUCTION TO ASP.NET	14
V	XML	14
Test and Model Exam		7
Total		80

RATIONALE:

.NET Framework is changing the way developers write applications. .NET Framework provides a number of components to create many types of applications including those for consoles, Windows, mobile units and the web. Using .NET framework the data can be made available anytime, anywhere and on any device.This subject introduces the basics of .NET Framework. Writing applications on C#.Net is covered in this course. Concepts of developing Window applications using C#.NET. Concepts of developing web applications using ASP.NET are discussed. This course helps to use ADO.NET to write the applications to connect with the back end database. The subject also enables the users to know the concepts of XML and the XML web services.

OBJECTIVES:

On completion of the following units of syllabus contents, the students must be able to

- List the major elements of the .NET Framework and describe some of the major enhancements to the new version of C#.
- Describe the basic structure of a C#.NET project and use the main features of the integrated development environment (IDE).
- Use the new language features and syntax in C# .NET.
- Explain and use the basic concepts and terminology of object-oriented design and programming in C#.NET.
- Use the basic concepts and terminology of object-oriented in C# .NET.
- Create applications by using Microsoft Windows Forms.
- Create applications that use ADO.NET.
- List down the features of ASP.NET.
- Create web controls using ASP.NET.
- Learn about server controls and events in ASP.NET.
- Set up and deploy various types of C# .NET-based applications.
- Develop Window applications using XML as back end database

DETAILED SYLLABUS

Unit	Name of the Topics	Hours
I	**INTRODUCTION TO .NET FRAMEWORK and C#.NET**	**15**
	Chapter: 1.1: Introduction to .NET framework and DOT NET CORE: Features of .NETframework, Features of .NET CORE,.Net Architecture – Managed Code and the CLR –Intermediate Language, Metadata and JIT Compilation–Automatic Memory Management. – Assembly, .NET objects, .NET web services, .net core Vs.net framework,	3
	Chapter: 1.2: Visual Studio .NET – Features, Using the .NETFramework, Exploring the Visual Studio Integrated Development Environment – System requirements – Versions	3
	Chapter: 1.3: INTRODUCTION TO C#.NET-- Variables and constants –data types– declaration. Operators– types– precedence – Expressions — Program flow — Decision statements — if .. then, if..then..else, switch..case, Loop statements– while, do...while, for..next, for..each..next, LINQ.	4
	Chapter: 1.4: Types: Value data types – Structures, Enumerations. Reference data types – Single dimensional– Multi-dimensional arrays– Jagged arrays– Dynamic arrays	3
	Chapter: 1.5: Classes & objects – Creating and using your own classes – Data members and member methods – Instantiate an object, abstract class – static class	2
II	**APPLICATION DEVELOPMENT USING C#.NET**	**15**
	Chapter: 2.1: Windows programming– Creating windows Forms– Working with Toolbox Controls – Button, Check Box, Combo Box, Label, List Box, Radio Button, Text Box, Group Boxes, Picture Box	4
	Chapter: 2.2*:* Advanced Controls & Events : Timer , Progress Bar, Month Calendar , ToolTips, Tab Controls, Panels -Events–Click, Close, Deactivate, Load, MouseMove, Mouse Down, MouseUp, Keypress ,KeyDown, KeyUp	3

	Chapter: 2.3: **Multiple Document Interface (MDI) Forms —** Creating MDI Applications – Creating MDI Child Windows –Arranging MDI Child Windows	4
	Chapter: 2.4: Menus and Dialog Boxes — Creating menus — Menu items – Creating Submenus , Menu Shortcuts, Context menu – Using dialog boxes – show Dialog() method.	4
III	**APPLICATION DEVELOPMENT USING ADO.NET**	**14**
	Chapter: 3.1: Features of ADO.NET. Architecture of ADO.NET – ADO.NET providers — Connection — Command — Data Adapter — Dataset.	5
	Chapter: 3.2: Accessing Data with ADO.NET: Connecting to Data Table data using Command Objects – Understanding Data Set and working with Data Column and DataRow – Data Tables - Working with Data Grid View	5
	Chapter: 3.3: Create an ADO.NET application — Using Stored Procedures	4
IV	**INTRODUCTION TO ASP.NET**	**14**
	Chapter: 4.1: ASP.NET Features: ASP .Net Life cycle, View state, session state, Change the Home Directory in IIS – Add a Virtual Directory in IIS Set a Default Document for IIS — Change Log File Properties for IIS — Stop, Start, or Pause a Web Site — Global.asax file	4
	Chapter: 4.2: Creating Web Controls: Web Controls – HTML Controls, Using Intrinsic Controls, Using Input Validation Controls, Selecting Controls for Applications – Adding web controls to a Page	4
	Chapter: 4.3: Creating Web Forms: Server Controls – Types of Server Controls – Adding ASP.NET Code to a Page.	3
	Chapter: 4.4: .NET CORE WEB API : What's web API?, Web API features, Restful services, Method of REST	3
V	**XML**	**14**
	Chapter: 5.1: Introduction: Advantages – HTML Vs XML – Browsing and parsing XML — Creating a XML file – Data island – Well formed XML document – XML components: elements – Entities – Comments - Processing instructions – Attributes	5

	Chapter: 5.2: DTD: Declarations in DTD: Element, Attribute, Entity and Notation – Construction of an XML document – XML Namespaces – Declaring namespaces – Default namespaces – XML schema – Need and use of Schema — Building blocks — Simple elements — Defining attributes – Complex elements	5
	Chapter: 5.3: XML with .NET: XML Serialization in the .NET Framework – SOAP Fundamentals- Using SOAP with the .NET Framework.	4

Reference Books

S.No	Author Name	Title	Publisher
1.	Douglas J. Reilly	Designing Microsoft ASP.NET Applications	Microsoft Press
2.	ISRD Group	Applicationsof.NET Technology	TMGH Education PvtLtd.,New Delhi
3.	E. Balagurusamy	Programming In C#, 3E	Tata McGraw-Hill Education,
4.	Rebecca M. Riordan	ADO NET 2 0 Step by Step	
5.	David S. Platt	Introducing Microsoft .NET	Microsoft Press
6.	-	Introduction to Microsoft ASP.NET - Work Book	Microsoft Press

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DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

III YEAR

N – SCHEME

V SEMESTER

4052532 – Elective Theory I

Artificial Intelligence and Data Analytics

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052562

Semester : V

Subject title : Elective Theory -I Artificial Intelligence and Data Analytics

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per Semester 16 Weeks

Subject	Instructions		Examination			
Artificial Intelligence and Data Analytics	Hours/ Week	Hours/ Semester	Marks			Duration
	5	80	Internal Assessment	Board Examination	Total	
			25	100 *	100	3 Hrs

*** Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

Topics and Allocation of Hours

Unit No.	Topic	No. of Hours
I	Artificial Intelligence	15
II	Introduction to Machine Learning	14
III	Data Analytics and NumPy Library	15
IV	Data Analysis with Pandas	15
V	Visualization with Matplotlib	14
Test and Revision		7
Total		80

RATIONALE:

This course provides the foundations for AI problem solving techniques and data analytics and articulates the different dimensions of these areas. The syllabus is designed to provide exposure to the theory as well as practical systems and software used in data analysis. This course explains fundamental data science techniques and the various Python programming packages required for data science.

OBJECTIVES:

After studying this subject students will be able

- To understand the fundamentals of Artificial Intelligence and its importance.
- To understand the techniques used in AI.
- To understand how the knowledge is represented, and the characteristics of intelligent agents.
- To Identify and formulate appropriate AI methods for solving a problem.
- To understand some of the search strategies and the constraint satisfaction problems.
- To understand the principles of Machine Learning.
- To explore some of the real-world applications of Machine learning techniques.
- To understand a range of topics and concepts related to data analytics.
- To familiarize with the Python NumPy library for array processing.
- To utilize the Pandas packages in Python for exploratory data analytics.
- To create informative visualizations with matplotlib to identify patterns.

DETAILED SYLLABUS

Unit	Name of the Topics	Hours
I	**Artificial Intelligence**	**15**
	1.1 Artificial Intelligence: What is AI?-Types of AI-History of AI-Turing Test- Structure of AI-Goals of AI-Importance of AI-Techniques used in AI-Perception, Understanding and Action**-** Technological drivers of modern AI.	**4**
	1.2 Knowledge: Definition-Knowledge Representation-objectives and requirements-practical aspects of representation-Components **Intelligent Agents**: Agents and Environments-Properties of environments-characteristics of agents- classification of agents -	**4**
	1.3 Problem Solving: Problem Formulation-Goal Formulation-State Space Search-Search Problem-Basic search algorithm-Search Tree-Search strategies –Uninformed and informed search-Breadth First Search, Depth First Search, Best First Search-Constraint Satisfaction Problem (CSP)-Backtracking Search. Problem Definitions: N Queen Problem, 8 Puzzle Problem, Tic-Tac-Toe.	**7**
II	**Introduction to Machine Learning**	**14**
	2.1 Learning: Strategies of Learning- Learning Model**-** Classes of Learning (Supervised, Unsupervised, Reinforcement)- Process of ML- Common types of ML algorithms.	**5**
	2.2 Neural Network: Biological and Artificial, Mathematical model of a neuron	**3**
	2.3 Machine Learning Applications: Learning Associations, Regression, Classification, Prediction-Natural Language Processing (NLP)- Automatic Speech Recognition (ASR)- Machine Vision-Robotics.	**6**
III	**Data Analytics and Computing with NumPy**	**15**
	3.1 Data Analytics: Data-Types of Data- Importance of Data- Data Analysis Vs Data Analytics-Types of Data Analytics- Elements of Analytics- Data Analysis Process- Qualitative and Quantitative analyses- Open-Source Data.	**4**
	3.2 Introduction to Python: Features of Python-Installing Python-	**5**

	Python IDEs- PyPI Python Package Index- Pip Python package manager- Importing Libraries and Functions- Python data structures (list, set, tuple, dict)- Functional programming (map, filter, reduce, lamda, list comprehension).	
	3.3 NumPy Library: Introduction- Installation- Ndarray: creating an array, intrinsic creation of an array, Data types- basic operations- aggregate functions- Indexing, slicing, Iterating- Conditions and Boolean arrays- Array manipulation: Joining, splitting, shape changing, sorting- Structured arrays- Reading and Writing array data on a File.	**6**
IV	**Data Analysis with Pandas**	**15**
	4.1 Introduction: Pandas data structures: **Series** - Declaration, selecting elements, assigning values, Filtering values, operations, mathematical functions, evaluating values, Handling missing data, creating series from dictionaries, adding two series.	**5**
	4.2 Data Frame: Defining, Selecting elements, assigning values, membership, deleting a column, filtering. **Index Objects**: Indexing, Reindexing, Dropping- sorting and ranking- Descriptive Statistics	**4**
	Data Loading: Reading and Writing csv, xls, text data files- **Data Cleaning and Preparation**: Handling missing data, Removing duplicates, replacing values- Vectorized String Methods- Hierarchical Indexing- Merging and Combining- Data aggregation and Grouping.	**6**
V	**Visualization with Matplotlib**	**14**
	5.1 Data Visualization: Introduction to Matplotlib -PyPlot package- Figures and Subplots-showing plots and images	**4**
	5.2 Customizing Plots: Colors, Markers, Line Styles, Limits, Tics, Labels, Legends, Grids - Annotating with text-Matplotlib configuration	**4**
	5.3 Chart types: Line, Bar, stacked bar, Box plots, pie chart - Histogram and Density plots- Scatter plot- Saving Plots to a file- Close and clear plots.	**6**

Reference books

1. Tom Taulli - Artificial Intelligence Basics.
   A Non-Technical Introduction-A press (2019)
2. Chowdhary K.R - Fundamentals of artificial intelligence-Springer (2020)
3. Stuart J.Russell,Peter Norvig- Artificial Intelligence A Modern Approach-(Prentice Hall- 2010, Edition 3)
4. NPTEL Web Content-Artificial Intelligence, Prof.P.Mitra, Prof.S.Sarkar, IIT Kharagpur (Link: https://nptel.ac.in/courses/106/105/106105078/)
5. Fabio Nelli, Python Data Analytics, APRESS, 2015
6. Wes McKinney, Python for Data Analysis: Data Wrangling with Pandas, NumPy,and IPython, O'REILLY 2018, Second Edition

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

III YEAR

N – SCHEME

V SEMESTER

4052533 – Elective Theory I – Mobile Computing

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052533

Semester : VI

Subject : Elective Theory -I Mobile Computing

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per Semester 16 Weeks

Subject	Instructions		Examination			
Mobile Computing	Hours/ Week	Hours/ Semester	Marks			Duration
	5	80	Internal Assessment	Board Examination	Total	
			25	100 *	100	3 Hrs

*** Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

Topics and Allocation of Hours

Unit No.	Topic	No. of Hours
I	Introduction to Mobile Computing	14
II	Mobile and Smart TV OS	14
III	Android Development Environment	15
IV	Basic and Advanced Views	15
V	Location Based Services and SQLite	15
Test and Revision		07
Total		80

RATIONALE:

Mobile Application development is the very hot business domain. Majority of the corporate have a separate division for the development of mobile applications. It is imperative that students must know the way to apply advanced data communicating methods and networking protocols for wireless and mobile devices.

Students must utilize and employ application frameworks for developing mobile applications including under disconnected and weakly connected environment. They should be in a position to select components and networks for particular application , creatively analyze mobile and wireless networks and critically analyze security issues of mobile and wireless computing systems

OBJECTIVES:

Students will be able

- To introduce the characteristics, basic concepts and systems issues in mobile Computing
- To illustrate architecture and protocols in Mobile computing and to identify the trends and latest development of the technologies in the area
- To understand the network protocols governing the mobile communication
- To know the different kinds of mobile OS prevailing in the market
- To know Android OS in detail
- To know Apple iOS and Smart TV OS
- To understand the components of a Mobile App.
- To give practical experience in the area through the development of Mobile apps
- To design successful mobile computing applications and services
- To evaluate critical design tradeoffs associated with different mobile technologies, architectures, interfaces and business models and how they impact the usability, security, privacy and commercial viability of mobile and pervasive computing services and applications
- To know the development of Mobile apps using SQLite database
- To know the cross platform application development tools

DETAILED SYLLABUS

Elective- I Mobile Computing

Unit	Name of the Topics	Hours
I	**Introduction to Mobile Computing**	**14**
	Chapter 1.1 Introduction to Mobile Computing Evolution of Mobile Computing - Important terminologies	4
	Chapter 1.2 Wireless LAN and Protocols WI-FI and WI-MAX , Bluetooth ,RFID, Wi-Fi-Direct, Li-Fi, LTE, and 6LoWPAN , VoLTE	5
	Chapter 1.3 Cellular Network Generations : Features of 1G,2G ,3G ,4G ,5G	5
II	**Mobile and Smart TV Operating System**	**14**
	Chapter 2.1 Mobile Operating Systems : Evaluation of Mobile Operating System-Handset Manufactures and their Mobile OS- Mobile OS and their features. Linux Kernel based Mobile OS	4
	Chapter 2.2Apple Mobile Operating Systems : History and features of Apple Operating Systems - iPadOS, tvOS, and watchOS	3
	Chapter 2.3 Smart TV operating systems Smart TV Operating System development History - versions and their features	3
	Chapter 2.4 Android Operating System : Android Operating System development History - versions and its feature - The various Android devices on the market , The Android Market application store	4
III	**Android Development Environment**	**16**
	Chapter 3.1 Android Development Environment System Requirements, Android SDK, Installing Java, and ADT bundle - Eclipse Integrated Development Environment (IDE), Creating Android Virtual Devices (AVDs) – Android Studio	4

	Chapter 3.2 Android Architecture Android Architecture - The Linux Kernel, Android Runtime - Dalvik Virtual Machine, Android Runtime – Core Libraries, Dalvik VM Specific Libraries, Java Interoperability Libraries, Android Libraries, Application Framework, **Chapter 3.3 Creating a New Android Project** Defining the Project Name and SDK Settings, Project Configuration Settings, Configuring the Launcher Icon, **Chapter 3.4Activity** Creating an Activity, Running the Application in the AVD, Stopping a Running Application, Modifying the Example Application, Reviewing the Layout and Resource Files	4 4 4
IV	**Basic and Advanced Views**	**16**
	Chapter 4.1 Basic Views : Text View, Button, Image Button, EditText, CheckBox, ToggleButton, RadioButton and RadioGroup Views, ProgressBar View, Auto Complete Text View **Chapter 4.2 Advanced Views :** Time Picker View and Date Picker View – List Views – Image View – Menus – Analog and Digital View – Dialog Boxes **Chapter 4.3 Displaying Pictures & Menus with Views:** Image View – Gallery View – ImageSwitcher – GridView - Creating the Helper Methods – Options Menu – Context Menu **Chapter 4.4 SMS and Dailer :** Sending SMS – Receiving SMS – Making phone call	4 4 5 3
v	**Location Based Services and SQLite**	**16**

	Chapter 5.1Location Based Services : Obtaining the Maps API Key- Displaying the Map – Zoom Control –Navigating to a specific location – Adding Marker – Geo Coding andreverse Geo coding **Chapter 5.2 Content Provider and Storage:** Sharing data — view contacts — Add contacts — Modify contacts —Delete Contacts - Store and Retire data's in Internal and ExternalStorage – SQLite - Creating and using databases **Chapter 5.3 Android Service** : Consuming Web service using HTTP , downloading binary Data –Downloading Text Content – Accessing Web Service **Chapter 5.4 Cross Platform App Development :** Cross platform application development tools and their features:	5 5 4 2

REFERENCE BOOK:

1. J. F. DiMarzio (Author) -Beginning Android Programming with Android Studio, 4th Edition (2016) - Wiley

2. Wei-MengLee -Beginning Android 4 Application Development,2012 - Wiley India Edition

3 Asoke K Talukder,Hasan Ahmed, Roopa R Yavagal Mobile Computing,2005 - MGH

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

III YEAR

N – SCHEME

V SEMESTER

4052540 – Python Programming

Practical

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052540

Semester : V Semester

Subject : Python Programming Practical

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 Weeks

Subject	Instructions		Examination			Duration
	Hours/ Week	Hours / semester	Internal Assessment	Board Examination	Total	
Python Programming Practical	4	64	25	100*	100	3 Hrs

*** Examination will be conducted for 100 marks and it will be reduced to 75 marks.**

RATIONALE:

To write, debug and run programs in Python to understand the basic concepts of industry standard modern programming language.

Objectives:

- To write, test and debug simple Python programs
- To Implement Python Programs with conditionals and Loops
- To use functions for structuring Python Programs
- To implement string manipulation functions using Python Program
- To implement List and its built-in functions and methods
- To implement Tuples and passing tuple as arguments
- To create Python Dictionaries and updating Dictionaries

- To develop programs to read and write data from or to files in Python
- To Develop programs with Exception Handling

DETAILED SYLLABUS

Contents: Practical

PART – A

1. i) Write a Python program to compute GCD of two numbers
   ii) Write a Python Program to print prime numbers in the given range.
2. i) Write a Python Program to check the given year is leap year or not.
   ii) Write a Python Program to print Armstrong numbers between given range.
3. i) Write a Python Program to do basic trim and slice operations on String.
   ii) Write a Python Program to accept line of text and find the number ofcharacters, vowels and blank spaces on it
4. i) Write a Python Program using function to display all such numbers which is divisible by 3 but are not multiple of 5 in a given range.
   ii) Write a Python Program using recursion to print ‘n’ terms in Fibonacci series.
5. Write a Python Program to add ‘ing’ at the end of a given string if the string has 3 or more characters . If the given string is already ends with ‘ing’ then add ‘ly’ instead. If the string has less than 3 characters, leave it unchanged.
6. Write a Python program to find minimum and maximum of a list of numbers
7. Write a Python program to display a list in reverse order.
8. Write a Python Program to print the first half values of tuple in one line and last half values in next line.

PART – B

9. Write a Python Program to take a list of words and return the length of the longest one using string.
10. Write a Python Program to find an element in a given set of elements using Linear Search
11. Write a Python Program to sort a set of elements using Selection sort.
12. Write a Python Program to multiply two matrices.
13. Write a Python program to demonstrate different operations on Tuple.

14. Write a Python Program to demonstrate to use Dictionary and related functions.
15. Write a Python Program to copy file contents from one file to another and display number of words copied.

BOARD EXAMINATION

Note:
Students should write one program from **PART A** and one program from **PART B.**

DETAILED ALLOCATION OF MARKS

SCHEME OF VALUATION		
1.	Any one program from PART - A	20 Marks
2.	Execution	20 Marks
3.	Result with Print out (Part A)	5 Marks
4.	Any one program from PART - B	25 Marks
5.	Execution	20 Marks
6.	Result with Print out (Part B)	5 Marks
7.	Viva voce	5 Marks
TOTAL		**100 Marks**

LIST OF EQUIPMENTS

HARDWARE:

1. Desktop Computers - 30 Nos.
2. Printer – 1 No

SOFTWARE:

1. Windows / Linux Operating System
2. Python (to run as interactive mode and IDLE mode)

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

III YEAR

N – SCHEME

V SEMESTER

4052550 – Cloud Computing and Internet of Things Practical

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4053550

Semester : V

Subject Title : Cloud Computing and Internet of Things Practical

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Cloud Computing and Internet of Things Practical	4	64	25	100*	100	3 Hrs.

*** Examinations will be conducted for 100 marks and it will be reduced to 75marks.**

RATIONALE:

1. To understand the Key concepts of virtualization.
2. To implement the various deployment models such as private, public, hybrid and community with SaaS, Iaas and Paas.
3. To train student show to design and program the Cloud based IoT based system.
4. To understand innovative application's needs such as Smart City, Smart Health, Smart Manufacturing, Smart Agriculture, etc.
5. To build industry capable talent, start-up community and entrepreneurial ecosystem for IoT.

OBJECTIVES

On completion of the following exercises, the students must be able to

1. Adapt different types of virtualization and increase resource utilization.
2. Build a private cloud using open source technologies.
3. Explain the concept and Application of Internet of Things
4. Application of IOT in automation of Commercial and Real-World examples
5. Design a simple IOT system comprising sensors, edge devices and wireless network connections involving prototyping, programming and data analysis.

LIST OF EXPERIMENTS

Experiment No.	Part – A : List of Experiments Performed for Cloud Computing
1	To implement program on SaaS to Create an word document of your class time table and store locally and on cloud with doc and pdf format
2	To implement program on SaaS to Create a spread sheet to generate a mark sheet for student progress report.
3	To implement web services by create your BlogSpot and Collaborating via Wikis
4	To implement on PaaS to Install Google App Engine, create a program to validate user; create a database login(username, password)in mysql and deploy to cloud
5	Install Virtual box / VMware Workstation with different flavours of linux or windows OS on top of windows7 or 8.
6	Install OpenStack and use it as Infrastructure as a Service and use technology own Cloud.
7	Case Study on any one Open source and commercial Cloud-Microsoft Azure , Eucalyptus , Amazon EC2

Experiment No.	Part – B : List of Experiments Performed for IoT
8	To implement LED Blink and LED Pattern With Arduino
9	To implement LED Pattern with Push Button Control With Arduino
10	To display “Hello World “ in LCD 16X2 Display With Arduino
11	To implement the Servo Motor Control with Arduino
12	To implement and monitor the LM35 Temperature Sensor and Ultrasonic Distance Measurement With Arduino
13	To implement the IR Sensor Analog Input With Arduino
14	Using ThinkSpeak Cloud Reading Temperature Sensor Monitoring with NodeMCU /Raspberry Pi

BOARD EXAMINATION

Note:
Students should write one program from **PART A** and one program from **PART B.**

DETAILED ALLOCATION OF MARKS

SCHEME OF VALUATION		
1.	Any one program from PART - A	20 Marks
2.	Execution (Part A)	20 Marks
3.	Result with Print out (Part A)	5 Marks
4.	Any one program from PART - B	25 Marks
5.	Execution (Part B)	20 Marks
6.	Result (Part B)	5 Marks
7.	Viva voce	5 Marks
TOTAL		**100 Marks**

LIST OF EQUIPMENTS

Software Requirement:

1. Arduino SDK

Components Requirement:

1. Arduino kit - 10 Numbers
2. Node MCU / Raspberry Pi - 10 Numbers
3. LED Blub – 10 Numbers
4. 330K Resistor - 10 Numbers
5. Push Button - 10 Number
6. Servo Motor 5 V DC - 10 Numbers
7. 5V DC Relay - 10 Numbers
8. Mini Bread Board - 10 Numbers
9. 16x2 LCD Display - 10 Numbers
10. IR Sensor - 10 Numbers
11. LM35 Temperature Sensor- 10 Numbers
12. Connecting Wires

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

III YEAR

N – SCHEME

V SEMESTER

4052561 – Elective Practical I

Component Based Technology Practical

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052561

Semester : V

Subject Title : Elective Practical I – Component Based Technology Practical

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Component Based Technology Practical	**4**	**64**	**25**	**100***	**100**	**3 Hrs.**

*** Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

OBJECTIVES:

. On completion of the following exercises, the students must be able to

- Develop and execute simple programs using C#.NET
- Understand the concepts of event handlers.
- Know the usage of various C#.NET controls
- Create C#.NET applications using menus.
- Access SQL database by using ADO.NET
- Use Form controls.
- Create Window applications using C#.NET form controls
- Use web controls.
- Create web pages using ASP.NET
- Develop XML database handling methodologies

DETAILED SYLLABUS

Exercise

PART- A

1. Accept a character from console and check the case of the character.
2. Write a program to accept any character from keyboard and display whether it is vowel or not.
3. Write a program to implement a calculator with memory and recall operations.
4. Develop a form in to pick a date from Calendar control and display the day, month, and year details in separate text boxes.
5. Develop a application using the File and Directory controls to implement a common dialog box
6. Develop a database application to store the details of students using ADO.NET
7. Create a simple ASP.NET page to Output Text with a form, two HTML text boxes, an HTML button, and an HTML element. Create an event procedure for the button.

PART B

1. Develop a menu based application to implement a text editor with cut, copy, paste, save and close operations with accessing and shortcut keys.
2. Develop an application to perform timer based quiz of 5 questions.
3. Develop a database application using ADO.NET to insert, modify, update and delete operations.
4. Develop a application using Datagrid to add, edit and modify records.
5. Develop a web application to input data through a web form to a database andvalidate the data. Use the Required Field Validator and RangeValidator Controls.
6. Develop a Window application to read an XML document containing subject, mark scored, year of passing into a Dataset
7. Develop a Window application to read students records from Database using ADO.NET and generate XML document containing students records

BOARD EXAMINATION

Note:

One from PART-A and one from PART-B

DETAILLED ALLOCATION OF MARKS

Writing answer for any one program from PART - A	20 Marks
Writing answer for any one program from PART - B	25 Marks
Executing program (PART – A)	20 Marks
Executing program (PART – B)	20 Marks
Result (PART – A)	5 Marks
Result (PART – B)	5 Marks
VIVA - VOCE	5 Marks
TOTAL	100 Marks

LIST OF EQUIPMENTS

HARDWARE REQUIREMENT	**SOFTWARE REQUIREMENT**
1. Desktop Computers – 30 Nos 2. Printer – 1 No	1.Visual Studio 2008/2012/2013/2015 2.Microsoft SQL Server 2005/2008 or above

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

III YEAR

N – SCHEME

V SEMESTER

4052562 – Elective Practical I

Data Analytics using Python Practical

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052562

Semester : V

Subject Title : Data Analytics Using Python Practical

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Data Analytics Using Python Practical	4	64	25	100*	100	3 Hrs.

*** Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

RATIONALE:

This course provides the students the foundations for data analytics with python. The syllabus is designed to provide exposure to practical systems and software used in data analysis. The course explains data science techniques and the various Python programming packages required to prepare data for analysis, perform data analytics and create meaningful data visualization.

OBJECTIVES:

- To familiarize with the Python NumPy library for array processing.
- To utilize the Pandas packages in Python for exploratory data analytics.
- To explore some of the real world applications of Machine learning techniques.
- To create informative visualizations with matplotlib to identify patterns.

DETAILED SYLLABUS

4052562 Data Analytics Using Python Practical

Prerequisite:

- Python : Install Python IDE and important Python Libraries. Install Anaconda and find the features of Jupyter Notebook.
- Data Source:
  https://archive.ics.uci.edu/ml/machine-learning-databases/auto-mpg/
  https://archive.ics.uci.edu/ml/machine-learning-databases/iris/iris.data
  https://www.kaggle.com/arshid/iris-flower-dataset
  https://www.kaggle.com/rohankayan/years-of-experience-and-salary-dataset

PART A

Perform the exercises in PART A using NumPy

1. **Basic data structures in NumPy**
   a. Create a List, set, tuple and dictionary which stores the details of a student (rollno,name , dept, branch, percentage of mark) in Python and print the values.
   b. Convert the list and tuple as NumPy array.
2. **Arrays in NumPy**
   a. Create arrays using different intrinsic methods (ones, zeros, arange, linspace, indice) and print their values.
   b. Check the results of arithmetic operations like add(), subtract(), multiply() and divide() with arrays created using arange and ones intrinsic method.
   c. Check the results of mathematical operations like exp(), sqrt(), sin(), cos(), log(), dot() on an array created using arange intrinsic method.
3. **Built-in functions in NumPy.**
   a. Load your class Marklist data from a csv (comma separated value) file into an array. Perform the following operations to inspect your array. Len(), ndim, size, dtype, shape, info()
   b. Apply the aggregate functions on this data and print the results. (Functions like min(), max(), cumsum(), mean(), median(), corrcoef(), std())

4. Handling Multiple Arrays

a. Create two python NumPy arrays (boys, girls) each with the age of nstudents in the class.
b. Get the common items between two python NumPy arrays.
c. Get the positions where elements of two arrays match.
d. Remove from one array those items that exist in another.
e. Extract all numbers between a given range from a NumPy array.

5. Array Slicing in NumPy

a. Load your class Marklist data into an array called "**marks"** to store students roll_num, subject marks and result.
b. Split all rows and all columns except the last column into an array called "features".
c. Split the marks array into 3 equal-sized sub-arrays each for 3 different subject marks.
d. Split the last column into an array "label".
e. Delete the roll_num column from the marks array and insert a new column student name in its place.

6. Indexing & Sorting in NumPy

a. Load your class Marklist data from a csv file into an array.
b. Access the mark of a student in a particular subject using indexing techniques.
c. Sort the student details based on Total mark.
d. Select a subset of 2D array using fancy indexing (indexing using integer arrays)
e. Print student details whose total marks is greater than 250 using Boolean indexing.

7. Handing Two dimensional array in NumPy

a. Import iris dataset with numbers and texts keeping the text intact into python NumPy.
b. Convert the 1D iris to 2D array (iris2d) by omitting the species text field.
c. Find the number and position of missing values in iris2d's sepal_length
d. Insert np.nan values at 20 random positions in iris 2d dataset
e. Filter the rows of iris2d that has petal_length > 1.5 and sepal_length < 5.0

PART-B

Perform the exercises in PART B using Pandas

8. Working with a Series

a. Create a series using list and dictionary.
b. Create a series using NumPy functions in Pandas.
c. Print the index and values of series.
d. Print the first and last few rows from the series.

9. Working with Data Frame Columns

a. Create and print a DataFrame.
b. Find the descriptive statistics for each column.
c. Group the data by the values in a specified column, values in the index.
d. Set Index and columns in a DataFrame.
e. Rename columns and drop columns
f. Select or filter rows based on values in columns.
g. Select single and multiple columns with specific names

10. Working with DataFrame Rows

a. Slicing DataFrame using *loc* and *iloc*.
b. Filter multiple rows using *isin*.
c. Select first n rows and last n rows
d. Select rows randomly n rows and fractions of rows (use *df.sample* method)
e. Count the number of rows with each unique value of variables
f. Select *nlargest* and *nsmallest* values.
g. Order/sort the rows

11. Handling missing data and duplicates

a. Identify rows with missing data (isnull(), notnull()) and replace NA/Null data with a given value.
b. Drop rows and columns with any missing data (dropna(), dropna(1))
c. Find duplicate values and drop duplicates.
d. Fill the missing values using forward filling and backward filling.
e. Replace the missing value with new value and write the dataframe to a CSV file inthe local directory.

12. Merge and combine data

a. Perform the *append, concat* and *combine_first* operations on DataFrames.
b. Apply different types of merge on data.
c. Use a *query* method to filter DataFrame with multiple conditions.

Perform the following exercises using Pandas matplotlib

13. Consider the Salary dataset, which contains 30 observations consisting of years of working experience and the annual wage (in dollars).

a. Create a linear plot to identify the relationship between years of working experience and the annual wages with suitable title , legend and labels.
b. Create a scatter plot to identify the relationship between years of working experience and the annual wages with title , legend and labels.
c. Also distinguish between observations that have more than 5 years of working experience and observations that have less than 5 years of working experience by using different colors in one single plot.

14. Consider the Iris dataset, where observations belong to either one of three iris flower classes.

a. Visualize the average value for each feature of the Setosa iris class using a barchart.
b. Format the obtained bar graph by Changing the color of each bar, Change the Edgecolor , Linewidth and Line style.

15. Consider the Iris dataset, where observations belong to either one of three iris flower classes.

a. Visualize the Histogram for each feature (Sepal Length, Sepal Width,petal Length & petal Width) separately with suitable bin size and color.
b. Plot the histograms for all features using subplots to visualize all histograms in one single plot. Save the plot as JPEG file.
c. Plot the boxplots for all features next to each other in one single plot.

BOARD EXAMINATION

DETAILED ALLOCATION OF MARKS

SCHEME OF VALUATION	
Write any one program from PART-A	20 Marks
Write any one program from PART-B	25 Marks
Executing program (PART-A)	20 Marks
Executing program (PART-B)	20 Marks
Result with print out(PART-A)	5 Marks
Result with print out(PART-B)	5 Marks
VIVA-VOCE	5 Marks
TOTAL	100 Marks

LIST OF EQUIPMENTS

Hardware Requirements

Desktop Computers – 30 Nos

Printer - 1 No.

Software Requirement:

Python , Microsoft Excel

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

III YEAR

N – SCHEME

V SEMESTER

4052563 – Elective Practical- I

Mobile Computing Practical

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052563

Semester : V

Subject title : Elective Practical -I Mobile Computing Practical

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per Semester 16 Weeks

Subject	Instructions		Examination			
Mobile Computing Practical	Hours / Week	Hours/ Semester	Marks			Duration
	4	64	Internal Assessment	Board Examination	Total	
			25	100 *	100	3 Hrs

*** Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

RATIONALE:

The Mobile Computing Lab studies design principles and evaluation methodologies for understanding and building systems support mechanisms for mobile computing systems including mobile adhoc and sensor networks for achieving the goal of anytime, anywhere computing in wireless mobile environments. The primary research focuses of the Mobile Application development practical are in mobility management, data and service management, security and dependability aspects in mobile computing environments.

OBJECTIVES:

On completion of the following exercises, the students must be able to

1. Provide a solid foundation and skills for programming to create applicationsfor Mobile Devices
2. Install, configure and use Android development environment.

3. To Learn about Basic Mobile Application Development tools
4. To learn How to create interactive applications in android with multiple activities
5. Create Mobile Application using SQLite Database

LIST OF EXPERIMENTS

PART-A

1.	Write a program to demonstrate activity(Application Life Cycle)
2.	Write a program to demonstrate different types of layouts
3.	Write a program to implement simple calculator using text view, edit view, option button and button
4.	Write a program to demonstrate list view
5	Write a program to display Text in Text View using different Font Style
6	Write a program to demonstrate AutoComplete Text View
7	Write a program to demonstrate Image Button View

PART-B

1	Write a program to demonstrate Date picker and time picker
2.	Develop an simple application with context menu and option menu
3.	Develop an application to send SMS
4.	Write a program to view ,edit, contact
5.	Write a program to send e-mail
6.	Write a program to display map of given location/position using map view
7.	Write a program to demonstrate the application of intent class
8.	Write a program to demonstrate SQLite (Create Database , Table , Insert ,Update, Delete and view records)

HARDWARE REQUIREMENTS:

Desktop Computers with minimum 4 GB RAM	30 Nos
Printer	1 No

SOFTWARE REQUIREMENTS:

Android Studio / Netbeans /Eclipse	Android ATD
Android SDK	JDK 6.0 or above

BOARD PRACTICAL EXAMINATION

DETAILED ALLOCATION OF MARKS	
Writing program in Part-A	20 Marks
Execution of program Part-A	20 Marks
Writing program in Part-B	20 Marks
Execution of program in Part-B	25 Marks
Printed Output (Part –A)	5 Marks
Printed Output (Part –B)	5 Marks
VIVA – VOCE	5 Marks
TOTAL	**100 Marks**

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

III YEAR

N – SCHEME

V SEMESTER

4052570 – Entrepreneurship and Startups

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052570

Semester : V

Subject Title : Entrepreneurship and Start ups

TEACHING AND SCHEME OF EXAMINATION

No. of Weeks per Semester: 16 Weeks

Subject	Instruction		Examination			
	Hours/ Week	Hours/ Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Entrepreneurship and Start ups	4 hours	64 hours	25	100*	100	3 Hours

*** Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

Topics and Allocation of Hours

UNIT	Topics	Hours
1	Entrepreneurship – Introduction and Process	10
2	Business Idea and Banking	10
3	Start ups, E-cell and Success Stories	10
4	Pricing and Cost Analysis	10
5	Business Plan Preparation	10
Revision, Field visit and Preparation of case study report		14
Total		64

RATIONALE:

Development of a diploma curriculum is a dynamic process responsive to the society and reflecting the needs and aspiration of its learners. Fast changing society deserves changes in educational curriculum particularly to establish relevance to emerging socio-economic environments; to ensure equity of opportunity and participation and finally promoting concern for excellence. In this context the course on entrepreneurship and start ups aims at instilling and stimulating human urge for excellence by realizing individual potential for generating and putting to use the inputs, relevant to social prosperity and thereby ensure good means of living for every individual, provides jobs and develop Indian economy.

OBJECTIVES:

At the end of the study of5th semester the students will be able to

- To excite the students about entrepreneurship
- Acquiring Entrepreneurial spirit and resourcefulness
- Understanding the concept and process of entrepreneurship
- Acquiring entrepreneurial quality, competency and motivation
- Learning the process and skills of creation and management of entrepreneurial venture
- Familiarization with various uses of human resource for earning dignified means of living
- Know its contribution in and role in the growth and development of individual and the nation
- Understand the formation of E-cell
- Survey and analyze the market to understand customer needs
- Understand the importance of generation of ideas and product selection
- Learn the preparation of project feasibility report
- Understand the importance of sales and turnover
- Familiarization of various financial and non financial schemes
- Aware the concept of incubation and starts ups

DETAILED SYLLABUS

Unit	Name of the Topics	Hours
1	**ENTREPRENEURSHIP – INTRODUCTION AND PROCESS** ● Concept, Functions and Importance ● Myths about Entrepreneurship ● Pros and Cons of Entrepreneurship ● Process of Entrepreneurship ● Benefits of Entrepreneur ● Competencies and Characteristics ● Ethical Entrepreneurship ● Entrepreneurial Values and Attitudes ● Motivation ● Creativity ● Innovation ● Entrepreneurs - as problem solvers ● Mindset of an employee and an entrepreneur ● Business Failure – causes and remedies ● Role of Networking in entrepreneurship	**10**
2	**BUSINESS IDEA AND BANKING** ● Types of Business: Manufacturing, Trading and Services ● Stakeholders: Sellers, Vendors and Consumers ● E- Commerce Business Models ● Types of Resources - Human, Capital and Entrepreneurial tools ● Goals of Business and Goal Setting ● Patent, copyright and Intellectual Property Rights ● Negotiations - Importance and methods ● Customer Relations and Vendor Management ● Size and Capital based classification of business enterprises ● Role of Financial Institutions ● Role of Government policy ● Entrepreneurial support systems ● Incentive schemes for State Government ● Incentive schemes for Central Government	**10**

3	**STARTUPS, E-CELL AND SUCCESS STORIES** ● Concept of Incubation centre's ● Activities of DIC, financial institutions and other relevance institutions ● Success stories of Indian and global business legends ● Field Visit to MSME's ● Various sources of Information ● Learn to earn ● Startup and its stages ● Role of Technology – E-commerce and Social Media ● Role of E-Cell ● E-Cell to Entrepreneurship	**10**
4	**PRICING AND COST ANALYSIS** ● Calculation of Unit of Sale, Unit Price and Unit Cost ● Types of Costs - Variable and Fixed, Operational Costs ● Break Even Analysis ● Understand the meaning and concept of the term Cash Inflow and Cash Outflow ● Prepare a Cash Flow Projection ● Pricing and Factors affecting pricing ● Understand the importance and preparation of Income Statement ● Launch Strategies after pricing and proof of concept ● Branding - Business name, logo, tag line ● Promotion strategy	**10**
5	**BUSINESS PLAN PREPARATION** ● Generation of Ideas, ● Business Ideas vs. Business Opportunities ● Selecting the Right Opportunity ● Product selection ● New product development and analysis ● Feasibility Study Report – Technical analysis, financial analysis and commercial analysis ● Market Research - Concept, Importance and Process ● Marketing and Sales strategy ● Digital marketing ● Social Entrepreneurship ● Risk Taking-Concept -Types of business risks	**10**

REFERNCE BOOKS:

1. Dr. G.K. Varshney, Fundamentals of Entrepreneurship, Sahitya Bhawan Publications, Agra - 282002
2. Dr. G.K. Varshney, Business Regulatory Framework , Sahitya Bhawan Publications, Agra - 282002
3. Robert D. Hisrich, Michael P. Peters, Dean A. Shepherd, Entrepreneurship , McGraw Hill (India) Private Limited, Noida - 201301
4. M.Scarborough, R.Cornwell, Essentials of Entrepreneurship and small business management, Pearson Education India, Noida - 201301
5. Charantimath Poornima M. Entrepreneurship Development and Small Business Enterprises, Pearson Education, Noida - 201301
6. Trott, Innovation Management and New Product Development, Pearson Education, Noida - 201301
7. M N Arora, A Textbook of Cost and Management Accounting, Vikas Publishing House Pvt. Ltd., New Delhi-110044
8. Prasanna Chandra, Financial Management, Tata McGraw Hill education private limited, New Delhi
9. I. V. Trivedi, Renu Jatana, Indian Banking System, RBSA Publishers, Rajasthan
10. Simon Daniel, HOW TO START A BUSINESS IN INDIA, BUUKS, Chennai - 600018
11. Ramani Sarada, The Business Plan Write-Up Simplified - A practitioners guide to writing the Business Plan, Notion Press Media Pvt. Ltd., Chennai 600095.

Board Examination – Evaluation Pattern

Internal Mark Allocation

Assignment (Theory portion)*	– 10
Seminar Presentation	– 10
Attendance	– 5
Total	**- 25**

Note: * Two assignments should be submitted. The same must be evaluated and converted to 10 marks.

Guidelines for assignment:

First assignment – Unit I

Second assignment – Unit II

Guidelines for Seminar Presentation- Unit III

Each assignment should have five three marks questions and two five marks questions.

BOARD EXAMINATION

Note

1. The students should be taught all units and proper exposure and field visit also arranged. All the portions should be completed before examinations.
2. The students should maintain theory assignment and seminar presentation. The assignment and seminar presentation should be submitted during the Board Practical Examinations.
3. The question paper consists of theory and practical portions. All students should write the answers for theory questions (40 Marks) and practical portions (60 Marks) should be completed for board examinations.
4. All exercises should be given in t he question paper and students are allowed to select by lot. If required the dimensions of the exercises may be varied for every batch. No fixed time allotted for each portion and students have liberty to do the examination for 3Hrs.
5. For Written Examination: theory question and answer: 45 Marks

   Ten questions will be asked for 3 marks each. Five questions from each unit 1 & 2.(10 X 3 = 30).

   Three questions will be asked for 5 marks each. One question from each unit 1, 2 & 3. (3 X 5 =15)
6. For Practical Examination: The business plan/Feasibility report or Report on Unit 4 & 5 should be submitted during the board practical examinations. The same have to be evaluated for the report submission (40 marks).

DETAILED ALLOCATION OF MARKS

Sl.No	Description	Marks
Part A	Written Examination - Theory Question and answer (10 questions x 3 marks:30 marks & (3 questions x 5 marks: 15 marks)	45
Part B	Practical Examination –Submission on Business Plan/Feasibility Report or Report on Unit 4 & 5	40
PartC	Viva voce	15
	Total	100

MODEL QUESTION PAPER

ENTREPRENEURSHIP AND START UPS

Part A

Time: 1 hour **Max. Marks:45**

I. Answer ten questions in brief (10x3=30)

1. Define entrepreneurship.
2. State the process of entrepreneurship
3. What are the benefits of being an entrepreneur?
4. How do entrepreneurs act as problem solvers?
5. Outline the role of networking in entrepreneurship.
6. List the various types of business
7. Outline the business model.
8. Suggest the various goals of business.
9. How selection of human resources is carried out?
10. Specify the role of government policy on entrepreneurship.

II. Answer three questions in detail (3x5=15)

11. Describe the importance of innovation on entrepreneurship.
12. Enumerate the various incentive schemes for the central government.
13. How technology will play a major role in E- commerce?

Part B

Practical Examination –

Submission on Business Plan/Feasibility Report

or Report on Unit 4 & 5 **(40) Marks**

PART C

Viva Voce **(15) Marks**

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

III YEAR

N – SCHEME

VI SEMESTER

4052610 – Computer Hardware and Servicing

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052610

Semester : VI

Subject title : Computer Hardware and Servicing

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per Semester: 16 Weeks

Subject	Instructions		Examination			Duration
	Hours /Week	Hours / semester	Internal Assessment	Board Examination	Total	
Computer Hardware and Servicing	6	96	25	100*	100	3 Hrs

*** Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

TOPICS & ALLOCATION OF HOURS :

Unit No.	Topics	Time (Hours)
I	MOTHERBOARD COMPONENTS	18
II	MEMORY & I/O DEVICES	18
III	DISPLAY, POWER SUPPLY & BIOS	17
IV	DESKTOP, LAPTOP, MOBILE AND TABLET PC	18
V	FUTURE HARDWARE SYSTEMS	18
TEST AND REVISION		07
TOTAL		96

RATIONALE:

A Computer Engineer should be able to install and maintain Keyboard, Printer, Mouse, Monitor, etc. along with the computer system. Additionally he should also be able to maintain and service mobile phones. The course provides the necessary knowledge and skills regarding working, construction and interfacing aspects of peripherals. The students will get to know how various peripherals communicate with central processing unit of the computer system and pattern their respective operations. The student will get to know about how Mobile phones are maintained. This subject provides the required background of installation, maintenance and testing of peripheral with Computers and Laptops. The student will also get to know about the basics Non Volatile Memory(NVM), Remote Direct Memory Access (RDMA) and Embedding hardware.

OBJECTIVES:

On completion of the following units of syllabus contents, the students must be able to

- Know the evolution of Personal Computer from PC through Core i and Laptop.
- Know and explain the major components that make up the system unit.
- Know the data process and store them in meaningful information.
- Explain about the principle of operations of Keyboard, Mouse and Displays.
- Understand the components of media system.
- Know the Basics, working principle, specification and modern technology of different types of drives.
- Know the specification of I/O Ports of all I/O devices like serial, parallel, USB — Gameport,blue tooth and IP Connectors
- Know the operation, working principle and troubleshooting of devices like Dot matrix, Inkjet, Laser, Thermal, MFP Printers.
- Know the aspects related to Power Supply.
- Understand the common problems in the computer system and the peripherals
- Trouble shoot the problems in Personal computers.
- Trouble shoot the problems in Computer peripherals.
- Know and explain the major components of Laptop.
- Trouble shoot the problems in Laptop.
- Understand the basic components and tools used in servicing of Mobile
- phones.Know to install the software required for mobile phones and to maintain it.
- Understand the basics of Non Volatile Memory(NVM), Remote Direct Memory Access(RDMA) and Embedding hardware.

DETAILED SYLLABUS

Contents: Theory

UNIT - I MOTHERBOARD COMPONENTS		**18 HOURS**
I	**1.1.Motherboard components:** Processor sockets/slots — Memory sockets - Chipsets — Cache— BIOS — Clock generator — RTC — Super I/O Controller — Power connector — Battery — Keyboard/Mouse Connectors — Jumpers — Ports and Headers — Pin Connectors - Motherboard Form factor - Hardware, Software and Firmware.	5 Hrs
	1**.2.Computer peripheral devices:** Internal and external devices	2 Hrs
	1.3.Processors: Introduction —Core2 Duo processor, Quad core processor,Core i3, i5, i7 series, AMD AIO series, Xeon Processor.	5 Hrs
	1.4.Chipsets: Chipset basics - North / South Bridge architecture and Hub architecture.	3 Hrs
	1.5.Bus Standards: Overview and features of PCI, AGP, USB, & Processor Bus.	3 Hrs
UNIT - Il MEMORY AND I/O DEVICES		**18 HOURS**
II	**2.1.Primary and Secondary Memory:** Introduction. Main Memory — types – Organization, Access time, Cycle time, and Memory errors and Error detection Techniques. Hard Disk: Introduction — Construction — Working Principle — File Systems — Formatting and Troubleshooting.	4 Hrs
	2.2. Removable Storage and Special Devices: DVD-ROM — Recordable DVD Rewritable DVD. Blu-ray: Introduction - Blu-ray Disc Parameters - Recording and Playback Principles. Special drives: External drives, Memory stick, USB flash drive, Solid state drive. Data Recovery tools - DOS, and Third party tools.	4 Hrs
	2.3.Keyboard and Mouse: Keyboard: Interfacing and Signals (USB, Wireless), Types of keys, Keyboard Matrix, Key bouncing, Types of keyboard (Simple, Mechanical). Mouse: Optical mouse operation — Optical mouse cleaning — Troubleshooting flowchart for a mouse.	4 Hrs
	2.4. Printers and Scanners: Printer: Introduction Types of printers —	4 Hrs

	Dot Matrix, Inkjet, Laser, Thermal, MFP printer (Multi-Function Printer) - Operation and Troubleshooting. Scanner: Introduction, Scanner mechanism, working principle —- Types of Scanners (Barcode, Handheld,Flatbed) — Preventive maintenance and Troubleshooting tools.	
	2.5.Special I/O Devices: Trackball, Touch pad, Pointing stick, Joystick, Light pen, Graphic tablet, Camera, Bar-code reader, RFID reader	2 Hrs
UNIT- Ill DISPLAY, POWER SUPPLY and BIOS		**17 HOURS**
III	**3.1.Displays and Graphic Cards:** Displays: LCD Principles —- Plasma Displays —- TFT Displays - LED Displays. Graphic Cards: Video capturecard - Troubleshoot display and graphics card problems	5 Hrs
	3.2.SMPS: Block diagram **-** Basic Principles and Operations O/P Voltage — Cable color code — Connectors and PowerGood — Common Failures(No circuit diagram to be discussed)	5 Hrs
	3.3.Bios: Bios functions — Cold and Warm booting — BIOS error codes —- BIOS interrupts —- BIOS advanced setup. Upgrading BIOS, FlashBIOS-setup. Identification of different BIOS (AMI, AWARD BIOS).	5 Hrs
	3.4.POST: Error, Beep Codes, Error messages, Post — Faults related to Hardware.	2 Hrs
UNIT - IV DESKTOP, LAPTOP, MOBILE AND TABLET PC		**18 HOURS**
IV	**4.1.Upgrading of Systems**: Hardware up-gradation. Updating of System & Application software: Device Driver - OS Update and Firewall Security — Control panel - Installed devices and properties — Install procedure, Rollback or Un-install procedure, Tests of various device driver software.	4 Hrs
	4.2.Installation and Troubleshooting: Formatting, Partitioning and Installation of OS —Trouble Shooting Laptop and Desktop computer problems. Antivirus and Application Software Installation — Backup and Restore procedure - recovery software	4 Hrs
	4.3.Laptop: Difference between laptop and desktop- Types of laptop, working principles, configuring laptops and power settings, Upgrade RAM, hard disk, Replacing battery - Configuration of camera, mic, WLAN	3 Hrs

	and Bluetooth, touchpad, Laptop Keyboard.	
	4.4. Mobile phone: Basics of mobile communication, battery- antenna- Ear piece- microphone -speaker-buzzer-LCD- keyboard. Basic circuit board components — Names and functions of different ICs used in mobilephones. Installation & Troubleshooting: Mobile servicing kit, Assembling and disassembling of different types of mobile phones – Installation of OS - Fault finding & troubleshooting	4 Hrs
	4.5.Introduction to Tablet PC: Digitizers Versus Touch-Screen Displays, Merits and Demerits. Comparisons: Laptops, Desktops, Pocket PC, Other PDAs, Other Pen-Based Computers, Differences in Hardware. Windows XP Tablet PC Edition Configuration: Basic Interface Settings, Screen Settings, Display Properties, Other Settings and Options	3 Hrs
UNIT – V FUTURE HARDWARE SYSTEMS		**18 HOURS**
V	**5.1.Moore's law :** Calculating the Hardware Growth using Moore's Law,Introduction to Non Volatile Memory Technology, Architecture of NVM technology – Advantages and Scope of NVM Technology	4Hrs
	5.2.Emerging Non Volatile Memory Technologies (Concepts only)- Magnetic random-access memory (MRAM), Spin-Transfer Torque Random-Access Memory (STT-RAM), Ferro electric Random Access Memory (FeRAM), Phase-Change Memory (PCM), and Resistive Random-Access Memory (RRAM).	5Hrs
	5.3.Introduction to advanced Network technologies: Remote Direct Memory Access (RDMA), Working Principle of RDMA – Limitationsand Challenges in RDMA technology	4Hrs
	5.4.Embedded systems- Basic concepts, Embedded Board and the von Neumann Model, Basic Electronics of Embedded devices - AC circuits, DC Circuits, and Active Devices, Power supply- Scope, Control and Probes- Advantages and Applications of Embedded devices.	5 Hrs

RE**FERENCES**

S.No	Title	Author	Publisher	Year of Publishing Edition
1	Computer Installation and Servicing	D.Balasubramanian	Tata Mc-Graw Hill, New Delhi	Second Edition 2010
2	Troubleshooting, Maintaining and Repairing PCs	Stephen J.Bigelow	TMH, New Delhi	Fifth Edition
3	PC Hardware in a nutshell	Robert Bruce Thompson.	O'Reilly Media	Third Indian Reprint 2008.
4	The Laptop Repair Workbook: An Introduction to Troubleshooting and repairing Laptop Computers	Morris Rosenthal	Foner books	First Edition 2008
5	The Cell Phone Handbook	P.J. Stetz and Penelo e Stetz	Find Tech Ltd	Second Edition
6	Advanced Mobile Repairing	Pandit Sanjib	BPB Publication, New Delhi	First Edition 2010
7	Absolute Beginner's Guide to Tablet PCs	Craig F. Mathews	ToolKits, Inc.	First Edition 2004
8	Embedded Hardware: Know It All	Ganssle J, Noergaard T, Eady F, Edwards L, Katz DJ, Gentile	Newnes	1st Edition (2007)

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

III YEAR

N – SCHEME

VI SEMESTER

4052620 – Computer Networks and Security

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052620

Semester : VI

Subject Title : Computer Networks and Security

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Computer Networks and Security	5	80	25	100*	100	3 Hrs.

*** Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

Topics and Allocation of Hours

UNIT	Topic	Hrs.
I	DATA COMMUNICATIONS	15
II	OSI MODEL AND LAN PROTOCOLS	16
III	TCP/IP PROTOCOLS	15
IV	NETWORK SECURITY	13
V	APPLICATION OF NETWORK SECURITY	14
Test and Model Exam		7
Total		**80**

RATIONALE:

The course aims to groom the students to gain concepts, knowledge and skills required to work on Computer Networking and Security industry. Course curriculum has been designed to give overview and use cases of Data Communication, Layered Networks, Internetworking technology/protocols and Computer Security is covered and this will help to prepare the students to keep pace with computer networking and security industry trends.

OBJECTIVES:

- Understand the concept of data communication.
- Discuss the advantages and disadvantages of different network topologies.
- Know different network classification based on different category.
- Study about different networking devices and their practical usages.
- Understand the different layers of OSI and their functions.
- Compare different LAN protocols.
- Understanding of Synchronization in networks
- Study of different WAN networks and protocols
- Study of Broadband Next Gen (BNG)
- Identify the protocols used in TCP /IP and compare with OSI model.
- Know the IP addressing and TCP/ IP protocols briefly.
- QoS and Traffic Engineering in networks
- Overview of Operations, Administration and Maintenance (OAM) in networks
- Understand the basic concepts of network security.
- Identify the attacks and threats.
- Understand the basic concepts of RAID and digital Signatures.
- Study about Cryptography and different Cryptography Algorithms.
- Discuss about Network Security Applications.
- Know the applications of Network Security.
- Discuss about VPN and Firewalls.

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topics	Hours
I	**DATA COMMUNICATIONS**	
	Data Communication: Components of a data communication – Data flow: Simplex - Half duplex – Full duplex; Networks – Network criteria – Types of Connections: Point to point – multipoint; Topologies: Star, Bus, Ring, Mesh, Hybrid – Advantages and Disadvantages of each topology.	2
	Types of Networks: Need for computer Networks **-** LAN – MAN – WAN – CAN – HAN –Internet – Intranet – Extranet , Client-Server, Peer to Peer, Wi-Fi, Bluetooth, Mobile Networks, Data Centre Networks, Service Provider Networks	5
	Transmission Media : Characteristics of Transmission Media - Classification of transmission media - Guided — Twisted pair — Coaxial — Fiber optics — Unguided — Radio waves — Infrared — LowOrbit satellite (LOS) – VSAT – Cabling and Standards	3
	Network devices: Features and Concepts of Switches – Routers (Wired and Wireless) –Gateways.	3
	Synchronization in Networks: Concepts of Frequency and Time synchronization in Computer networks.	2
II	**OSI MODEL and LAN PROTOCOLS**	
	Network Models: Protocol definition - Standards - OSI Model – Layered architecture–Functions of all layers.	3
	802.X Protocols : Concepts and PDU format of CSMA/CD (802.3) – Token bus (802.4) –Token ring (802.5) – Ethernet – Types of Ethernet (Fast Ethernet, gigabit Ethernet, High speed Ethernet 10GE to 800GE) –Comparison between 802.3, 802.4 and 802.5 – Overview of Carrier Ethernet and use cases	4
	2.3. Understanding Wireless Network protocols- 802.11a, 802.11b, 802.11g, 802.11n, 802.11ac	2

	2.4.WAN Networks: Different layers in Service Provider Networks – Protocols Involved – High level design of Data Centre Networks **Switching:** Definition **–** Circuit switching – Packet switching – Message switching – Optical Switching OTN– Multicasting **BNG** – Concepts – Services – Broadband NextGen	3 2 2
III	**TCP/IP SUIT and PROTOCOLS** **3.1Overview of TCP / IP:** OSI & TCP/IP – Transport Layer Protocol Connection Oriented and Connectionless Services– Sockets - TCP & UDP. **3.2Network Layers Protocol:** IP – Interior Gateway Protocols (IGMP, ICMP, ARP, RARP, IGP, BGP Concept only). **3.3IP Addressing :**Dotted Decimal Notation –Subnetting & Supernetting – VLSM Technique-IPv6 (concepts only) **3.4Application Layer Protocols:** FTP– Telnet – SMTP– HTTP DNS – POP **3.5 QoS and Traffic Engineering –** Overview of QoS and Traffic Engineering techniques and protocols **3.6. OAM–** Concepts of OAM in networks Protocols – Fault detection and isolation	3 2 3 2 3 2
IV	**NETWORK SECURITY** **Introduction to Network security**: Definition – Need for security – Principles of Security – Attacks – Types of Attacks – Criminalattacks – Legal Attacks – Passive and Active attacks – Software Supply Chain attacks - Security Services – Security Mechanisms . **Cryptography**: Definition – Symmetric Encryption principles – Symmetric Block Encryption Algorithms – DES, AES – Stream	3 3

	ciphers – RC4 – Digest function – Public key Cryptography Principles–RSA- Diffe-Hellman algorithm – Digital Signature(Definition only) **Network Security Application**: Authentication applications – Kerberos (concepts only) - Overview- Motivation –Encryption Techniques.	2
	4.4 Internet Security: Email security – PGP - S/MIME - IP security – Overview –IP Security Architecture - Web security - SSL, TLS,SET (Concepts only) — Link Layer MACSEC security overview-Network Address Translation NAT - Distributed Denial of Service attacks– DDoS and its mitigation — Lawful intercept of traffic flow overview	5
V	**APPLICATIONS OF NETWORK SECURITY** **Introduction to network security** : Definition and Basic concepts-Basic concepts of RAID levels(0,1,2,3,4,5). **Hackers Techniques**: Historical hacking techniques & open sharing-Bad Passwords- Advanced Techniques- Viruses-worms-Trojan horses-SPAM **Security Mechanism** : Introduction – Types of Firewalls – Packetfilters – Application gate ways – Limitations of firewalls. **Intrusion**: Intruders– Intruder detection – Classification of IntruderDetection systems –Honey pots. **Wireless Security Issues**: Definition and Types -Transmission Security, Authentication , WLAN Detection, Eaves Dropping, Active Attacks, WEP Definition and Features. **Network Security Appliances**: Overview of Network security appliances: IPSec, DDoS, NAT, IPS gateways.	2 2 2 2 2 4

TextBooks :

1	Data Communication and networking	Behrouz A.Forouzen	Tata Mc GrawHill
2	Network Security Essentials	William Stallings	Pearson Publications.
3	CRYPTOGRAPHY AND NETWORK SECURITY	William Stallings	Pearson Publications.
4	CRYPTOGRAPHY AND NETWORK SECURITY	Behrouz A.Forouzen	TataMcGraw-Hill,New Delhi
5	Computer Networks	Andrew S.Tanenbaum	Pearson Publications.

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

III YEAR

N – SCHEME

VI SEMESTER

4052631 – Software Engineering

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052631

Semester : VI

Subject title : Elective Theory II – Software Engineering

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per Semester 16 Weeks

Subject	Instructions		Examinatio			Duration
	Hours / Week	Hours / Semester	Internal Assessment	Board Examination	Total	
Software Engineering	5	80	25	100*	100	3 Hrs

*** Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

TOPICS AND ALLOCATION OF HOURS

Unit No	Topic	No of
I	INTRODUCTION TO SOFTWARE ENGINEERING	**15**
II	SOFTWARE DESIGN AND PLANNING	**15**
III	SOFTWARE MAINTENANCE AND RISK MANAGEMENT	**15**
IV	SOFTWARE TESTING	**15**
V	SOFTWARE RELIABILTY AND QUALITY ASSURANCE	**13**
TEST AND REVISION		**07**
TOTAL		80

RATIONALE

Software Engineering deals with reliability and quality assurance of the software under development. It provides framework for development of quality software product. The course enables the students to write specifications for software system understand the importance of good software, design and develop test plans from design specifications. The course also covers other important aspects of software Engineering such as software lifecycle, requirement analysis and documentation, characteristics of good design, design techniques, testing, software implementation and maintenance etc.

OBJECTIVES

On completion subject, the students must be able to

- Define Software Engineering.
- Understand the characteristics of Software Engineering.
- Explain different software development models.
- Learn about the phases of software development cycle.
- Understand the significance of requirement analysis.
- Know various tools and techniques used for requirement analysis.
- Understand architectural and modular design.
- Understand the different types of project metrics.
- Understand different software estimation techniques.
- Describe CASE.
- Explain about software maintenance. e.
- Identify and mange risks.
- Know the different scheduling methods.
- Define the basic terms used in testing terminology.
- Describe black box and white box testing.
- Describe testing tools.
- Understand the concepts of Software quality and quality assurance.
- Know the concepts of software reliability and software quality standards.
- Define software re-engineering.
- Differentiate forward engineering from re-engineering.

DETAILED SYLLABUS

UNIT I INTRODUCTION TO SOFTWARE ENGINEERING .. 15 HOURS		
1.1	**Basics of Software Engineering :** Need for Software Engineering – Definition – Software Characteristics – Software Myths – Program versus Software Products	3
1.2.	**Software Development Life Cycle Models:** Introduction –Waterfall Model — Prototyping model — Spiral Model — Iterative Enhancement model – Agile model – Object Oriented Model - Advantages and Disadvantages of above models – Comparison of various models.	6
1.3	**Software Requirement Analysis (SRS):** Value of good SRS- developing SRS from Business Requirements- Requirement Process-Requirement Specification — Desirable Characteristics of an SRS-Components of anSRS- Structures of a requirements documents-Requirements gathering- Creating a backlog in Agile model.	6
UNIT – II SOFTWARE DESIGN AND PLANNING 15 HOURS		
2.1.	**Software Design** : Definition of software design — Objectives of software design – Process of software design – Architectural design – Modular design – Structure chart – Coupling and Cohesion – Differenttypes – Interface design – Design of Human Computer Interface	4
2.2.	**CODING:** Information Hiding –Programming style — Internal documentation — Monitoring and Control for coding –Structured programming- Error / Exception handling-Executing sprints for agile model. Scrum meetings in agile - importance of code reviews and unit testing	4

2.3.	**Software Planning:** Software metrics - Definition – Types of metrics – Product and product metrics-relevant metrics in agile-Function point and feature point metrics - Software project estimation — Steps for estimation — Reason for poor and inaccurate estimation — Project estimation guidelines — Models for estimation — COCOMO Model — Automated tools for estimation – Sprint planning in agile.	4
2.4	**CASE :** CASE and its scope- Architecture of CASE environment – Building blocks for CASE – CASE support in software Life cycle – Objectives of CASE – Characteristics of CASE tools – List of CASE tools – Categories, advantages and advantages of CASE tools.	**3**
UNIT – III SOFTWARE MAINTENANCE AND RISK MANAGEMENT 15 HRS		
3.1.	**Software Maintenance:** Software as an evolution entity – Software configuration management activities — Change control process — Software version control – Software configuration management – Need for maintenance – Categories of maintenance – Maintenance cost –Factors affecting the effort	5
3.2.	**Risk management :** Definition of risk – Basics for different types ofsoftware risks – Monitoring of risks – Risk management – Risk avoidance — Risk detection — Risk control — Risk recovery — Sources of risks — Types of risks	5
3.3.	**Project scheduling** : Introduction — Factors affecting the task set for the project – scheduling methods – Work breakdown structure – Flow graph – Gant chart - PERT - Setting up Sprint burn down charts for Agile model	5
UNIT – IV SOFTWARE TESTING 15 HRS		

4.1.	**Software Testing :** Introduction to testing – Testing principles – Testing objectives – Basic terms used in testing – Fault – Error – Failure - Testcases – Black box and white box testing – Advantages and disadvantages of above testing – Methods for Block box testing strategies – Methods forwhite box testing strategies – Testing activities – Test plan – Tracking defects.	3
4.2.	**Levels of testing:** Integration tests – System testing – Types.	3
4.3.	**Software Testing strategies:** Static testing strategies – Formal technical reviews – Code walkthrough – Code inspection - Debugging – Definition – Characteristics of bugs – Life cycle of a Debugging task – Debugging approaches.	3
4.4	**Software Testing Tools:** Need for tools – Classification of tools – Functional/Regression Testing tools – Performance/Load Testing Tools –Testing process management Tools – Benefits of tools – Risk Associated with tools — Selecting tools — Introducing the tool in thetesting process - Different categories of tools – Examples for commercial software testing tool.	3
4.5	**Code of Ethics for Software Professionals:** Human Ethics – Professional Ethics – Ethical issues in Software Engineering – Code ofEthics and professional Practice: Software Engineering code of ethics and professional Practice – Ethical issues: Right versus Wrong	3
UNIT – V SOFTWARE RELIABILITY AND QUALITY ASSURANCE		**13 HRS**
5.1.	**Software Quality Assurance :** Verification and validation – SQA – Objectives and Goals – SQA plan - Definition of software quality – Classification of software qualities - Software quality attributes – Important qualities of software products - Importance of software quality –SEI – CMM - Five levels - ISO 9000 – Need for ISO Certification – Benefits of ISO 9000 certification – Limitation of ISO 9000 certification – Uses of ISO - Salient features of ISO 9000 Requirements – Introduction to ISO 9126	5

5.2	**Software Reliability :** Definition – Reliability terminologies – Classificationof failures – Reliability metrics – Reliability growth modeling - Reliability measurement process	3
5.3	**Reverse Software Engineering:** Definition – Purpose - Reverse engineering Process – Reverse engineering tasks – Characteristics and application areas of reverse engineering – Software re-engineering – Principle – Re-engineering process – Difference between forward engineering and re-engineering.	5

REFERENCES

S. No	TITLE	AUTHOR	PUBLISHER	Year of Publishing / Edition
1.	Software Engineering	Ian Sommerville	PearsonEducation	Sixth Edition
2.	Fundamentals of Software Engineering	Rajib Mall	PHI Learning Pvt Limited, New Delhi	28th Printing August 2011
3.	Software Engineering	Bharat Bhusan Agarwal, Sumit Prakash Tayal	Firewall Media, New Delhi	Second Edition 2008
4.	Software Testing	K.Mustafa and R.A.Khan	Narosa Publishing House, New Delhi	Reprint 2009
5.	Software Quality	R.A. Khan, K.Mustafa and SI	Narosa Publishing House, New Delhi	Reprint 2008
6.	Software Engineering	Stephen Schach	TMGH Education Pvt Ltd, New Delhi	Eight Reprint 2011
7.	Software Engineering fundamentals	Ali Behforooz and Fredick J Hudson	Oxford University press,	2005

8.	Software Testing Principles and Practices	Srnivasan desikan, Gopalswamy Ramesh	Pearson	First Edition
9.	Suftware Testing Concepts and Tools	Nageshwara Rao Pusulri	DreamTeach	First Edition
10.	Software Engineering Concepts and application	Subhasjit Dattun	OXFORD University Press	2010
11.	Software Engineering	Rohit Khurana	Vikas Publishing	Second Edition

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

III YEAR

N – SCHEME

VI SEMESTER

4052632 – Elective Theory II

Multimedia Systems

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052632

Semester : VI

Subject Title : Elective Theory II - Multimedia Systems

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
			Marks			Duration
	Hours / Week	Hours / Semester	Internal Assessment	Board Examinations	Total	
Multimedia Systems	5 Hrs	80 Hrs	25	100*	100	3 Hrs.

*** Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

Topics and Allocation of Hours

Unit	Topics	Time (Hrs)
I	Introduction to Multimedia	11
II	Defining Objects for Multimedia Systems	15
III	Multimedia Data and Standards, Database	16
IV	Multimedia Devices and Making Multimedia	15
V	Multimedia for Internet and Streaming	16
Test and Model Exam		7
Total		**80**

RATIONALE:

The exponential growth of Engineering and Technology particularly Information and Communications Engineering has benefited the day-today life of entire mankind in all respects. The research and developments are continually happening in this field to fine tune and improve the field particularly in multimedia which directly or indirectly has impact on every man's daily life. As such the introduction of current and future trends and technology of multimedia systems would strengthen the knowledge and skills of Engineering community in taking one-step further the prosperity of mankind.

OBJECTIVES:

On successful completion of the course, the students will be able to

- Understand the relevance and underlining infrastructure of Multimedia system.
- Apply contemporary theories of multimedia learning to the development of multimedia products.
- Analyze instructional and informational media (audio/ visual materials, web based materials, games and simulations etc) applied with multimedia techniques.
- Acquire knowledge about multimedia software tools.
- Understand the multimedia systems components and fundamental elements of any multimedia system.
- Acquire knowledge about compression / decompression and various media file formats.
- Understand the underlying principles of processing various multimedia data.
- Understand the working principles of various multimedia input–output devices.
- Gain knowledge about various multimedia related standards.
- Understand the design and development process of multimedia projects.
- Understand the technologies of multimedia used in Internet and its applications.
- Acquire knowledge about streaming, webcasting and many evolving technologies.

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topics	Hours
I	**Introduction:** Definition of Multimedia, Multimedia Basics, Multimedia Elements, Multimedia Applications, Delivering Multimedia.	2
	Multimedia Systems Architecture: Multimedia Workstation Architecture, High resolution Graphic displays, The IMA Architectural Framework, Network architecture for Multimedia systems.	3
	Evolving Technologies For Multimedia Systems: Hypermedia Documents, Hypertext, Hyper Speech, HDTV and UDTV, 3D Technologies and Holography.	2
	Defining Objects for Multimedia System: Text, Images, Audio and Voice, Full-Motion and Live Video, Multimedia Data Interface Standards, Video Processing Standards.	2
	Multimedia Software: Overview of Multimedia Software Tools, Open Source Replacements, Multimedia OS, VRML, OpenGL, Windows and Open Source API.	2
II	**Text:** About Fonts and Faces, Using Text in Multimedia, Hypermedia and Hypertext, Using Hypertext, Hypermedia Structures, Hypertext Tools.	2
	Images: Making Still Images, Bitmaps, 1 bit images, 8-bit gray level images, 8-bitcolor images, Dithering, 24 bit color images, Vector Drawing, 3-D Drawing and Rendering, Color, Understanding Natural Light and Color, Computerized Color, Color Palettes, Color Look-up table. Image Processing, Image acquisition, Image enhancement. Color image processing.	4
	Sound : The Power of Sound, Digital Audio, Making Digital Audio Files, MIDI Audio, MIDI vs. Digital Audio, Multimedia System Sounds, Adding Sound to Your Multimedia Project , Audio Recording, Keeping Track of Your Sounds, Audio CDs, Sound for your Mobile, Sound for the Internet.	3
	Animation, the Power of Motion, Principles of Animation, Animation by Computer, Animation Techniques. Animation using OpenGL.	
	Video: Using Video, How Video Works and Is Displayed, Analog	3

	Video, Digital Video, Displays, Digital Video Containers, Codec, Video Format Converters, Obtaining Video Clips, Shooting and Editing Video.	3
III	**3.1 Data Compression**: Need for Data compression, General Data compression Scheme, Compression standards, Non-lossy compression for images, Lossy compression for Photographs and Video, Hardware Vs Software Compression. **3.2 Compression Schemes and standards**:(Only Concepts of) Binary Image Compression, Color, Gray Scale and Still-Video Image Compression, JPEG, Video Image Compression, Multimedia Standards for Video, Requirements for Full-motion Video Compression, MPEG, Audio compression, Fractal compression, advantages / disadvantages. **3.3 Data and File Format Standards**: Popular File Formats, RTF, RIFF, GIF, PNG, TIFF, MIDI, JPEG, JFIF, AVI, WAV, BMP, WMF, MIX, MPEG standards. TWAIN. **3.4 Database System:** Data Types in Multimedia Databases, Storage and Retrieval, Database Management System, Database Organization and Transaction Management for Multimedia System. **3.5 Content Based Retrieval in Digital Libraries(C-BIRD)**– C-BIRD GUI – Color Histogram – Color Density – Color Layout – Texture layout- - Search by Illumination Invariance – Search by Object Model.	3 4 3 3 3
IV	**4.1 Multimedia Input/output Technologies:** Limitations of Traditional input devices, Multimedia input/output devices, PEN input, Working of Electronic Pen, Digitizer, (only the concepts of) Video and Image display systems, Printer, Scanner. Digital voice and video: Voice Recognition system, Digital Camera, Video frame grabber, Video and still image processing, Full – motion video controller, Video Capture Board. **4.2 Making Multimedia:** The Stages of a Multimedia Project: Creativity, Organization, Communication, Hardware, Software: Text Editing and Word Processing Tools, OCR Software, Painting and Drawing Tools, 3-D Modeling and Animation Tools, Image-Editing Tools, Sound-Editing Tools, Animation, Video, and Digital Movie Tools, Authoring Systems, Making Instant Multimedia, Types of Authoring Tools. **4.3 Multimedia Skills**: The Team, Project Manager, Multimedia Designer, Interface Designer, Writer, Video Specialist, Audio Specialist,	5 4 3

	Multimedia Programmer, Producer of Multimedia for the Web. **4.4 Designing and Producing**, Designing, Designing the Structure, Designing the User Interface, Producing–Tracking, Copyrights.	3
V	**5.1 The Internet and Multimedia** : The Bandwidth Bottleneck, Internet Services, MIME Types, Multimedia on the Web, Web Page Makers and Site Builders, Plug-ins and Delivery Vehicles. **5.2 Designing for the World Wide Web**: Developing for the Web, Small-Device Workspace, text and images for the Web, Clickable Buttons, Client-Side Image Maps, Sound for the Web, Animation for the Web, and Video for the Web, HTML5 Video - Plug-ins and Players. **5.3 Multimedia Communication**: Study of Multimedia networking, Quality of data transmission, Media on demand, Multimedia Over Wireless and Mobile Networks – Media Entertainment, web-based applications, e-learning and education. **5.4 Streaming:** Introduction - Applications of Streaming- The Streaming Architecture, Stream Serving: Webcasting – On-Demand Servicing – Voice and Video Conferencing - Internet Telephony - Virtual Reality.	3 3 4 6

Reference Books

1. "Ze- Nian Li and M.S. Drew", "Fundamental of Multimedia", Pearson Education, Second Edition, 2014.
2. "Tay Vaughan", "Multimedia: Making It Work", Tata-McGrawHill.
3. "Prabhat, k.Andleigh, Kiran Thakra", "Multimedia systems Design", PHI
4. "Ralf Steinmetz, and Klara Nahrstedt", "Multimedia Computing Communication and Applications", Pearson Education.
5. "Ranjan Parekh", "Principles of Multimedia", TMGH, New Delhi.
6. "John F. Koegel Buford", " Multimedia Systems", Pearson Education.
7. David Austerberry, The Technology of Video and Audio Streaming, Focal Press.

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

III YEAR

N – SCHEME

VI SEMESTER

4052633 – Elective Theory II

Data Science and Big Data

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052633

Semester : VI

Subject title : Elective Theory - II Data Science and Big Data

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per Semester 16 Weeks

Subject	Instructions		Examination			
Data Science and Big Data	**Hours/ Week**	**Hours/ Semester**	**Marks**			
	5	80	**Internal Assessment**	**Board Examination**	**Total**	**Duration**
			25	100 *	100	3 Hrs

*** Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

Topics and Allocation of Hours

Unit No.	Topic	No. of Hours
I	Introduction to Data Science	15
II	Fundamentals of Data Modelling	15
III	Fundamentals of Big Data	15
IV	Big Data Storage	14
V	Big Data Processing	14
Test and Revision		7
Total		80

RATIONALE:

This course provides a comprehensive understanding of data science and data modeling. The foundation on data science is laid to understand the core concepts and the techniques that underlie today's big data computing technologies. This course helps the students in identifying and applying appropriate techniques and tools to solve problems in managing huge quantities of data.

OBJECTIVES:

This subject has two major divisions. The objectives of these topics are given below.

Data Science

After studying the first two units of this syllabus, students will be able

- To understand the fundamentals of data science, various data types, theirsources, problems and issues, various formats of data .
- To apply the Python libraries and Microsoft Excel for Data analysis.
- To work with Microsoft Excel for data analysis and applying various
- functions for data analysis.
- To familiarise with the basic data representation methods.
- To understand the concepts of samples, attributes and their relationships.
- To develop and implement simple linear regression models.
- To understand the concept of model equation and of fit.
- To understand and differentiate the concepts of predictive models and the classification models.
- To familiarize with the concepts of Neural Networks, Decision Trees and Nearest neighbors techniques.

Big Data

After studying the lessons from Units III to V, the students will be able to

- Get conceptual understanding of Big Data, Web data, classification of data, Big Data characteristics, types, classification and handling techniques.
- Get the conceptual understanding of the impact of ICT developments on Big Data Adoption.

- Understand the Big Data Analytics Life Cycle.
- Get the conceptual understandings of Big Data Storage systems and technologies.
- Understand the concepts of NoSQL databases, their types and characteristics.
- Understand the concepts of Hadoop and its Ecosystem.
- Understand the steps involved in Big data processing like parallel processing, distributed processing and Batch processing.
- Get understanding of MapReduce, map and reduce tasks, MapReduce algorithm.
- Understand the various techniques for Big Data analysis.
- Get introduced to the concepts and types of machine learning techniques.
- Explore the applications of Big Data in different fields.

Detailed Syllabus

Contents : Theory

Unit	Name of the Topics	Hours
I	**Introduction to Data Science**	**15**
	1.1.Data Science - Subfields of Data Science- Data Types-Data Science Road Map- Programming languages for Data Science- Problems with Data- Formatting issues- Python features- Python Technical libraries- Python Arrays and Data Frames.	6
	1.2.Data sources- Data Quality- Consistency and accuracy (Integrity), Noise: Outliers, Missing and Duplicate values- Data Preprocessing using Cleaning, Enrichment, Editing, Reduction, Wrangling- Data Formats: TXT, CSV, XML, JSON, TLV- Loading and Saving files	4
	1.3 Working with Excel: Loading data- Statistical functions- Text Functions- Lookup Functions- Sorting- Filtering- Data Analysis: Correlation, covariance, Descriptive statistics, Regression.	5
II	**Fundamentals of Data Modelling**	**15**

	2.1.Linear Algebra: Data representation - Data as a Matrix - Samples and Attributes- Classification of attributes- Concept of Rank-Identify the relationship among attributes	5
	2.2.Predictive models: Regression Models - Linear regression - Simple and Multiple Regression-Correlation-Mean squared Error-Testing goodness of fit-Model Equation	5
	2.3.Classification models: Two class- Multi class classification-Separability- Performance measures- Terminology- Confusion Matrix-Types (Concepts only): Neural Network- Decision Trees-Nearest Neighbors.	5
III	**Fundamentals of Big Data**	**15**
	3.1Data - Web Data- Classification of Data- Big Data-Characteristics- Volume, Velocity, Variety, Veracity, Value- Need for Big Data- Big Data Types and classifications- Sources of Big Data-Big Data handling techniques-Challenges.	6
	3.2 Impact of ICT developments on Big data Adoption: data analytics and data science, digitization, affordable technology and commodity hardware, social media, hyper connected communities and devices, cloud computing and IoT.	4
	3.3.Big Data Analytics Life Cycle: Business Case Evaluation, Data Identification, Data Acquisition & Filtering, Data Extraction, Data Validation & Cleansing, Data Aggregation & Representation, Data Analysis, Data Visualization, Utilization of Analysis Results.	5
IV	**Big Data Storage**	**14**
	4.1.Storage Concepts: Clusters, File Systems, Distributed File System, NoSQL, Sharding, Replication, Master Slave, Peer to Peer, CAP Theorem	4

	4.2. Big Data Storage Technologies: On-Disk Storage Devices- Distributed File system-RDBMS- NoSQL Databases- Characteristics of NoSQL- Types of NoSQL Storage devices. In-Memory storage devices-Data Grids-Databases	5
	4.3.Hadoop: Introduction- Hadoop and its Ecosystem: Hadoop core components - Features of Hadoop- Hadoop Ecosystem components- Hadoop streaming- Hadoop pipes- Hadoop distributed File system- HDFS data storage -Hadoop Ecosystem tools.	5
V	**Big Data Processing**	**14**
	5.1.Parallel data processing- Distributed data processing- Hadoop Framework- Processing workloads- cluster for processing- Batch processing with MapReduce- Map and Reduce Tasks- MapReduce algorithms- Processing in Realtime mode- Real time processing and MapReduce.	**5**
	5.2.Big Data Analysis Techniques: Quantitative analysis, Qualitative analysis, Data mining, Statistical analysis: Correlation, regression, Machine Learning: Classification, clustering, outlier detection, filtering. Semantic analysis: Natural language processing, Text Analytics, Sentiment analysis, Visual Analysis	**5**
	5.3.Big Data Analytics Applications and case studies: Big data in Marketing and sales- Big data and Healthcare- Big data in Medicine- Big Data in Advertising.	**4**

Reference books

1. Field Cady, “The Data Science Handbook”, Wiley, 2017.
2. Jake VanderPlas, “Python Data Science Handbook- Essential tools for working with data”, O’REILLY, 2017
3. Davy Cielen, Arno D. B. Meysman, Mohamed Ali, “Introducing Data Science”, manning publications, 2016
4. Thomas Erl, Wajid Khattak - Big Data Fundamentals Concepts, Drivers & Techniques-Prentice Hall (2016).
5. Raj kamal, Preeti Saxena, “Big Data Analytics-Introduction to Hadoop, Spark and Machine Learning”, McGraw Hill Education(India) Pvt Ltd., 2019.

6. Michael Minelli, Michelle Chambers, and Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley, 2013.
7. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'Reilley, 2012.
8. NPTEL MOOC courses on “Data Science” and “Big Data”.

DIPLOMA IN COMPUTER ENGINEERING

SEMESTER PATTERN

III YEAR

N – SCHEME

VI SEMESTER

4052640 – Computer Hardware and Networking Practical

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering **.**

Subject Code : 4052640

Semester : VI

Subject title : Computer Hardware and Networking Practical

SCHEME OF INSTRUCTION AND EXAMINATION:

No. of weeks per Semester: 16 Weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Computer Hardware and Networking Practical	6 Hrs	96 Hrs	25	100*	100	3 Hrs.

***Board Examination Conducted for 100 Marks and Converted To 75Marks**

RATIONALE:

The course aims at making the students familiar with various parts of Computers, Laptops, Tablet, devices and know the different types of peripherals desired. In addition, the course will provide the students with necessary knowledge and skills in computer, laptop, notebook, tablet its software installation and maintenance and to make them diagnose the software faults. This subject also gives the knowledge and competency to diagnose the problems in computer hardware and peripherals and also gives the knowledge for trouble shooting for systematic repair and maintenance of computers and laptops.

OBJECTIVES

On completion of the following exercises, the students must be able to

- Know the various indicators, switches and connectors used in Computers.
- Familiarize the layout of SMPS, motherboard and various Disk Drives.
- Configure Bios set up options.
- Install various secondary storage devices with memory partition and formatting.
- Know the various types of printer installation and to handle the troubleshooting ability.
- Assemble PC system and checking the working condition.
- Installation of Dual OS in a system.
- Identify the problems in Computer systems, software installation and rectification
- Assembling and disassembling of Laptop to identify the parts and to install OS and configure it.
- Enable to perform different cabling in a network.
- Configure Internet connection and use utilities to debug the network issues.
- Configure router for any topology
- Installation of sever operating system
- Configuring various services in server operating system
- Install various packet sniffing tools in linux

LAB EXERCISES

PART – A

Contents: Practical

1	HARD DISK a) Install Hard Disk. b) Configure CMOS-Setup. c) Partition and Format Hard Disk. d) Identify Master /Slave / IDE Devices. e) Practice with scan disk, disk cleanup, disk De-fragmentation, Virus Detecting and Rectifying Software. f) Creating System restore points in windows for system recovery.
2	a) Install and Configure a DVD Writer & Blu-ray Disc Writer. b) Recording a Blank DVD & Blu-ray Disc.
3	Printer Installation and Servicing a) Install and configure Dot matrix printer, Ink jet and Laser printer. b) Troubleshoot the above printers
4	Install and configure Scanner, Web cam, and bio-metric device with system and troubleshoot the problems
5	Do the following cabling works in a network a) Cable Crimpling b) Standard Cabling c) Cross Cabling d) Testing the Crimped cable using a Cable tester
6	a) Configure Host IP, Subnet Mask and Default Gateway in a system in LAN(TCP/IP Configuration). b)Configure Internet connection and use IPCONFIG, PING / Tracert and Netstat utilities to Debug the Network issues.
7	a) Install and configure Network Devices: HUB, Switch and Routers b)Install and Configure Wired and Wireless NIC and transfer files betweensystems

8	Transfer files between systems in LAN using FTP Configuration. Install a printer in LAN and share it in the network.
	PART B – SYSTEM ADMINISTRATION PRACTICAL
1	Installation of Windows 2008 / 2013 Server
2	Installation and configuration of DHCP Server
3	Installation and configuration of Mail Server
4	Installation and configuration of Active directory Services. Create a user and permission using logon script and group permissions.
5	Installation and configuration of DNS Server
6	a) Installation of Red Hat Linux using Graphical mode. b) Installation of Red Hat Linux using VMware.
7	Installation of various open source packet sniffing tools and inspect packets in linux.

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DETAILED ALLOCATION OF MARKS

SCHEME OF VALUATION	
Procedure Writing – One Question from PART – A	20 Marks
Procedure Writing – One Question from PART - B	25 Marks
Executing Exercise (PART – A)	20 Marks
Executing Exercise (PART – B)	20 Marks
Result(Part – A)	5 Marks
Result(Part – B)	5 Marks
VIVA - VOCE	5 Marks
TOTAL	100 Marks

LIST OF EQUIPMENTS	
Hardware Requirements :	
Desktop Systems	30 Nos
Hard disk drive	06 Nos
DVD, Blu-ray Drive	06 Nos
Blank DVD , Blu-ray Disc	30 Nos
Head cleaning CD	01 No
Dot matrix Printer	01 No
Laser Printer	01 No
Ink Jet Printer	01 No
Web camera	01 No
Biometric Device	01 No
Scanner	01 No
Crimping Tool	06 Nos
Screwdriver set	06 Nos
Network Cables	50 mtrs
Switch	01 No
Hub	01 No
Router	01 No
Wires / Wire cutters	
Software Requirements:	
Windows server OS Windows /Linux OS	
DVD and Blu-ray Burning S/W.	

DIPLOMA IN COMPUTER ENGINEERING

III YEAR

N – SCHEME

VI SEMESTER

4052651– Elective Practical – II
Software Engineering Practical

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052651

Semester : VI

Subject title : Elective Practical II – Software Engineering Practical

SCHEME OF INSTRUCTION AND EXAMINATION:

No. of weeks per Semester: 16 Weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Software Engineering Practical	4 Hrs	64 Hrs	25	100*	100	3 Hrs.

*** Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

RATIONALE:

The course aims at making the students familiar with the Software Development Lifecycle. While the Software Engineering theory paper provides a good view to our students on the various models, different phases involved in the model, risk tracking etc., the practical application of this is missing. This subject is quite difficult to comprehend just by sitting in theory classes or reading books, unless the students experience it practically. Hence exposing our students to a lab which mimics a real-life situation / case study would immensely benefit the students. This way the student will understand the concept of Software Engineering — how projects are planned and executed, different stages of the project life cycle, how are metrics tracked, risk management and quality assurance. IT companies spend a lot of time and effort in teaching the Software Development Life cycle principles. Each team member must have complete understanding of the execution methodology and the role he / she is playing in the project, without which the project will never be successful. Inculcating this knowledge to our team would help in easily deploying them in the industry.

OBJECTIVES

On completion of the following exercises, the students must be able to

- Understand the difference between different SDLC models especially Iterative / incremental and Agile methodologies
- Understand difference between a green field implementation (programs) and Software products.
- Learn how the requirements management phase works — how does the requirement gathering happen, how does this get converted to BRDs / SRSs in Iterative and Backlog in Agile, Dos and Don'ts etc
- Understand how the estimation and project planning is done based on the requirements. We will do feature point / complexity point estimate for Iterative and Story point estimate for Agile
- Preparing a work breakdown structure
- Setting up quality assurance process in line with CMMI principles and defining metrics that will be gathered
- Convert the requirements to design. Understand the different designing principles and alignment to standards. Building interface designs to integrate different modules
- Convert the design to structured coding following the coding standards. Understand the concept of continuous integration. Assessing the quality of the code.
- Perform Unit Testing
- Perform System Integration testing — preparing the test plan, test cases,system testing, tracking the defects found during testing
- Understand how the Requirement Traceability works
- Assessing the risk of the project by analyzing the metrics gathered

LAB EXERCISES

Contents : Practical

REQUIREMENT ANALYSIS
1) Develop requirements specification for student Management system such as overall problem description, system features, external interface requirements andnon-functional requirements.
DESIGN
Draw the following Structural modeling diagrams for student Management system: 2) Develop an UML Class Diagram. 3) Develop an UML Object Diagram. 4) Develop an UML Component Diagram. 5) Develop an UML Deployment Diagram.
Draw the following Dynamic modeling diagrams for Library Management system: 6) Develop a Use case Diagram. 7) Develop an UML Sequence Diagram. 8) Develop an UML Collaboration Diagram. 9) Develop an UML StateChart Diagram. 10) Develop an UML Activity Diagram.
TESTING
11) Write a simple JAVA code and perform unit testing.
REVERSE ENGINEERING
12) Perform reverse engineering from a simple JAVA code.
MINI PROJECT
Develop a University Result Management System using Classical Life Cycle model.

DETAILED ALLOCATION OF MARKS

SCHEME OF VALUATION	
Procedure / Program Writing – One Question	45 Marks
Execution	35 Marks
Result with printout	10 Marks
Demonstration of mini project	5 Marks
VIVA - VOCE	5 Marks
TOTAL	100 Marks

REQUIREMENTS	
Hardware Requirements :	
Desktop Systems	30 Nos
Software Requirements : Microsoft office (Word, Excel, Powerpoint), MS – Project or JIRA for miniproject Relational Database(SQL Server Express or MYSQL, JAVA/IDE, **JUNIT(**open source) for unit testing **SELENIUM**(automated testing)	

DIPLOMA IN COMPUTER ENGINEERING

III YEAR

N – SCHEME

VI SEMESTER

4052652– Elective Practical – II
Multimedia Systems Practical

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052552

Semester : VI

Subject Title : Elective Practical II - Multimedia Systems Practical

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
			Marks			Duration
	Hours / Week	Hours / Semester	Internal Assessment	Board Examinations	Total	
Multimedia Systems Practical	4 Hrs	64 Hrs	25	100*	100	3 Hrs.

*** Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

RATIONALE:

The competencies which form the basis for this practical enable students to develop skills with interactive visual and auditory technology. This lab prepares students to use digital multimedia for communication, creativity, collaboration, critical thinking. This practical is to bring awareness to the students regarding the numerous resources available in the area of multimedia. Students will become a skilled and creative user of current multimedia technology with an increased understanding of multimedia concepts and techniques

OBJECTIVES:

After the completion of this lab students will be able to

- Create Audio / Video hardware & software applications.
- Record & edit digital audio using sound editing software.
- Learn about video editing.

- Apply various filters & Compression techniques in Multimedia Applications.
- Learn photo editing software.
- Learn about 2D, 3D and cloud animation.
- Learn about chroma key technique.

DETAILED SYLLABUS

1. Use a audio processing software and perform the audio editing tasks — Import audio, select and edit the sound, create fade-in and fade-out effects, label audio segments, use noise remove filter, mix multiple sound sources, change stereo to mono tracks, export audio to different format and save.
2. Use a video processing software to perform — Trim video clips, rotate video, merge video, split video, add titles, add special effects and edit video dimensions, bit rate, frame rate, sample rate, channel.
3. Create a movie from video clips to demonstrate — Audio-Video mixing, add music,video effects, video transition and titles.
4. Use suitable software and perform a) compress / decompress audio / video files. b) Convert audio/video to different format.
5. Use a scanner to create two or more partial scanned images of large poster/photo. Create a panoramic view of multiple photos by stitching together them using any panorama software.
6. Develop a web page which shows animation with sound effect using any professional HTML editor.
7. Convert the given image into pencil sketch using suitable photo editing software.
8. Design a certificate for sports day with different text effects using suitable software.
9. Import any two pictures, Morph, Merge and Overlap those two pictures.
10. Draw the raindrop that falls on the ground. Show the splash effect and sound effectusing suitable software.
11. Create a moving cloud animation using any animation software.
12. Create a 2D animation using motion guide layer and masking.
13. Create a 2D animation of an aeroplane take off using suitable software.
14. Design a metallic text using 3D animation tool

15. Import an image with green screen background. Change the background of the imported image with required image using chroma key technique.

DETAILED ALLOCATION OF MARKS

Procedure / Program	45 Marks
Execution	40 Marks
Result with printout	10 Marks
VIVA – VOCE	5 Marks
TOTAL	100 Marks

LIST OF HARDWARE SUGGESTED

I Desktop PCs– 30 Nos

II Laser Printer Monochrome, Color — 1 Each

III Digital (Video) Camera - 1No.

IV Flat bed A4 size Scanner - 1 No.

LIST OF SOFTWARE SUGGESTED

Operating system: Windows 7, Windows 10, Linux

Software tools: Open Source Software or Commercial Software.

The following is the suggestive list of open source software and their commercial replacement. Experiments may be done using either open source software or commercial software.

3D Graphics and Animation

1. Art of Illusion Replaces: AutoDesk Maya
2. Blender Replaces: AutoDesk Maya

Audio Players

3. aTunes, Audacious, Clementine are Replaces: iTunes
4. CoolPlayer, MPH-HC Replaces: Windows Media Player
5. Zing Replaces: Windows Media Player

Audio Recorders and Editors

6. Audacity Replaces: Sonar X1, Sony ACID, Adobe Audition
7. Frinika Replaces: Sonar X1, Sony ACID

Audio Ripping and Conversion

8. fre:ac, BonkEnc Exact Audio Copy, Audio Convertor Studio
9. CUERipper, CDex Exact Audio Copy

10. MMConvert Exact Audio Copy

Multimedia Players

11. VLC Media Player Replaces: Windows Media Player
12. Mplayer Replaces: Windows Media Player
13. KODI Replaces: Windows Media Player
14. MediaPortal Replaces: Windows Media Player

Video Editing

15. Cinelerra Replaces: Adobe Premiere
16. OpenShot Video Editor Replaces: Adobe Premiere Pro CS5
17. Avidemux Replaces: Adobe Premiere
18. Kdenlive Replaces: Adobe Premiere Pro CS5
19. CineFX Replaces: Adobe Premiere Pro CS5

Video File Conversion

20. DVDx Replaces: Movavi Video Converter, Zamzar
21. DVD Flick Replaces: Movavi Video Converter, Zamzar
22. FFDShow Replaces: Movavi Video Converter, Zamzar

Video Player

23. Miro Replaces: Windows Media Player

CD / DVD Burners 24

Infrared Recorder**DVD**

Authoring

25. DVD Flick, DVDStyler**,** Bombono DVD

DIPLOMA IN COMPUTER ENGINEERING

III YEAR

N – SCHEME

VI SEMESTER

4052653– Elective Practical – II
Data Science and Big Data Practical

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052653

Semester : VI

Subject Title : Elective Practical II - Data Science and Big Data Practical

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Data Science and Big Data Practical	4	64	25	100*	100	3 Hrs.

*** Examinations will be conducted for 100 marks and it will be reduced to 75 marks.**

RATIONALE:

The data science process is about analyzing, visualizing, extracting, managing and storing data. It enables companies to efficiently understand large volume of data from multiple sources and derive valuable insights to make smarter data-driven decisions. Data Science is widely used in various industry domains, including marketing, healthcare, finance, banking, policy work, and more. This practical subject helps students understand how they can use Python NumPy, Pandas and Matplotlib to critically examine a dataset with summary statistics and graphs, and extract meaningful insights. Also, the data analysis using Microsoft Excel has been included to familiarize some advanced features like data analysis. Microsoft Excel has been chosen as the software to start with in this subject because many of our students are already be familiar with Excel, so very little further time will be required for them to learn to apply Excel for Data Processing. Processing unstructured data in the form of text files is also introduced. Basic statistics and data visualization techniques have been introduced as simple exercises.

OBJECTIVES:

On Completion of the exercises in this practical subject, the students will be able to

- Install the required packages to set up a data science coding environment
- Load different types of data into a Python Environment.
- Use basic operation with NumPy and Pandas libraries to prepare data
- Preprocess the data by handling missing data, duplicate values
- Aggregate the data
- Create data subsets
- Perform data cleaning operations
- Develop a single dataset by merging various datasets together
- Examine statistical summaries
- Use Matplotlib to create data visualizations
- Find the relationship between the data attributes
- Measure the basic statistical properties of the data
- Fit a regression model and understand the predictive capabilities of the models.
- Understand the basic text processing concepts.

LAB EXERCISES

1.	Load the data about the exam fee paid by the students of all branches of your college. Perform the following operations on it using Excel. a. Arrange the data branch wise within the branch and arrange register numbers. Replace all names with CAPITAL. b. Count the number of students in each branch and semester c. Calculate the total fee paid by students of each branch. d. Find the minimum and the maximum fee paid by the student. e. Find the sum, average, max, min of fee paid in each branch
2.	Load the data collected from all students during online answer paper submission with the following details for each exam. Regno, name, course_code, subject_code, semester, number_of_pages(nop), mode_of_dispatch, email_id, mobile_number. Perform the following operations using Excel. a. Check the file for any missing data in the columns. b. Count the number of students appeared for the exam. c. Count the number of papers (subjects) submitted by each student (Using register number) d. Create a new column by concatenating register number and the subject code. Using this column, perform the vlookup function to find the number of pages (nop) written by the students in that subject, and the mode of dispatch. e. Count the number of students appeared (submitted) for each subject. f. Count the number of different (unique) subject_codes that have been submitted.
3.	Read the dataset from the Auto-MPG repository and perform the descriptive statistics on the data using Excel-Data Analysis. Verify the same using the statistical functions of Excel.
4.	Read the dataset from the Auto-MPG repository and a) Identify the relationship between the variables using correlation. b) Identify the independent and the dependent variables. c) Perform the linear regression on the related variables and find theregression equation. d) Estimate the performance of the regression model.

5.	Load any external csv data file and store it in a Pandas DataFrame. a. Check the shape and column types of the DataFrame (rows andcolumns). [Note: Use df.info () and df.shape()] b. Subset the data column by names, by index, by range. c. Subset data based on index label, row index, multiple rows. d. Subset based on rows and columns
6.	DESCRIPTIVE STATISTICS using Python-Pandas a) Write a Python script to find basic descriptive statistics on AUTO-MPG dataset. b) Find the values of the descriptive statistics. c) Determine the measures of a central location, such as mean, markers suchas quartiles or percentiles, and measures of variability or spread, such as the standard deviation.
7.	READING AND WRITING DIFFERENT TYPES OF DATASETS a. Reading different types of data sets (.txt, .csv) from Web and disk and writing in file in specific disk location. b) Reading Excel data sheet using Pandas c) Export the values from the DataFrame to several other formats.
8.	DATA VISUALIZATION a. Load the Auto-MPG dataset from csv file into pandas. a) Analyze the Behavior of the Number of Cylinders and Horsepower Using aBoxplot b) Find the relationship between horsepower and weight using the scatter plotusing the data from Auto-MPG: c) Find the outliers using plot. d) Plot the histogram, bar chart and pie chart on sample data.
9.	COVARIANCE and CORRELATION a. Find the correlation and covariance between two variables. b. Plot the correlation plot on the dataset and visualize giving an overview ofrelationships among data. C. Fit a simple linear regression model using libraries such as Numpy or Scikit-learn. (importLinearRegression from sklearn.linear_model) • Import the packages and classes you need. • Provide data for independent and dependent variables.

	• Create a regression model and fit it with existing data. • Check the results of model fitting to know whether the model is satisfactory.
10.	OUTLIER Detection When analysing data collected as part of a science experiment it may be desirable to remove the most extreme values before performing other calculations. Write a function that takes a list of values and an non-negative integer, n, as its parameters. The function should create a new copy of the list with the n largest elements and the n smallest elements removed. Then it should return the new copy of the list as the function's only result. The order of the elements in the returned list does not have to match the order of the elements in the original list.
11	Text Processing a) Open a text file and read all the lines of the file. b) Tokenise (separate the words) the text. c) Count the total number of lines, total number of words and unique words d) Sort the words alphabetically. e) Find the most frequent and least frequent words. f) List the words having certain suffixes. Note: You can open a Tamil text file using 'UTF-16' encoding.
12	Text Processing-II Load a text file containing a list of words into aDataFrame. Apply the following functions and verify the results. Replace(), repeat(), count(pattern), startswith(pattern), endswith(pattern), find(pattern), findall(pattern).
	Mini Project: Develop any data science application using Python/Excel for processing your college data.

DETAILED ALLOCATION OF MARKS

Writing answer for any one program from the list	45 Marks
Execution	35 Marks
Result with printout	10 Marks
Demonstration of Mini Project	5 Marks
Viva -Voce	5 Marks
TOTAL	100 Marks

Hardware Requirements

Desktop Computers – 30 Nos

Laser printer - 1 No.

For the optimal student experience, we recommend the following hardware configuration:

• Processor: Intel Core i5 or equivalent

• Memory: 4 GB RAM

• Storage: 35 GB available space

Software Requirements

You'll also need the following software installed

- OS: Windows 7 SP1 64-bit, Windows 8.1 64-bit or Windows 10 64-bit, Linux.
- Browser: Google Chrome/Mozilla Firefox Latest Version
- Notepad++ as IDE (this is optional, as you can practice every thing using the Jupyter Notebook on your browser)
- Python 3.4+ (latest is Python 3.9) installed (from https://python.org)
- Python libraries as needed (NumPy, Pandas, Matplotlib and so on)
- Microsoft Excel

Install Anaconda by following the instructions at this link: https://www.anaconda.com/distribution/Data Source:

Students may use the following data sources form their department

Online examination answer paper uploaded details.

Data about the alumni of your college

Your college result details.

Data collected from students like students' profile, resume etc.

Some other online resources for testing

https://archive.ics.uci.edu/ml/machine-learning-databases/auto-mpg/

https://archive.ics.uci.edu/ml/machine-learning-databases/iris/iris.data

https://www.kaggle.com/rohankayan/years-of-experience-and-salary-dataset

DIPLOMA IN COMPUTER ENGINEERING

III YEAR

N – SCHEME

VI SEMESTER

4052660– Project Work and Internship

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2021 - 2022 onwards)

Course Name : 1052:Diploma in Computer Engineering

Subject Code : 4052660

Semester : VI

Subject : Project Work and Internship

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 Weeks

Subject	Instructions		Examination			
	Hours /Week	Hours/ Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Project Work and Internship	6	96	25	100*	100	3Hrs

Minimum Marks for pass is 50 out of which minimum 50 Marks should be obtained out of 100 Marks in the Board Examination alone.

Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

RATIONALE:

Project Work aims at developing innovative skills in the students whereby they apply the knowledge and skills gained through the course by undertaking a project. The individual students have different aptitudes and strengths. Project work, therefore, should match the strengths of students. The primary emphasis of the project work is to understand and gain the knowledge of the principles of software engineering practices, so as to participate and manage a large software engineering projects in future

.

OBJECTIVES:

- Implement the theoretical and practical knowledge gained through the curriculum into an application suitable for a real practical working environment preferably in an industrial environment .
- Develop software packages or applications to implement the actual needs of the community.
- Get exposure on industrial environment and its work ethics.
- Learn and understand the gap between the technological knowledge acquired through curriculum and the actual industrial need and to compensate it by acquiring additional knowledge as required
- Carry out cooperative learning through synchronous guided discussions within the class in key dates, asynchronous document sharing and discussions, as well as to prepare collaborative edition of the final project report.
- Expose students to the field of computing and to gain experience in software design.
- Understand and gain knowledge about disaster management.

GUIDELINES FOR PROJECT FORMULATION

The project work constitutes a major component in most of the professional programmes and it is to be carried out with due care and should be executed with seriousness by the candidates. Batch size : Maximum 6 students per batch

TYPE OF PROJECT

As majority of the students are expected to work out a real life project in some industry / research and development laboratories / educational institutions / software companies, it is suggested that the project is to be chosen which should have some direct relevance in day-to-day activities of the candidates in his/her institution. Students are encouraged to work in the areas listed at the end. However, it is not mandatory for a student to work on a real life project. The student can formulate a project problem with the help of Guide.

PROJECT PROPOSAL (SYNOPSIS)

The students of all the Diploma Courses have to do a Project Work as part of the Curriculum and in partial fulfillment for the award of Diploma by the State Board of Technical Education and Training, Tamil Nadu. In order to encourage students to do worthwhile and innovative projects, every year prizes are awarded for the best three projects i.e. institution wise, region wise and state wise. **The Project work must be reviewed twice in the same semester. The project work is approved during the V semester by the properly constituted committee with guidelines.**

The project proposal should clearly state the project objectives and the environment of the proposed project to be undertaken. The project work should compulsorily include the software development. The project proposal should contain complete details in the following form:

1. Title of the Project.
2. Introduction and Objectives of the Project.
3. Project Category (DBMS/OOPS/Networking/Multimedia/Artificial Intelligence / Expert Systems etc.).
4. Tools / Platform, Hardware and Software Requirement specifications.
5. Analysis (DFDs at least up to second level , ER Diagrams/ Class Diagrams/ DatabaseDesign etc. as per the project requirements).
6. A complete structure which includes: Number of modules and their description to provide an estimation of the student's effort onVthe project. Data Structures as per theproject requirements for all the modules.
   - Process logic of each module.
   - Testing process to be used.
   - Reports generation (Mention tentative content of report).
7. ..Are you doing this project for any Industry/Client? Mention Yes/No.
   If Yes, Mention the Name and Address of the Industry or Client.
8. Future scope and further enhancement of the project. Also mention limitation of the project.

SUGGESTIVE AREAS OF PROJECT WORK:

- Database Management Systems
- Software Engineering and Software Development
- Web page Designing
- Digital Image Processing
- Computer Graphics and Animation
- Multimedia Systems
- Computer Networks
- Artificial Intelligence
- Internet and e-commerce
- Computer Security and Cryptography
- Computer hardware and embedded systems
- Internet Of Things
- Cloud Computing
- Any other related area found worth.

INTERNSHIP TRAINING

The internship training for a period of two weeks shall be undergone by every candidate at the end of IV / V semester during vacation. The certificate shall be produced along with the internship report for evaluation. The evaluation of internship training shall be done along with final year "Project Work & Internship" for 20 marks. The internship shall be undertaken in any industry / Government or Private certified agencies which are in social sector / Govt. Skill Centres / Institutions / Schemes.

A neatly prepared PROJECT REPORT as per the format has to be submitted by individual student during the Project Work & Internship Board examination.

INTERNAL ASSESSMENT :

The internal assessment should be calculated based on the review of the progress of the work done by the student periodically as follows.

Detail of assessment	Period of assessment	Max.Marks
First Review	6th week	10
Second Review	12th week	10
Attendance	Entire semester	5
Total		**25**

Proper record should be maintained for the two Project Reviews and preserved for one semester after the publication of Board Exams results. It should be produced to the flying squad and the inspection team at the time of inspection/verification.

EVALUATION FOR BOARD EXAMINATION:

Details of Mark allocation	Max.Marks
Demonstration/Presentation	25
Report	25
Viva Voce	30
Internship report	20
Total	**100**