



**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.Saratha M.E.,**

Principal, Government Polytechnic College,

Kirishnagiri-635 001

<b>DIPLOMA IN COMPUTER ENGINEERING (1052)</b>	
<u>Convener</u> <b>Thiru.M.Jeyapal M.E.,</b> Principal i/c, Government Polytechnic College Kadathur-635 303	
Members	
<b>Thiru.P.Selvakumar M.E.,</b> HOD / Computer Engineering, Government Polytechnic College, Perambalur.	<b>Ms.P.Bhavani M.E.,</b> HOD / Computer Engineering, Government Polytechnic College, Purasaiwakam.
<b>Ms.T.Hemachitra M.E.,</b> HOD / Computer Engineering, Tamil Nadu Polytechnic College, Madurai.	<b>Thiru.P.K.Murugan M.E.,</b> Principal i/c, Computer Engineering, IRT Polytechnic College,
<b>Dr.V.Bhuvaneshwari M.E.,Ph.D.,</b> Lecturer / Computer Engineering, Government Polytechnic College, Baisuhalli,	<b>Ms.S.Rathinam M.E.,</b> Lecturer / Computer Engineering, Government Polytechnic College, Kadathur.
<b>Thiru.C.M.T.Karthikeyan M.E</b> Assistant Professor, Government College of Engineering, Bargur,.	<b>Thiru.HariharanJaisankar B.E.,</b> Team Leader, Grasko Solutions Pvt. Ltd., 2 <sup>nd</sup> stage Bangalore-560 076.
<b>Ms.S.Hemalatha, B.E</b> Executive Director, EY Global Directory Services India LLP,	

**DIPLOMA COURSES IN ENGINEERING/TECHNOLOGY**  
**(SEMESTER SYSTEM)**  
**(Implemented from 2020 - 2021)**  
**N – SCHEME**  
**REGULATIONS\***

*\*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<sup>th</sup> and/or during 7<sup>th</sup> 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 Secretaryship.	-

- For the Diploma Courses related with Engineering/Technology, the related / equivalent subjects 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:

<b>Diploma Course</b>	<b>Minimum Period</b>	<b>Maximum Period</b>
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 year 2020-2021.

**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 the 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 6 <sup>th</sup> week	50	2 Hrs
Test II	Unit – III & IV	End of 12 <sup>th</sup> week	50	2 Hrs
Test III	<b>Model Examination:</b> Covering all the 5 Units. (Board Examinations-question paper-pattern).	End of 16 <sup>th</sup> 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
	<b>Total</b>	<b>50 marks</b>

**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. For Practical Subjects:**

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

a) Attendance	<b>: 5 Marks</b>
(Award of marks same as theory subjects)	
b) Procedure/ observation and tabulation/ Other Practical related Work	<b>: 10 Marks</b>
c) Record writing	<b>: 10 Marks</b>
<b>TOTAL</b>	<b>: 25 Marks</b>

- *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, programme, 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.*

## **0. Communication Skill Practical, Computer Application Practical and Physical Education:**

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	...	<b>10 marks</b>
Project Review II	...	<b>10 marks</b>
Attendance	...	<b>05 marks</b> (Award of marks same as theory subject pattern)

---

Total	...	<b>25 marks</b>
-------	-----	-----------------

---

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
<b>Total</b>	<b>100* marks</b>

\*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 *40 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).

\*\*\*\*\*

**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

**IV SEMESTER**

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		<b>Elective Theory-I</b>	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		<b>Elective Practical-I</b>		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	HOURS PER WEEK		
			THEORY	PRACTICAL	TOTAL
1	4052610	Computer Hardware and Servicing	6		6
2	4052620	Computer Networks and Security	5		5
3		<b>Elective Theory-II</b>	5		5
	4052631	Software Engineering			
	4052632	Multimedia Systems			
	4052633	Data science and Big Data			
4	4052640	Computer Hardware and Networking Practical		6	6
5		<b>Elective Practical - II</b>		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		<b>Elective Theory-I</b>					
	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		<b>Elective Practical-I</b>					
	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 For pass	Duration
			Internal	External *	Total		
1	4052610	Computer Hardware and Servicing	25	100	100	40	3
2	4052620	Computer Networks and Security	25	100	100	40	3
3		<b>Elective Theory-II</b>					
	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		<b>Elective Practical - II</b>					
	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

**\*External Examination Marks are conducted for 100 Marks and converted to 75 Marks**



## LIST OF EQUIVALENT PAPERS OF M SCHEME TO N-SCHEME

M SCHEME		N SCHEME	
<b>III SEMESTER</b>			
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
<b>IV SEMESTER</b>			
35241	Computer Architecture	4052410	Computer Architecture
35242	Computer Networks and Security	4052620	Computer Networks and Security <b>(W.e.f. Apr 2023 onwards)</b>
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**

<b>M SCHEME</b>		<b>N SCHEME</b>	
<b>V SEMESTER</b>			
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
<b>VI SEMESTER</b>			
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	4052660	Project work and Internship

**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			Duration
	Hours /Week	Hours/ Semester	Marks			
			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
<b>TOTAL</b>		<b>80</b>

**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 flipflops
- Know about Synchronous and Asynchronous counters
- Know about the function of shift registers

## DETAILED SYLLABUS

Contents:Theory

Unit	Name of the topics	Hours
<b>I</b>	<p><b>AC FUNDAMENTALS, BATTERIES AND UPS</b></p> <p><b>1.1 AC Fundamental</b></p> <p>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 factor and 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</p>	4
	<p><b>1.2 Batteries</b></p> <p>Classification of cells- Construction of Lead acid cell— Methods of charging –Care and Maintenance of Lead acid battery– Indications of a fully charge battery—Maintenance free batteries.</p>	3
	<p><b>1.3 UPS</b></p> <p>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.</p>	3
	<p><b>1.4 Switches</b></p> <p>Basics of switches used - Ratings of switches used for a system Installation – Ratings and types of wires used – necessity of MCB,ELCB.</p>	3
<b>II</b>	<p><b>TRANSFORMER AND SPECIAL MOTORS</b></p> <p><b>2.1 Single Phase transformer</b></p> <p>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 - Comparison with two winding transformer– Applications – Step up and Step down transformer (Definition only)</p>	5

	<p><b>2.2. Special Motors</b></p> <p>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.</p> <p><b>2.3. Electrical Safety:</b></p> <p>Electric shock – need for earthing - types of earthing, fuses- need  – types of fuses</p>	<p>5</p> <p>2</p>
III	<p><b>SEMICONDUCTOR DEVICES</b></p> <p><b>3.1 Diodes</b></p> <p>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)</p>	8
	<p><b>3.2 Rectifiers</b></p> <p>Definition – Need of Rectification – Circuit diagram, Operation, i/p and o/p Waveforms of Half wave - Full wave- Bridge rectifiers (without filters) - Uses of filters in rectifier circuit — Ripple factor, Efficiency and PIV (No derivation) – Comparison</p>	4
	<p><b>3.3 Bipolar Junction Transistor</b></p> <p>Definition- Principle of NPN and PNP transistor- Symbol - Transistor terminals - Operating principle (NPN transistor only) -Configurations of transistor.</p>	2
	<p><b>3.4 Basics of Converters</b></p> <p>Inverters circuits and types</p>	2
	<p><b>BOOLEAN ALGEBRA, LOGIC GATES COMBINATIONAL SYSTEM</b></p> <p><b>4.1 Number representation</b></p> <p>Decimal, Binary, Octal and Hexadecimal number Systems-Conversion of number from one number system to another (without decimal point) -</p>	4
IV		

	BCD CODE — ASCII Codes - Parity bit — Use of a parity bit —Odd parity and Even parity	
	<b>4.2 Logic gates</b> 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
	<b>4.3 Boolean Algebra</b> 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
	<b>4.4 Arithmetic Circuits</b> Half Adder and full adder-Truth table, Circuit diagram–Half subtractor and Full subtractor- Truth table, Circuit diagram.	3
	<b>4.5 Combinational logic circuits</b> Parity generator and checker -Multiplexer – De multiplexer – Encoder - Decoder (Definition and Basic Circuits only)——Comparator Circuit for two bit words.	2
<b>V</b>	<b>SEQUENTIAL LOGIC SYSTEM</b>	
	<b>5.1 Flip flops</b> Basic principle of operation - S-R, D flip-flop – Operation and truth table- Race Condition – JK flipflop–T flipflop– Toggling- Edge Triggered Flip-flop – Level Triggered flip flop - Need for a Master-slave flipflop - JK Master Slave flipflop.	6
	<b>5.2 Counters</b> 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
	<b>5.3 Registers</b> 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.	3
	<b>5.4 Basics of Microprocessor</b> Microcontroller – Embedded system.	2



## TEXTBOOKS

S.No	Title	Author	Publisher	Year of Publishing / Edition
1	Electrical Technology Vol I and II	.B.L.Theraja	S.Chand &Co, NewDelhi	Mutiple 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

## Board Examination – Question Paper Pattern

Time: 3 Hrs.

Max.Marks: 100

PART - A Five questions will be asked covering all units. All questions are to be answered. Each question carries 1 mark.

PART - B Fifteen questions will be asked covering all the units. Three questions from each unit. Answer any ten questions. Each question carries 2 marks.

PART - C Five questions will be asked Either or type. One question from every unit. Answer either A or B. Each question carries 15 marks. A and B have sub divisions. ( 7 + 8 )

**The questions are to be numbered from 1 to 25. All the units are to be covered with equal weightage.**

<b>PART - A</b> Definitions and Statements. Question number 1 to 5	5 X 1 = 5 Marks
<b>PART - B</b> Short answer type questions. Question number 6 to 20	10 X 2 = 20 Marks
<b>PART - C</b> Descriptive answer type questions (Either A or B) Question number 21 to 25	5 X 15 = 75 Marks
<b>TOTAL</b>	100 Marks

Note: Board Examinations will be conducted for 100 Marks and converted to 75 Marks

## MODEL QUESTION PAPER

**Time: 3.00Hrs.**

**Max.Marks:100**

**Note:**

- Answer all questions in PART A. Each question carries one mark.
- Answer any ten questions in PART B. Each question carries two marks.
- Answer all question by selecting either A or B. Each question carries fifteen marks.

### **PART-A**

**(5x1=5)**

**Answer all questions in PART A. Each question carries one mark**

1. What is a diode?
2. Define: Barrier voltage
3. List the names and the base values for various number systems.
4. Convert the decimal number 75 into binary.
5. What is a flip flop?

### **PART-B**

**(10x2=20)**

**Answer any ten questions in PART B. Each question carries two marks.**

6. Write on forward biasing of a diode.
7. Write on reverse biasing of a diode.
8. What is the disadvantage of parity bit in error detection?
9. Draw the logic diagram for odd parity generator.
10. Draw the symbols of XOR and NAND gates.
11. Write the truth table for 2-input Ex-NOR gate.
12. Write on four states of flip-flops.
13. Write notes on Level Triggering.
14. What is edge triggering? Write on it.
15. Write on Race condition and need for Master Slave flip flop.
16. Write on Counter.
17. How MOD N counter is working?
18. What is mean by Shift register?
19. What are the differences between parallel and serial counters?
20. What are the applications of counters?

**PART-C**

**(5x15=75)**

**Answer all question by selecting either A or B. Each question carries fifteen marks**

21. A.i. Write notes on Maintenance free batteries. (7)

ii. Explain in detail about online UPS. (8)

(Or)

B. i. What are the advantages of three phase over single Phase? (7)

ii. Write notes on the construction of Lead Acid cell. (8)

22. A.i. Explain the working principle of auto transformer. (7)

ii. Discuss about various Losses in a transformer. (8)

(Or)

B. .i. Explain the working principle of stepper motor. (7)

ii. Discuss the factors about selection of motor for a particular application . (8)

23. A.i. Describe the principle of operation of photo diode. (7)

ii. Describe the characteristics of LDR & LED. (8)

(Or)

B. i. Explain the forward/reverse characteristics of PN Junction diode (7)

ii. Explain the working of bridge rectifier. (8)

24. A.i. Convert  $(79169)_{10}$  into binary number & octal number . (7)

ii. a.Explain ASCII code. b.Parity bit (8)

(Or)

B.i. Explain about the universal gates with logic diagram . (7)

ii. Explain the working of half adder and full subtractor. (8)

25. A.i. List the types of flip flop explain any one with logic diagram. (7)

ii. How a 4 bit asynchronous counter is working? (8)

(Or)

B.i. What is decade counter? Write on it. (7)

ii. Explain about serial in and serial out shift register and its application . (8)

# **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			Duration
	Hours /Week	Hours/ Semester	Marks			
			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
	<b>Total</b>	<b>80</b>

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



	<p><b>2.2.Process Scheduling</b></p> <p>Definition–Scheduling objectives–Types of Schedulers–Scheduling criteria – CPU utilization, Throughput, Turn around 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.</p> <p><b>2.3.Inter-process Communication and Synchronization</b></p> <p>Definition – Shared Memory System – Message passing–Critical section –Mutual Exclusion–Semaphores.</p> <p><b>2.4Deadlocks</b></p> <p>Definition –Deadlock characteristics–Deadlock Prevention–Deadlock Avoidance –Deadlock detection and Recovery.</p>	<p><b>6</b></p> <p><b>4</b></p> <p><b>3</b></p>
III	<p><b>MEMORYMANAGEMENT</b></p> <p><b>Basic Memory Management</b></p> <p>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.</p> <p><b>Virtual Memory</b></p> <p>Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault , Working Set , Dirty page/Dirty bit – Demand paging, Segmentation</p> <p><b>Page Replacement Algorithms</b></p> <p>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.</p>	<p><b>6</b></p> <p><b>4</b></p> <p><b>3</b></p>

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

	<p><b>5.4Shell Programming</b></p> <p>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.</p>	<p><b>2</b></p>
--	---	-----------------

## REFERENCE BOOKS

1. “Operating System Internal and Design Principles”, William Stallings, Pearson Education,7<sup>th</sup> Edition
2. “Operating System, Principles & Design”, Pal Chaudhury, PHI Learning, First Edition
3. “Operating System”, Rohit Khurana ITLESE, Vikas Publishing Ltd, First Edition 2011
4. “Operating System concepts”, Abraham Siberschatz Galvin, Gagne, Wiley Publishers, 9<sup>th</sup> Edition
5. “Operating Systems”, Harvey M. Deitel and Paul J. Deitel, David R. Choffnes, Pearson Education, New Delhi, Third Edition, 2007

## Learning Websites

[https://en.wikipedia.org/wiki/Operating\\_system](https://en.wikipedia.org/wiki/Operating_system)

<https://computer.howstuffworks.com/operating-system.htm>

[https://www.tutorialspoint.com/operating\\_system/index.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>

## Board Examination – Question Paper Pattern

Time: 3 Hrs.

Max.Marks: 100

PART - A Five questions will be asked covering all units. All questions are to be answered. Each question carries 1 mark.

PART - B Fifteen questions will be asked covering all the units. Three questions from each unit. Answer any ten questions. Each question carries 2 marks.

PART - C Five questions will be asked Either or type. One question from every unit. Answer either A or B. Each question carries 15 marks. A and B have sub divisions. ( 7 + 8 )

**The questions are to be numbered from 1 to 25. All the units are to be covered with equal weightage.**

<b>PART - A</b> Definitions and Statements. Question number 1 to 5	5 X 1 = 5 Marks
<b>PART - B</b> Short answer type questions. Question number 6 to 20	10 X 2 = 20 Marks
<b>PART - C</b> Descriptive answer type questions(Either A or B) Question number 21 to 25	5 X 15 = 75 Marks
<b>TOTAL</b>	100 Marks

Note: Board Examinations will be conducted for 100 Marks and converted to 75

**MODEL QUESTION PAPER**  
**4052320 OPERATING SYSTEM**

**Time: 3.00 hrs.**

**Max.Marks:100**

**Note:**

- Answer all questions in PART A. Each question carries one mark.
- Answer any ten questions in PART B. Each question carries two marks.
- Answer all question by selecting either A or B. Each question carries fifteen marks

**PART–A**

**(5X1=5)**

**Answer all questions in PART A. Each question carries one mark.**

1. Define Operating System.
2. What is PCB?
3. What is the full form of LRU?
4. Define cache.
5. Expand GNOME.

**PART–B**

**(10X2=20)**

**Answer any ten questions in PARTB. Each question carries two marks.**

6. What are the types of memory?
7. List the types of system call.
8. What is virtual machine?
9. What are the types of thread?
10. What are the types of scheduler?
11. What is mutual exclusion and semaphore?
12. Define logical address and physical address.
13. What is paging?
14. What is Page fault?
15. What is RAID?
16. Give the types of non-contiguous allocation.
17. What are the two types of security threats?
18. List two types of Linux desktop.
19. What is mount point?
20. List the file security levels.

**PART-C**

**(5X15=75)**

**Answer all question by selecting either A or B. Each question carries fifteen marks**

21. A) i. Explain any two types of operating systems. (7)

ii. Explain system call execution with an example. (8)

(OR)

B) i. Explain any two operating system services. (7)

ii. Explain monolithic and micro kernel operating systems. (8)

22. A) i. Explain context switching and Multithreads. (7)

ii. Explain shortest job first and round robin scheduling with example. (8)

(OR)

B) i. Discuss in detail deadlock detection and recovery. (7)

ii. Explain critical section and mutual exclusion. (8)

23. A) i. Explain internal and external fragmentation. (7)

ii. With neat diagram, explain hardware support for paging. (8)

(OR)

B) i. Explain the hardware and control structure for virtual memory. (7)

ii. Explain any two page replacement policies. (8)

24. A) i. Explain disk structure. (7)

ii. With example explain contiguous disk space allocation. (8)

(OR)

B) i. Discuss about file system structure. (7)

ii. Explain the security mechanisms. (8)

25. A) i. Explain the three levels of file security in Linux. (7)

ii. Explain Linux architecture with neat diagram. (8)

(OR)

B) i. Explain in detail about ext2 filesystem. (7)

ii. Write a shell script to print contents of file from given line number to next given number of lines. (8)

# **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			Duration
	Hours /Week	Hours/ Semester	Marks			
			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
	<b>TOTAL</b>	<b>96</b>

**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
<b>I</b>	<b>PROGRAM DEVELOPMENT &amp; INTRODUCTION TO C</b> <b>1.1 Program</b> Program Definition - Program development cycle – Programming Language levels & features. Algorithm – Properties & classification of Algorithm, flowchart – symbols, importance & advantage of flow chart.	4
	<b>1.2 Introduction to C</b> 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.	2
	<b>1.3 Variables, Constants &amp; Data types</b> 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
	<b>1.4 C operators</b> Arithmetic, Logical, Assignment, Relational, Increment and Decrement, Conditional, Bitwise, Special Operator precedence and Associativity. C expressions – Arithmetic expressions, Evaluation of expressions- Type cast operator. Simple Programs using Operators.	5
	<b>1.5 I/O statements</b> Formatted input, formatted output, Unformatted I/O statements	2
<b>II</b>	<b>DECISION MAKING, ARRAYS , STRINGS, FUNCTIONS</b> <b>2.1 Control Statements</b> 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. Simple programs.	5
	<b>2.2 Arrays</b> Definition – Array element and subscript - Declaration – Initialization of one dimension array elements - Two dimensional arrays – initialization of elements. Simple Programs.	4

	<b>2.3 Strings</b> Introduction – Declaring and Initializing string variables, Reading strings , Writing strings, String handling functions — strlen() , strcpy() , strcmp() ,strcat() and strrev() functions. Simple Programs.	3
	<b>2.4.Built in Functions</b> Declaration and definition of function. Math functions – Console I/O functions – Standard I/O functions – Character Oriented functions – Simple programs.	3
	<b>2.5.User defined functions</b> Defining functions & Needs-, Scope and Life time of Variables, Function call, return values, Recursion – Simple programs	3
<b>III</b>	<b>STRUCTURES, UNIONS AND POINTERS</b> <b>3.1 Structures and Unions</b> 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. Simple programs.	7
	<b>3.2 Pointers</b> Introduction – Advantages of pointers – Accessing the address of a variable – Declaring and Initializing pointers – Accessing a variable through its pointer –Pointer Expressions. Simple programs	4
	<b>3.3 Dynamic memory allocation</b> Advanatges – malloc(), calloc(), realloc() and free() functions. Simple programs	2
	<b>3.4 File Management</b> Introduction — Defining and Opening a file, Closing a file, Input/output operations on files. <b>Command line arguments</b> :Introduction – argv and argc arguments . Simple programs.	4
<b>IV</b>	<b>INTRODUCTION TO DATA STRUCTURES, STACK, QUEUES</b> <b>4.1 Introduction to Data Structures</b> 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)	
	<b>4.2 Definition of a Stack</b> Operations on Stack (PUSH & POP) - Implementing Push and Pop operations - Implementation of stack through arrays – Applications of Stack : Reversing a list - Polish notations — Conversion of infix to postfix expression, Evaluation of postfix expression.	6
	<b>4.3 Queues</b> Definition – Representation of Queue using arrays – Circular Queue, Dequeue (Definition and Examples only)	3
<b>V</b>	<b>LINKED LIST, TREES, SORTING, SEARCHING</b> <b>5.1 Terminologies</b> 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)	7
	<b>5.2. Trees</b> 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
	<b>5.4. Sorting</b> Introduction , Types of sorting - Bubble sort , Quick Sort - Examples. Simple programs.	2
	<b>5.4 Searching</b> Definition – Algorithms and “C” programs for Linear search and Binary search.	3

**TEXT BOOKS:**

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

**REFERENCE BOOKS:**

<b>S.No</b>	<b>TITLE</b>	<b>AUTHOR</b>	<b>PUBLISHER</b>
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

## Board Examination – Question Paper Pattern

**Time: 3 Hrs.**

**Max.Marks: 100**

PART - A Five questions will be asked covering all units. All questions are to be answered. Each question carries 1 mark.

PART - B Fifteen questions will be asked covering all the units. Three questions from each unit. Answer any ten questions. Each question carries 2 marks.

PART - C Five questions will be asked Either or type. One question from every unit. Answer either A or B. Each question carries 15 marks. A and B have subdivisions.( 7 + 8 )

**The questions are to be numbered from 1 to 25. All the units are to be covered with equal weightage.**

<b>PART - A</b> Definitions and Statements. Question number 1 to 5	5 X 1 = 5 Marks
<b>PART - B</b> Short answer type questions. Question number 6 to 20	10 X 2 = 20 Marks
<b>PART - C</b> Descriptive answer type questions (Either A or B) Question number 21 to 25	5 X 15 = 75 Marks
<b>TOTAL</b>	100 Marks

**Note: Board Examinations will be conducted for 100 Marks and converted to 75 Marks**

**MODEL QUESTION PAPER**  
**4052330 – C PROGRAMMING AND DATA STRUCTURES**

**Time : 3 Hrs.**

**Max. Marks: 100**

**Note:**

- Answer all questions in PART A. Each question carries one Mark.
- Answer any ten questions in PART B. Each question carries two Marks.
- Answer all question by selecting either A or B. Each question carries fifteen Marks.

**PART – A (5 x 1 = 5)**

**Answer all questions in PART A. Each question carries one Mark.**

1. Define Algorithm.
2. What is the use of goto statement?
3. What is Union?
4. What are the two operations of stack?
5. Define degree of a tree.

**PART – B (10 x 2 = 20)**

**Answer any ten questions in PART B. Each question carries two Marks**

6. Write down the syntax of scanf( ) and printf ( ) function.
7. Differentiate constant and variables.
8. What is mean by formatted input statement?
9. Write and explain syntax of — for loop.
10. What is recursion?
11. What is an array? Write the types of an array.
12. Define Structure? How to Initialize a Structure?
13. Define pointer. How can you declare it?
14. What is the purpose of realloc( )?
15. Give an example for infix expression.
16. What is circular queue?
17. Define stack.
18. Define Bubble Sorting.
19. What is meant by linear search?
20. Define degree of a node.

**PART - C**

**( 5 x 15 = 75 )**

**Answer all question by selecting either A or B. Each question carries fifteen Marks.**

- 21 A. i. Explain in detail about the structure of a C program with an example. [7]  
ii. Explain the various operators in C with one example for each operator. [8]  
(or)
- B. i. Discuss the Program development cycle in detail. [7]  
ii. Explain about the formatted and unformatted I/O statements in C. [8]
- 22 A. i. Explain for statement with syntax and an example. [7]  
ii. How does switch statement differ from if statement. Give examples [8]  
(or)
- B. i. Discuss the different types of if statements with an example. [7]  
ii. Write a program to read a list of n elements and find the minimum number using array. [8]
- 23 A. i. Explain structure with syntax and example. [7]  
ii. What are the advantages of using pointers? How are pointers declared & initialized? [8]  
(or)
- B. i. Explain about array within structure with example. [7]  
ii. Write a program to demonstrate malloc() and free() functions. [8]
24. A. i. What are different data structure operations? Define them. [7]  
ii. Explain any one applications of a stack. [8]  
(or)
- B. i. Explain different approaches to design an algorithm. [7]  
ii. Explain about Circular queue and dequeue. [8]
25. A. i. With a set of 10 values explain quick sort method. [7]  
ii. What are the advantages and disadvantages of linked list [8]  
(or)
- B. i. Describe about post order traversal of a tree. [7]  
ii. Write a program to sort a set of integers using bubble sort method. [8]



# **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 to 75 marks.

**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 sequential circuits

## 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	A	Construct the circuit and draw the forward characteristics of PN junction Diode and find input resistance.
	B	Construct the circuit and draw the reverse characteristics of Zener Diode and find breakdown voltage.
3		Construct the circuit and draw the VI characteristics of LED
4		Construct the circuit and draw the characteristics of LDR
5	A	Construct CE configuration circuit and draw the input characteristics and also find input resistance.
	B	Construct CE configuration circuit and draw the output characteristics and also find output resistance.

6	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.
7		Construct and verify Half adder and Half Subtractor
8		Construct and verify the truth table of Full adder
9		Construct and verify the truth table of Full subtractor
10		Verify the truth tables of RS,D,T and JKFF
11		Construct and test the parity generator and checker function using IC74180
12		Construct and test encoder and decoder circuit(IC74138)
13		Construct and test the function of Multiplexer and De-Multiplexer(IC74151)
14		Construct and test the 4bit Ripple counter(IC7493)
15		Construct and test decade counter(IC7490)

## **BOARD EXAMINATION**

### **DETAILED ALLOCATION OF MARKS**

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

## LIST OF EQUIPMENTS / COMPONENTS REQUIRED

S.No	Name of the Equipments	Range	RequiredNos
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.

### DETAILED SYLLABUS

Contents: Practical

Units	Topics	Hours
I	<b>Basics of Linux OS:</b> Entering and Exiting from a Linux system –User Accounts- General understanding of various application programs–Different shells	2
II	<b>Linux Commands:</b> 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	<b>Text Editor:</b> File operations(New, Open, Close, Save, Save and Exit, Print) –Text Editing operations (Inserting, deleting, finding, replacing, copying and moving).	2
IV	<b>Shell Scripts:</b> 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

<b>PART–A LINUX COMMANDS</b>	
<b>Write down the syntax and usage of the following exercise with all options.</b>	
<b>Check the commands with the system</b>	
	Learn to use Linux Operating System( <b>Study Exercise</b> ) Log on to LINUX and logoff. Learn usage of various applications installed in LinuxOS such as Terminal, Editor, System Monitor
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.
<b>PART– BSHELL SCRIPTS</b>	
	Test commands related with File Editing with Vi, Vim, gedit( <b>StudyExercise</b> )
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	a) Write a shell script to say Good morning/Afternoon/Evening as you login to system. 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 Thu 4 Feb2016
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	A) Write a shell script to determine whether given file exist or not, file name is supplied as command line argument ,also check for sufficient number of command line argument B) 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**

<b>SCHEME OF VALUATION</b>	
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
<b>TOTAL</b>	<b>100 Marks</b>

## **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			
	Hours / Week	Hours / Semester	Marks			Duration
			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 to 75 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 perform following tasks
  - a. Find factorial of a number
  - b. Print prime numbers up N times.
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 that uses a function to sort an array of integers.

### **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 for pre -order traversal of a binary tree.
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**

<b>SCHEME OF VALUATION</b>	
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
<b>Total</b>	<b>100 Marks</b>

### **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			Duration
	Hours /Week	Hours/ Semester	Marks			
			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 frame in 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 and Character 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**

<b>SCHEME OF VALUATION</b>	
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
<b>TOTAL</b>	<b>100 Marks</b>

## **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
<b>Total</b>		<b>80</b>

**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	<b>REGISTER TRANSFER LOGIC AND CPU</b>	
	<b>Register transfer</b> Register Transfer Language – Inter Register transfer – Control function-Bus transfer-Memory transfer.	3
	<b>Micro operations and ALU</b> 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
	<b>Central processing unit</b> 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
	<b>Control unit</b> Structure of control unit–Fetch cycle, Indirect cycle, Execute cycle, Interrupt cycle, Instruction cycle - Types of control unit – Hardwired, Micro-programmed control.	3



II	<p><b>INPUT – OUTPUT ORGANIZATION</b></p> <p><b>Input Output Interface</b> 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.</p> <p><b>Asynchronous data transfer</b> Strobe control, Handshaking, Asynchronous serial transfer, Asynchronous communication interface.</p> <p><b>Modes of transfer</b> Programmed I/O, Interrupt initiated I/O-vector interrupt, non-vector interrupt, Priority interrupt, Interrupt controller ,DMA –DMA controller, DMA transfer.</p> <p><b>I/O Processor</b> CPU-IOP communication, Data Communication Processor - Serial and Parallel communication.</p>	<p>3</p> <p>4</p> <p>4</p> <p>3</p>
III	<p><b>MEMORY ORGANIZATION</b></p> <p><b>Memory types</b> Sequential Access memory, Random Access memory, CPU registers, Main memory, Secondary memory, Cache memory - Memory Hierarchy – Characteristics, Design, Advantages of Memory Hierarchy.</p> <p><b>Main Memory</b> ROM, Types of ROM, RAM - SRAM, DRAM, Chips – ROM, RAM - Memory address map, Memory connection to CPU.</p> <p><b>Secondary Memory</b> Magnetic disk- Structure, Storage capacity, Optical disks, USB drives, Solid State Drives, SD cards.</p> <p><b>Cache</b> Need for cache memory, Operational principle, Cache initialization, Different mapping techniques, Writing into cache.</p> <p><b>Memory Management</b> 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.</p>	<p>2</p> <p>3</p> <p>3</p> <p>2</p> <p>4</p>

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

### 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, Third Edition

5. Computer Organization and Embedded Systems”, Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Naraig Manjikian, Sixth Edition, Tata McGraw Hill, 2012.

**Board Examination-Question Paper Pattern**

Time: 3 Hrs.

Max.Marks:100

PART - A Five questions will be asked covering all units. All questions are to be answered. Each question carries 1 mark.

PART- B Fifteen questions will be asked covering all the units. Three questions from each unit. Answer any ten questions. Each question carries 2 marks.

PART-C Five questions will be asked either or type. One question from every unit. Answer either A or B. Each question carries 15 marks. A and B have subdivisions. (7 + 8)

**The questions are to be numbered from 1 to 25. All the units are to be covered with equal weightage.**

<b>PART A</b> Definitions and Statements. Question Number 1 to 5	5 X 1 = 5 Marks
<b>PART B</b> Short answer type questions Question Number 6 to 20	10 X 2 = 20 Marks
<b>PART C</b> Descriptive answer type questions (Either A or B) Question number 21 to 25	5 X 15 = 75 Marks
<b>TOTAL</b>	<b>100 Marks</b>

Note: Board Examinations will be conducted for 100 Marks and converted to 75 Marks.

**MODEL QUESTION PAPER**  
**4052410 COMPUTER ARCHITECTURE**

**Time: 3.00 Hrs.**

**Max.Marks:100**

**Note:**

- Answer all questions in PART A. Each question carries one mark.
- Answer any ten questions in PART B. Each question carries two marks.
- Answer all question by selecting either A or B. Each question carries fifteen marks.

**PART – A**

**(5x1=5)**

**Answer all questions in Part A. Each question carries one Mark**

1. Define RTL
2. What is a COMMAND?
3. Expand EPROM?
4. What is flag register?
5. Define SMP?

**PART – B**

**(10x2=20)**

**Answer any ten questions in Part B. Each question carries two Marks**

6. List out the various Micro operations.
7. What is the use of ROM?
8. What is CPU? What are the major components of CPU?
9. What are the I/O commands?
10. Define synchronous and asynchronous data transfer.
11. What are pointer registers?
12. Why we need ROM for a system?
13. What is mapping table in virtual memory concept?
14. What is random accessing give example?
15. List down the segment registers.
16. What is parallel processing?
17. What are Superscalar pipeline?
18. List out any two characteristics of SMP.
19. What are the two different types of thread?
20. What is CC-NUMA?

**Part – C**

**(5x15=75)**

**Answer all question by selecting either A or B. Each question carries fifteen marks**

- 21 A) i..What is bus and explain bus transfer with a neat block diagram? (8)  
ii. Explain various Arithmetic Micro operations. (7)

(OR)

- B) i. Write in detail about Three, Two, One, Zero address instruction format? (8)  
ii. Explain in detail about functioning of Control unit with block diagram. (7)

- 22 A) i. Explain in detail about I/O interface with example. (8)  
ii. Explain strobe controlled data transfer in detail. (7)

(OR)

- B) i.Explain DMA transfer with block diagram. (8)  
ii.Explain CPU-IOP programming with flow chart. (7)

- 23 A) i. Explain about ROM and RAM chip. (8)  
ii. How magnetic disk works? (7)

(OR)

- B) i. Discuss in detail about the operational principle of cache memory. (8)  
ii. Explain in detail about memory table in a paged system with diagram. (7)

- 24 A) i. With a neat diagram explain the 8086 architecture. (8)  
ii. Explain the various types of parallel processor organizations (Flynn's classification) (7)

(OR)

- B) i. Explain in detail about vector processing. (8)  
ii. Explain Arithmetic pipeline with a neat diagram. (7)

- 25 A) i. Explain the organization of a multiprocessor system with a neat block diagram. (8)

- ii. Explain the various approaches of vector computation with diagram. (7)

(OR)

- B) i. Explain the various approaches to explicit multithreading. (8)  
ii. Explain in detail about core i7 processor. (7)

# **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
<b>Total</b>		<b>80</b>

**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 sites 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

<b>Unit</b>	<b>Name of the Topics</b>	<b>Hours</b>
I	<b>INTERNET, HTML AND ADVANCED HTML</b>	
	<b>Internet</b> 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.	5
	<b>HTML</b> 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 with Images - META Tag.	5
	<b>Advanced HTML</b> 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	5
II	<b>FRAMES, FORMS AND CSS</b>	
	<b>Frames</b> Frameset – FRAME Tag – Frame inside other frames – NOFRAME Tag.	2
	<b>Forms</b> FORM and INPUT Tag – Textbox - Radio Button – Checkbox – SELECT Tag and Pull Down Lists: Hidden - Submit and Reset; Some Special Tags: COLGROUP - THREAD, TBODY, TFOOT - _blank, _self, _parent, _top – IFRAME – LABEL - Attribute for <SELECT> - TEXTAREA..	3
	<b>CSS</b> Introduction – Features – Style Sheet basics - Working with CSS files – Syntax - Types of Style Sheets - Inline Styles - Embedded	4

	<p>Styles - External or Linked Styles - What is CSS3? Animation – Borders – Backgrounds – Fonts – Multiple columns – Text effects.</p> <p><b>Formatting Text and Fonts</b></p> <p>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.</p>	5
III	<p><b>JAVASCRIPT</b></p> <p><b>3.1 JavaScript Basics</b></p> <p>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.</p>	5
	<p><b>3.2 Object-Based Programming and Message boxes</b></p> <p>Functions - Executing Deferred Scripts - objects: Document object Model, Predefined objects, Array object, History object, Location object - Dialog Boxes - Alert Boxes - Confirm Boxes - Prompt Boxes.</p>	5
	<p><b>3.3 JavaScript with HTML</b></p> <p>Events - Event Handlers: onLoad and onUnload – onFocus and onBlur – onError - Forms: Forms Array – Form element properties -Introduction to jQuery – Features of jQuery - jQuery example.</p>	5
IV	<p><b>PHP</b></p> <p><b>Introduction</b></p> <p>A Brief Introduction to Apache, MySQL, PHP and Open Source - Server-Side Web Scripting.</p> <p><b>PHP</b></p> <p>PHP Structure and Syntax - Integrating HTML with PHP - Syntax and Variables - Constants and Variables - Passing Variables between</p>	4
		3

	<p>Pages – if Statements - if and else – switch case - for loop – for eachloop.</p> <p><b>Includes</b></p> <p>Includes and Functions for Efficient Code - Strings – Arrays and Array Functions - Sessions and Cookies – Sample Programs - Alternates to Incrementing/Decrementing Values.</p> <p><b>OOP</b></p> <p>Object Oriented Programming - Classes - Properties and Methods.</p>	<p>4</p> <p>4</p>
V	<p><b>PHP PRGRAMMING AND MYSQL</b></p> <p><b>PHP with MYSQL</b></p> <p>MySQL Syntax and Commands - Connecting to the MySQL Server – Data types - Functions - Querying the Database - SELECT, LogicalOperators – MySQL Programs.</p> <p><b>Form Elements</b></p> <p>Processing the Form - FORM Element - Tables to Display Data – Edit, Update and Delete data.</p> <p><b>Hands on Experiments</b></p> <p>Creating a Simple Shopping - Cart Script – Mini Project.</p>	<p>3</p> <p>3</p> <p>8</p>

### 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 McGraw-Hill.
4. “Thomas Powell, Fritz Schneider” “Java Script: The Complete Reference”, Tata McGraw-Hill.
5. “Timothy Boronczyk, Elizabeth Naramore, Jason Gerner, Yann Le Scouarnec, Jeremy Stolz, Michael K. Glass” “Beginning PHP6, Apache, MySQL, Web Development”, Wrox Publications.

## Board Examination-Question Paper Pattern

Time: 3 Hrs.

Max.Marks:100

PART - A Five questions will be asked covering all units. All questions are to be answered.  
Each question carries 1 mark.

PART- B Fifteen questions will be asked covering all the units. Three questions from each unit. Answer any ten questions. Each question carries 2 marks.

PART-C Five questions will be asked either or type. One question from every unit.  
Answer either A or B. Each question carries 15 marks. A and B have subdivisions. (7 + 8)

**The questions are to be numbered from 1 to 25. All the units are to be covered with equal weightage.**

<b>PART A</b> Definitions and Statements. Question Number 1 to 5	5 X 1 = 5 Marks
<b>PART B</b> Short answer type questions Question Number 6 to 20	10 X 2 = 20 Marks
<b>PART C</b> Descriptive answer type questions (Either A or B) Question number 21 to 25	5 X 15 = 75 Marks
<b>TOTAL</b>	<b>100 Marks</b>

Note: Board Examinations will be conducted for 100 Marks and converted to 75 Marks.

**MODEL QUESTION PAPER**  
**4052420 WEB DESIGN AND PROGRAMMING**

**Time: 3.00 Hrs.**

**Max.Marks:100**

**Note:**

- Answer all questions in PART A. Each question carries one mark.
- Answer any ten questions in PART B. Each question carries two marks.
- Answer all question by selecting either A or B. Each question carries fifteen marks.

**PART – A**

**(5x1=5)**

**Answer all questions in Part A. Each question carries one Mark**

1. What is Internet?
2. What are the 3 types of CSS?
3. How do you write variables in JavaScript?
4. What does PHP stand for?
5. How to Execute MySQL Query in PHP?

**PART – B**

**(10x2=20)**

**Answer any ten questions in Part B. Each question carries two Marks**

6. Define TCP/IP.
7. What are Lists in HTML?
8. What is the relationship between HTML and CSS?
9. What are attributes in Forms?
10. How many Input controls can be used in Forms?
11. What are attributes in Input Tag?
12. What are the types of variables in JavaScript?
13. How to create an Array in JavaScript?
14. What are two types of validations in JavaScript?
15. How to write "Hello World" in PHP?
16. How do you get information from a form that is submitted using the "get" and "post" method?
17. What is increment and decrement operator with example?
18. Define Open Source.
19. What is MySQL and why it is used?
20. List various logical operators of MySQL.

**PART – C**

**(5x15=75)**

**Answer all question by selecting either A or B. Each question carries fifteen marks**

21. (A) i. Brief in detail about networking concepts. (8)  
ii. Write a HTML to design mark sheet using Table Tag. (7)

OR

- (B) i. What are the different types of Web servers? (8)  
ii. Design a web page using HTML and CSS. (7)
- 22.(A) i. Write CSS syntax with example all <p> elements will be center-aligned, (8)  
with a red text color.  
ii. How do you create a drop down box on a form? (7)

OR

- (B) i. Write a HTML code to create three horizontal frames. (8)  
ii. What are properties of CSS text and CSS fonts? (7)
- 23.(A) i. Describe control statements in JavaScript with syntax and flowchart. (8)  
ii. What is event handling in JavaScript with examples? (7)

OR

- (B) i. How to use various alerts in JavaScript? (8)  
ii. What is the syntax of for statement in JavaScript? Give an example. (7)
- 24.(A) i. Describe the uses of GET and POST methods. (8)  
ii. Explain the syntax of "for" and "for each" loop. Give examples. (7)

OR

- (B) i. Define array in PHP and explain various array functions. (8)  
ii. What is session and cookie in PHP? (7)
- 25.(A) i. How to connect to MySQL database using PHP? (8)  
ii. What are transactions in MySQL? (7)

OR

- (B) i. Write a PHP form to insert student details in data base. (8)  
ii. Write a PHP to view student details from data base. (7)

# **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			Duration
	Hours / Week	Hours / Semester	Marks			
			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
<b>Total</b>		<b>80</b>

**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	<b>FUNDAMENTALS OF OOPS &amp; JAVA</b>	
	<b>Basics of OOPs</b> 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.	4
	<b>Introduction to Java</b> 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.	6
	<b>Elements</b> Constants – Variables – Data types – Type casting – Scope of variables – Operators - Types – Expressions – Evaluation of Expressions.	5
II	<b>CONTROL STRUCTURES, ARRAYS, VECTORS AND STRINGS</b>	
	<b>Decision making and Branching</b> 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.	5
	<b>Arrays &amp; Vectors</b> Arrays: One Dimensional Array – Creating an array – Array processing –Multidimensional Array, Vectors: Definition- Creation - Methods	4
	<b>Strings</b> String Class – Creation – Methods, String Buffer Class -- Creation - Methods– Difference between String and String Buffer.	4
III	<b>CLASSES, INTERFACES AND PACKAGES</b>	
	<b>3.1 Class and object</b> Defining a class — Creating objects — Accessing class members– Constructors – Method overloading – Static members – Nesting of Methods – this keyword – Command line argument.	6



	<b>5.3 AWT Components and Event Handlers</b> 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.

## Board Examination-Question Paper Pattern

Time: 3 Hrs.

Max.Marks:100

**PART - A** Five questions will be asked covering all units. All questions are to be answered. Each question carries 1 mark.

**PART- B** Fifteen questions will be asked covering all the units. Three questions from each unit. Answer any ten questions. Each question carries 2 marks.

**PART-C** Five questions will be asked Either or type. One question from every unit. Answer either A or B. Each question carries 15 marks. A and B have subdivisions. (7 + 8)

**The questions are to be numbered from 1 to 25. All the units are to be covered with equal weightage.**

<b>PART A</b> Definitions and Statements. Question Number 1 to 5	5 X 1 = 5 Marks
<b>PART B</b> Short answer type questions Question Number 6 to 20	10 X 2 = 20 Marks
<b>PART C</b> Descriptive answer type questions (Either A or B) Question number 21 to 25	5 X15 = 75 Marks
<b>TOTAL</b>	<b>100 Marks</b>

Note: Board Examinations will be conducted for 100 Marks and converted to 75 Marks.

## MODEL QUESTION PAPER

### 4052430 OBJECT ORIENTED PROGRAMMING WITH JAVA

Time: 3.00 Hrs.

Max.Marks:100

#### Note:

- Answer all questions in PART A. Each question carries one mark.
- Answer any ten questions in PART B. Each question carries two marks.
- Answer all question by selecting either A or B. Each question carries fifteen marks.

#### PART – A

(5x1=5)

**Answer all questions in PART A. Each question carries one mark**

1. Who developed java?
2. What is the use of continue statement?
3. List any two system packages.
4. Define exception.
5. Which method is used to draw a circle?

#### PART – B

(10x2=20)

**Answer any ten questions in PART B. Each question carries two marks**

6. List any two applications of OOPs.
7. What is separator?
8. Define typecasting.
9. Draw the flow diagram of if-else statement.
10. Define array. Write syntax to create an one dimensional array.
11. Write is the use of append() method.
12. Define constructor.
13. What is abstract class?.
14. Define interface. Give its syntax.
15. List the advantages of exception handling.
16. What is thread scheduling?
17. Define stream. List its types.
18. What is the use of Applet tag?.
19. Write the syntax of drawArc() method.
20. What is the use of layout manager?

**PART – C**

**(15x5=75)**

**Answer all question by selecting either A or B. Each question carries fifteen marks**

21. A. i. Explain how will you create & execute a java program?. (7)

ii. Explain any 4 basic concepts of OOPs. (8)

(OR)

B. i. Explain in detail about java features. (8)

ii. Explain about scope of variables. (7)

22. A. i. Explain about if-else & switch statement. (8)

ii. Explain any 4 methods of Vector class. (7)

(OR)

B. i. Explain about string class with example. (8)

ii. Differentiate String and String buffer class with example. (7)

23. A. i. Explain Multilevel inheritance with example. (8)

ii. Explain in detail about implementing interface. (7)

(OR)

B. i. Define class. Explain in detail. (8)

ii. Explain how will you create & access a package. (7)

24. A. i. Explain about the life cycle of thread. (8)

ii. Explain about exception handling. (7)

(OR)

i. Explain about character stream classes. (8)

ii. Write notes about runnable interface with example. (7)

25. A. i. Explain about creating and executing an applet with example. (8)

ii. With suitable example, describe about the parameter tag. (7)

(OR)

B. i. Explain about Scrollbar. (8)

ii. Explain any 4 methods of Graphics class. (7)



# **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
<b>Total</b>		<b>80</b>

## **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
<b>I</b>	<p><b>CONCEPTS OF DATABASES AND DATA MODELING</b></p> <p><b>Basic Concepts</b> Data, Databases, Database Management System – Components of Database – Data Dictionary – Architecture: Overall Architecture of DBMS, Three level architecture.</p> <p><b>Data Models</b> Types of Database models: Hierarchical Database Model, Network Database Model and Relational Database Model. E-R model: Entities - Attributes – Relationships – E-R diagram – Samples.</p> <p><b>Database Administrator</b> Server / Client and distributed concept – DBA tasks – DBA Tools/Utilities – Database Maintenance – Backup &amp; Recovery.</p> <p><b>Advanced Concepts</b> 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.</p>	<p>4</p> <p>3</p> <p>3</p> <p>5</p>
<b>II</b>	<p><b>RELATIONAL DATA MODEL &amp; MYSQL ADMINISTRATION</b></p> <p><b>Relational data model</b> 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.</p> <p><b>Normalization</b> Benefits – Normal forms: 1<sup>st</sup> Normal form, 2<sup>nd</sup> Normal form, 3<sup>rd</sup> Normal form.</p> <p><b>MySQL Installation</b> Install, Configure and test the MySQL server on Microsoft Windows.</p>	<p>5</p> <p>3</p> <p>3</p>

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

<b>V</b>	<b>STORED PROGRAM CONCEPTS &amp; DEVELOPMENT</b>	
	<b>MySQL Procedures &amp; Functions</b> Creating – Executing and Deleting stored procedures – Creating – Executing and Deleting stored functions – Advantages.	3
	<b>MySQL Trigger &amp; Cursor</b> Use of Trigger — Creating Trigger — Types of Triggers — Cursor: Creation and Deletion.	3
	<b>MySQL and Web</b> Need for own MySQL programs – MySQL Application Programming Interfaces.	3
	<b>MySQL with PHP</b> 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. 3<sup>rd</sup> Edition.
3. “Vikram Vaswami”, “The Complete Reference MySQL”.
4. “Paul DuBois”, “MySQL Developers library”, Addison Wesley (4<sup>th</sup> Edition).

## Board Examination-Question Paper Pattern

Time: 3 Hrs.

Max.Marks:100

PART - A Five questions will be asked covering all units. All questions are to be answered.  
Each question carries 1 mark.

PART- B Fifteen questions will be asked covering all the units. Three questions from each unit. Answer any ten questions. Each question carries 2 marks.

PART-C Five questions will be asked Either or type. One question from every unit.  
Answer either A or B. Each question carries 15 marks. A and B have subdivisions. (7 + 8)

**The questions are to be numbered from 1 to 25. All the units are to be covered with equal weightage.**

<b>PART A</b> Definitions and Statements. Question Number 1 to 5	5 X 1 = 5 Marks
<b>PART B</b> Short answer type questions Question Number 6 to 20	10 X 2 = 20 Marks
<b>PART C</b> Descriptive answer type questions (Either A or B) Question number 21 to 25	5 X 15 = 75 Marks
<b>TOTAL</b>	<b>100 Marks</b>

Note: Board Examinations will be conducted for 100 Marks and converted to 75 Marks.

**MODEL QUESTION PAPER**  
**4052440 RELATIONAL DATABASE MANAGEMENT SYSTEMS**

**Time: 3.00 Hrs.**

**Max.Marks:100**

**Note:**

- Answer all questions in PART A. Each question carries one mark.
- Answer any ten questions in PART B. Each question carries two marks.
- Answer all question by selecting either A or B. Each question carries fifteen marks.

**PART – A**

**(5x1=5)**

**Answer all questions in PART A. Each question carries one mark.**

1. What is DBMS?
2. Define Primary key.
3. List any three MySQL data types.
4. What is the use of Index?
5. Define Cursor.

**PART – B**

**(10x2=20)**

**Answer any ten questions in PART B. Each question carries two marks**

6. What are the components of database?
7. What is E-R model?
8. What are the characteristics of big data?
9. What is Normalization?
10. List the types of Constraints.
11. Explain the following terms – records, Attributes.
12. Name some Aggregate functions.
13. Give the syntax for IF() and IF NULL() commands.
14. What are the Data Definition Commands?
15. Write down the syntax for the creating sequence.
16. What is natural join?
17. Explain GRANT command with an example.
18. Give the syntax of database connections.
19. List the types of Triggers.
20. Write down the advantages of MySQL functions.



**PART – C**

**(5x15=75)**

**Answer all question by selecting either A or B. Each question carries fifteen marks**

21.A.i. Give the difference between RDBMS and NoSQL. (8)

ii) What are the types of data stores in NoSQL? Explain any two of them. (7)

[OR]

B. i. Explain architecture of DBMS with a neat diagram. (8)

ii. What are the different types of Data models? Explain anyone with an example. (7)

22.A. i. Explain referential integrity constraint with an example. (8)

ii. List and explain CODD's rules. (7)

[OR]

B. i. Discuss Backup and recovery. (8)

ii. How to install and configure MySQL server on Microsoft windows. (7)

23.A. i. Explain different types of Data Definition commands with an example (8)

ii. List and explain different types of operators with an example. (7)

[OR]

B. i. Explain aggregate functions with an example. (8)

ii. Explain IF(), IF NULL(), CASE, WHILE flow control with an example. (7)

24.A. i. Explain sequence with an example. (8)

ii. Explain Transaction handling commands with an example. (7)

[OR]

B. i. Explain GRANT and REVOKE commands with an example. (8)

ii. How will you create view? Explain with an example. (7)

25.A. i. With an example, explain stored functions in MySQL. (8)

ii. Write about the creation of triggers with an example. (7)

[OR]

B. i. Give the syntax for MySQL with PHP database connections, managing data base connections and closing database connections. (8)

ii. Write about fetch statement used in cursor with its syntax and examples. (7)

# **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			Duration
	Hours / Week	Hours / Semester	Marks			
			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 an object 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 are changed 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**.

### **DETAILED 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			Duration
	Hours / Week	Hours / Semester	Marks			
			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 environment to 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

..

## **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**.

### **DETAILED ALLOCATION OF MARKS**

<b>SCHEME OF VALUATION</b>	
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
<b>TOTAL</b>	<b>100 Marks</b>

### **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 in Windows.
- 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 one 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 these commands:
  - Find the names of all employees who live in 'Chennai' and whose salary is between 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 the number 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 1<sup>st</sup> and 2<sup>nd</sup> normal forms to fix it.

7. To study the commands for views and execute the following queries using these commands:

- 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 IT department 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 like withdrawal, 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)

- SELECT all the users along with their profile details. (Hint: Use INNER JOIN)
- SELECT the users who do not have profiles (Hint: USE LEFT JOIN and exclude 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 table each 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 to update 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**.

#### **DETAILED 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
<b>TOTAL</b>	<b>100 Marks</b>

#### **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

## DETAILED SYLLABUS

Content: Theory

UNIT	Name of the Topics	Hours
<b>I</b>	<b>Introduction to Python</b> <b>Features of Python</b> - Installing and running Python - interpreter and Interactive mode - Identifiers - Reserved Keywords - Variables - Comments in Python	<b>4</b>
	<b>Data Types</b> – Numeric, String, List, Sets, Tuple, Dictionary, Boolean; Operators – Arithmetic, Relational, Assignment, Logical, Bitwise, Membership operator, identity operator.	<b>4</b>
	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.	<b>5</b>
<b>II</b>	<b>Decision Making, Control structure and Functions</b> <b>Decision Making</b> – Simple if, if...else and if ... elif statement; Control Statement - for loop, range(), while, break , continue, pass	<b>5</b>
	<b>Functions:</b> 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.	<b>5</b>
	Writing Scripts in Python; Illustrative programs.	<b>5</b>
<b>III</b>	<b>Strings and Lists</b> <b>Strings</b> :Strings in python, String functions and methods, string slicing, immutable property, string Traversal, Escape Characters, string formatting operators and functions.	<b>5</b>
	<b>Lists</b> — Creation of List, values and accessing elements, mutable property, Traversing a List, copying the list, altering values, deleting elements from list.	<b>5</b>
	Built-in List operators and built-in methods. Illustrative Programs	<b>4</b>

<p><b>IV</b></p>	<p><b>Tuples and Dictionaries:</b></p> <p><b>Tuples</b>-creating, accessing values, immutable property, assignment of tuples, returning tuples, tuples as arguments - variable length arguments - basic tuple operations, Built-in tuple functions.</p> <p><b>Dictionaries:</b> Creating a Dictionary , accessing values, updating dictionary, deleting elements from dictionary; dictionary keys-Properties, operations in Dictionary, Built-in dictionary methods, Illustrative Programs.</p>	<p><b>8</b></p> <p><b>7</b></p>
<p><b>V</b></p>	<p><b>Files and Exception Handling</b></p> <p><b>Files:</b> 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.</p> <p><b>Directory :</b>Directory methods – mkdir(), chdir(), getcwd(), rmdir().</p> <p><b>Exceptions in Python:</b> Definition - Built-in exceptions, Handling Exceptions-try...except, except with No Exception, except with Multiple Exceptions, try...finally; User defined exceptions. Illustrative programs</p>	<p><b>7</b></p> <p><b>2</b></p> <p><b>6</b></p>

## 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.	1 <sup>st</sup> 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	2 <sup>nd</sup> Edition/ 2020
6.	Programming in Python	Dr.Pooja Sharma	BPB Publications	2017

### Python Online Learning Resources:

<https://www.learnpython.org>

[www.python.org](http://www.python.org) ,

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

## Board Examination-Question Paper Pattern

Time: 3 Hrs.

Max.Marks:100

PART - A Five questions will be asked covering all units. All questions are to be answered. Each question carries 1 mark.

PART- B Fifteen questions will be asked covering all the units. Three questions from each unit. Answer any ten questions. Each question carries 2 marks.

PART-C Five questions will be asked either or type. One question from every unit. Answer either A or B. Each question carries 15 marks. A and B have subdivisions. (7 + 8)

**The questions are to be numbered from 1 to 25. All the units are to be covered with equal weightage.**

<b>PART A</b> Definitions and Statements. Question Number 1 to 5	5 X 1= 5 Marks
<b>PART B</b> Short answer type questions Question Number 6 to 20	10 X 2 = 20 Marks
<b>PART C</b> Descriptive answer type questions (Either A or B) Question number 21 to 25	5 X15 = 75 Marks
TOTAL	100 Marks *

**Note: Board Examinations will be conducted for 100 Marks and it is reduced to 75 Mark**

**MODEL QUESTION PAPER**  
**4052510- Python programming**

Time: 3 Hrs

Max.Marks: 100

**Note:**

- Answer all questions in PART A. Each question carries one mark.
- Answer any ten questions in PART B. Each question carries two marks.
- Answer all question by selecting either A or B. Each question carries fifteen marks.

**PART – A**

**Answer all the questions**

5 X 1 = 5 Marks

- 1.Which character is used for commenting in python?
- 2.What is the importance of indentation in python?
- 3.What is a list?
- 4.What is meant by “tuples are immutable”?
5. Write the syntax to open the file “abc.txt” in both read and write mode.

**PART-B**

**Answer any TEN questions**

10 X 2 = 20 Marks

- 6.What are the key features of python?
- 7.Write any two operations performed on sets?
- 8.What are identity operators?
- 9.What is the use of range function?
10. Write a python program to print first five odd numbers?
- 11.What are local variables and global variables in python?
12. What is the use of following functions? a. len()b.capitalize()
- 13.Write the difference between List and Tuples?
14. How will you access the elements in List?
15. List the built-in functions used in tuples.
16. What is a dictionary in python?
17. What are the different methods used in deleting elements from dictionary?
18. What are the File Object Attributes?
19. Write the syntax for each of basic directory methods.
20. Write the syntax for try...except.

## PART – C

Answer any ONE subdivision either from A or B

15 X 5 = 75 Marks

21. (A) i. Explain different data types supported by Python. (8)  
ii. How to install and run python? (7)

(Or)

- (B) i. Explain Bitwise operators, Membership Operators with example. (8)  
ii. Write a python program to swap the values of two variables. (7)

22. (A) i. Explain 'for ... else' statement with necessary examples. (8)  
ii. Write a program to print all prime numbers in the given range. (7)

(Or)

- (B) i. With example, explain composition of functions. (7)  
ii. Write a function to display Fibonacci sequence using recursion. (8)

23. (A) i.. What is string slicing? Illustrate how it is done in Python with example. (7)  
ii. Write a Python code to search a string in the given list. (8)

(Or)

- (B). i. What do you understand from traversing a List? Give Example. (7)  
ii. Explain the different ways of deleting elements from List. (8)

24. (A). i. Demonstrate with code the various operations that can be performed on tuples. (8)  
ii. Write notes on built in tuple functions. (7)

(Or)

- (B) i.. Illustrate with an example how a dictionary is created and updated. (7)  
ii. List the built-in Dictionary Methods. Explain any four methods. (8)

25. (A) i. Explain renaming a file and deleting a file with example. (7)  
ii. Write a program to count the number of words in a Python file. (8)

(Or)

- (B) i. Explain different ways of exception handling in Python with example. (8)  
ii. Write notes on file related methods. (7)



# **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
<b>Total</b>		<b>96</b>

**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

## DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topics	Hours
I	<p><b><u>INTRODUCTION TO CLOUD COMPUTING</u></b></p> <p>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</p> <p>Architectural influences — High-performance computing, utility and enterprise grid computing, Autonomic computing, Service consolidation, Horizontal scaling, Web services, High scalability architecture</p> <p>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</p>	5  6  5
II	<p><b><u>CLOUD COMPUTING ARCHITECTURE &amp; SERVICES</u></b></p> <p>Cloud architecture: Cloud delivery model – SPI framework, SPI evolution, SPI vs. traditional IT Model.</p> <p>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</p> <p>Platform as a Service (PaaS): Cloud Plat form &amp; Management — Computation&amp; Storage - PaaS service providers — Right Scale — Salesforce.com – Rackspace - Force.com – services and benefits.</p> <p>Infrastructure as a Service (IaaS): IaaS service providers –Amazon EC2, GoGrid – Microsoft implementation and support – Amazon EC service level agreement – recent developments – benefits.</p> <p>Cloud deployment model: Public clouds – private clouds – community clouds – hybrid clouds - Advantages of Cloud computing.</p>	3  3  3  4  4
III	<p><b><u>SECURITY IN THE CLOUD</u></b></p> <p>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</p>	8

	3.2 Cloud Computing Security Challenges - Security Policy Implementation - Policy Types - Virtualization Security Management - Virtual Threat	8
IV	<p><b><u>INTRODUCTION TO INTERNET OF THINGS</u></b></p> <p>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</p> <p>IOT enabling Technologies: Wireless sensor networks — Cloud Computing- Big Data Analytics- Communication protocols- embedded systems.</p> <p>IOT Levels and Deployment templates: IOT Level-1- IOT Level-2- IOT Level-3-IoT Level-4 - IOT Level-5- IOT Level-6</p>	7 6 7
V	<p><b><u>IOT PLATFORMS : DESIGN AND DEVELOPMENT</u></b></p> <p>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.</p> <p>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.</p>	10 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

## Board Examination-Question Paper Pattern

Time: 3 Hrs.

Max.Marks:100

PART-A Five questions will be asked covering all units. All questions are to be answered.

Each question carries 1 mark.

PART- B Fifteen questions will be asked covering all the units. Three questions from each unit. Answer any ten questions. Each question carries 2 marks.

PART-C Five questions will be asked Either or type. One question from every unit. Answer either A or B. Each question carries 15 marks.A and B have subdivisions. (7 + 8)

**The questions are to be numbered from 1 to 25. All the units are to be covered with equal weightage.**

<b>PART A</b> Definitions and Statements. Question Number 1 to 5	5 X 1 = 5 Marks
<b>PART B</b> Short answer type questions Question Number 6 to 20	10 X 2 = 20 Marks
<b>PART C</b> Descriptive answer type questions (Either A or B) Question number 21 to 25	5 X15 = 75 Marks
<b>TOTAL</b>	<b>100 Marks</b>

Note: Board Examinations will be conducted for 100 Marks and converted to 75 Marks.

**MODEL QUESTION PAPER**  
**4052520-Cloud Computing and Internet Of Things**

Time: 3 Hrs

Max.Marks: 100

**Note:**

- Answer all questions in PART A. Each question carries one mark.
- Answer any ten questions in PART B. Each question carries two marks.
- Answer all question by selecting either A or B. Each question carries fifteen marks.

**PART A (5 \* 1 = 5 marks)**

**Answer all questions in PART A. Each question carries one mark.**

1. Define autonomic computing
2. List cloud deployment models
3. Define encryption
4. Define Internet of Things
5. What is an IoT device?

**PART B (10 \* 2 = 20 marks)**

**Answer any ten questions in PART B. Each question carries two marks.**

6. Briefly explain the components of cloud.
7. What is High Performance Computing?
8. Explain security concerns in a cloud.
9. Explain SPI framework.
10. List few IaaS service providers.
11. List the advantages of cloud computing.
12. What is security mapping?
13. How do you secure data in a cloud?
14. What is Denial of Service risk?
15. List IOT functional blocks.
16. List the various technologies involved in IoT.
17. List IOT communication models.
18. List any four steps in designing any IOT system.
19. What are the basic building blocks of an IOT device?
20. What is the use of GPIO pins in Raspberry Pi?

**PART C (5 \* 15 = 75 marks)**

**Answer all question by selecting either A or B. Each question carries fifteen marks.**

- 21.A.i. Explain the characteristics of cloud in detail. (8)  
ii. Write notes on origin of cloud computing. (7)  
(OR)
- B.i. Discuss the architectural influences of cloud computing in detail. (8)  
ii. Explain the government policies on cloud computing. (7)
- 22.A.i. Explain cloud architecture with a neat diagram. (8)  
ii. Explain in detail about Google app engine. (7)  
(OR)
- B.i.Explain Amazon EC2 as an IaaS provider. (8)  
ii.Explain in detail about hybrid cloud. (7)
- 23.A.i. Explain Cloud Security Alliance reference model with a neat diagram.(8)  
ii. Write notes on storage location and tenancy. (7)  
(OR)
- B.i. Explain Security Policy implementation. (8)  
ii. Explain about the virtual threats. (7)
- 24.A.i.Explain IoT communication models. (8)  
ii.Explain about the communication protocols in IoT. (7)  
(OR)
- B.i. Explain any two levels of an IOT system. (8)  
ii. Describe in detail about embedded systems. (7)
- 25.A.i.List and briefly explain the steps involved in IOT System (8)  
ii.Explain about domain model specification in IoT. (7)  
(OR)
- B.i. Explain the various components and peripherals of Raspberry pi Board.. (8)  
ii. Describe in detail about other IOT devices. (7)



# **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			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
<b>Component Based Technology</b>	<b>5</b>	<b>80</b>	<b>25</b>	<b>100*</b>	<b>100</b>	<b>3 Hrs.</b>

\* 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	<b>INTRODUCTION TO .NET FRAMEWORK and C#.NET</b>	<b>15</b>
	<p><b><u>Chapter: 1.1:</u> Introduction to .NET framework and DOT NET CORE:</b> Features of .NETframework, Features of .NET CORE,.Net Architecture – Managed Code and the CLR –Intermediate Language, Metada ta and JIT Compilation–AutomaticMemory Management. – Assembly, .NET objects, .NET web services, .net core Vs.net framework,</p>	3
	<p><b><u>Chapter: 1.2:</u> Visual Studio .NET</b> – Features, Using the .NETFramework, Exploring the Visual Studio Integrated DevelopmentEnvironment – System requirements – Versions</p>	3
	<p><b><u>Chapter: 1.3:</u> INTRODUCTION TO C#.NET--</b> 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.</p>	4
	<p><b><u>Chapter: 1.4:</u> Types:</b> Value data types – Structures, Enumerations. Reference data types – Single dimensional– Multi-dimensional arrays– Jagged arrays– Dynamic arrays</p>	3
	<p><b><u>Chapter: 1.5:</u> Classes &amp; objects</b> – Creating and using your own classes – Data members and member methods – Instantiate an object, abstract class – static class</p>	2
II	<b>APPLICATION DEVELOPMENT USING C#.NET</b>	<b>15</b>
	<p><b><u>Chapter: 2.1:</u> Windows programming–</b> Creating windows Forms– Working with Toolbox Controls – Button, Check Box, Combo Box, Label, List Box, Radio Button, Text Box, Group Boxes, Picture Box</p>	4
	<p><b><u>Chapter: 2.2:</u> Advanced Controls &amp; Events</b> : Timer , Progress Bar, Month Calendar , ToolTips, Tab Controls, Panels -Events–Click, Close, Deactivate, Load, MouseMove, Mouse Down, MouseUp, Keypress ,KeyDown, KeyUp</p>	3

	<b>Chapter: 2.3:</b> <b>Multiple Document Interface (MDI) Forms</b> — Creating MDI Applications – Creating MDI Child Windows –Arranging MDI Child Windows	4
	<b>Chapter: 2.4: Menus and Dialog Boxes</b> — Creating menus — Menu items – Creating Submenus , Menu Shortcuts, Context menu – Using dialog boxes – show Dialog() method.	4
<b>III</b>	<b>APPLICATION DEVELOPMENT USING ADO.NET</b>	<b>14</b>
	<b>Chapter: 3.1: Features of ADO.NET.</b> Architecture of ADO.NET – ADO.NET providers — Connection — Command — Data Adapter — Dataset.	5
	<b>Chapter: 3.2: Accessing Data with ADO.NET:</b> Connecting to Data Table data using Command Objects – Understanding Data Set and working with Data Column and DataRow – Data Tables - Working with Data GridView	5
	<b>Chapter: 3.3: Create an ADO.NET application</b> — Using Stored Procedures	4
<b>IV</b>	<b>INTRODUCTION TO ASP.NET</b>	<b>14</b>
	<b>Chapter: 4.1: ASP.NET Features:</b> 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
	<b>Chapter: 4.2: Creating Web Controls:</b> Web Controls – HTML Controls, Using Intrinsic Controls, Using Input Validation Controls, Selecting Controls for Applications – Adding web controls to a Page	4
	<b>Chapter: 4.3: Creating Web Forms:</b> Server Controls – Types of Server Controls – Adding ASP.NET Code to a Page.	3
	<b>Chapter: 4.4: .NET CORE WEB API :</b> What's web API?, Web API features, Restful services, Method of REST	3
<b>V</b>	<b>XML</b>	<b>14</b>
	<b>Chapter: 5.1: Introduction:</b> 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

	<p><b>Chapter: 5.2: DTD:</b> 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</p>	5
	<p><b>Chapter: 5.3: XML with .NET:</b> XML Serialization in the .NET Framework – SOAP Fundamentals- Using SOAP with the .NET Framework.</p>	4

## Reference Books

S.No	Author Name	Title	Publisher
1.	Douglas J. Reilly	Designing Microsoft ASP.NET Applications	Microsoft Press
2.	ISR D 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

## Board Examination-Question Paper Pattern

Time: 3 Hrs.

Max.Marks:100

PART- A Five questions will be asked covering all units. All questions are to be answered. Each question carries 1 mark.

PART- B Fifteen questions will be asked covering all the units. Three questions from each unit. Answer any ten questions. Each question carries 2 marks.

PART- C Five questions will be asked Either or type. One question from every unit. Answer either A or B. Each question carries 15 marks.A and B have subdivisions. (7 + 8)

**The questions are to be numbered from 1 to 25. All the units are to be covered with equal weightage.**

<b>PART A</b> Definitions and Statements. Question Number 1 to 5	5 X 1 = 5 Marks
<b>PART B</b> Short answer type questions Question Number 6 to 20	10 X 2 = 20 Marks
<b>PART C</b> Descriptive answer type questions (Either A or B) Question number 21 to 25	5 X15 = 75 Marks
<b>TOTAL</b>	<b>100 Marks</b>

Note: Board Examinations will be conducted for 100 Marks and converted to 75 Marks.

## MODEL QUESTION PAPER

### SEMESTER -V

#### 4052531 - COMPONENT BASED TECHNOLOGY

- NOTE : PART- A All questions are to be answered. Each question carries 1 mark.  
PART- B .Answer any ten questions. Each question carries 2 marks.  
PART-C Answer either A or B. Each question carries 15 marks. A and B have subdivisions. (7 + 8)
- 

Time : 3 Hrs

Max. Marks: 100

#### **PART – A (5 x 1 = 5 Marks)**

**All questions are to be answered. Each question carries 1 mark.**

1. Define JIT.
2. What is an event?
3. Define ADO.
4. Define Intrinsic controls.
5. What is XML serialization?

#### **PART – B ( 10 x 2 = 20 Marks)**

**Answer any ten questions. Each question carries 2 marks.**

6. Which is the root namespace in .NET framework?
7. List any two features of Visual studio .NET.
8. What is a variable? How will you declare it?
9. Define event procedure.
10. Differentiate system context menu and custom context menu.
11. List any four mouse related events.
12. Define ADO.
13. What is the use of fill method?
14. Define Data Table Collection.
15. What is the use of ASP.NET?
16. Name the default home directory.
17. What is the purpose of global.asax file?
18. Define XML.
19. What are the important classes of XML?
20. List the major components of XML.



**PART – C ( 5 x 15 = 75 Marks)**

**Answer either A or B from each Question. Each question carries 15 Marks**

21. A. i. Explain the features of .NET Framework. [7]  
ii. Explain the Architecture of .NET Framework. [8]

[ OR]

- B. i. Explain any three decision making statements with example. [7]  
ii. What are the various operators available in C#.NET?  
Explain with example. [8]

22. A. i. Differentiate Checkbox and Radio button with an example. [7]  
ii. Define Context Menu. Explain the steps to create a context menu. [8]

[ OR]

- B. i. Design an application to implement the methods of List box control. [7]  
ii. What is context menu? Create your own Context menu using  
visual studio. [8].

23. A. I Explain the features of ADO.NET. [7]  
ii. Explain the objects in .NET Data provider. [8]

[ OR]

- B. i. Write your own ADO.NET application with suitable steps and code. [7]  
ii. What are the steps required to create a Stored procedure. [8]

24. A. i. Define Virtual Directory. List the steps to create a Virtual Directory in IIS.[7]  
ii. What are the major events in GLOBAL.ASAX? [8]

[ OR]

- B. i. Write down the steps to change the properties of Log file. [7]  
ii. What are server controls and explain it briefly. [8]

25. A. i. Explain about browsing and parsing in XML. [7]  
ii. Explain in detail about XML serialization with its architecture diagram. [8]

[ OR]

- B. i. Explain briefly about DTD. [7]  
ii. Define Schema. Write about the building blocks of schema. [8]

# **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			
	Hours/Week	Hours/Semester	Marks			Duration
Artificial Intelligence and Data Analytics	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
<b>I</b>	<b>Artificial Intelligence</b>	<b>15</b>
	<b>1.1 Artificial Intelligence:</b> 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.	<b>4</b>
	<b>1.2 Knowledge:</b> Definition-Knowledge Representation-objectives and requirements-practical aspects of representation-Components <b>Intelligent Agents:</b> Agents and Environments-Properties of environments-characteristics of agents- classification of agents -	<b>4</b>
	<b>1.3 Problem Solving:</b> 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.	<b>7</b>
<b>II</b>	<b>Introduction to Machine Learning</b>	<b>14</b>
	<b>2.1 Learning:</b> Strategies of Learning- Learning Model- Classes of Learning (Supervised, Unsupervised, Reinforcement)- Process of ML- Common types of ML algorithms.	<b>5</b>
	<b>2.2 Neural Network:</b> Biological and Artificial, Mathematical model of a neuron	<b>3</b>
	<b>2.3 Machine Learning Applications:</b> Learning Associations, Regression, Classification, Prediction-Natural Language Processing (NLP)- Automatic Speech Recognition (ASR)- Machine Vision-Robotics.	<b>6</b>
<b>III</b>	<b>Data Analytics and Computing with NumPy</b>	<b>15</b>
	<b>3.1 Data Analytics:</b> 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.	<b>4</b>
	<b>3.2 Introduction to Python:</b> Features of Python-Installing Python-	<b>5</b>

	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).	
	<b>3.3 NumPy Library:</b> 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.	<b>6</b>
<b>IV</b>	<b>Data Analysis with Pandas</b>	<b>15</b>
	<b>4.1 Introduction:</b> Pandas data structures: <b>Series</b> - Declaration, selecting elements, assigning values, Filtering values, operations, mathematical functions, evaluating values, Handling missing data, creating series from dictionaries, adding two series.	<b>5</b>
	<b>4.2 Data Frame:</b> Defining, Selecting elements, assigning values, membership, deleting a column, filtering. <b>Index Objects:</b> Indexing, Reindexing, Dropping- sorting and ranking- Descriptive Statistics	<b>4</b>
	<b>Data Loading:</b> Reading and Writing csv, xls, text data files- <b>Data Cleaning and Preparation:</b> Handling missing data, Removing duplicates, replacing values- Vectorized String Methods- Hierarchical Indexing- Merging and Combining- Data aggregation and Grouping.	<b>6</b>
<b>V</b>	<b>Visualization with Matplotlib</b>	<b>14</b>
	<b>5.1 Data Visualization:</b> Introduction to Matplotlib -PyPlot package- Figures and Subplots-showing plots and images	<b>4</b>
	<b>5.2 Customizing Plots:</b> Colors, Markers, Line Styles, Limits, Tics, Labels, Legends, Grids - Annotating with text-Matplotlib configuration	<b>4</b>
	<b>5.3 Chart types:</b> Line, Bar, stacked bar, Box plots, pie chart - Histogram and Density plots- Scatter plot- Saving Plots to a file- Close and clear plots.	<b>6</b>

### 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

## Board Examination-Question Paper Pattern

**Time: 3 Hrs.**

**Max.Marks:100**

**PART - A** Five questions will be asked covering all units. All questions are to be answered. Each question carries 1 mark.

**PART- B** Fifteen questions will be asked covering all the units. Three questions from each unit. Answer any ten questions. Each question carries 2 marks.

**PART-C** Five questions will be asked Either or type. One question from every unit. Answer either A or B. Each question carries 15 marks.A and B have subdivisions. (7 + 8)

**The questions are to be numbered from 1 to 25. All the units are to be covered with equal weightage.**

<b>PART A</b> <b>Definitions and Statements.</b> <b>Question Number 1 to 5</b>	<b>5 X 1 = 5 Marks</b>
<b>PART B</b> <b>Short answer type questions</b> <b>Question Number 6 to 20</b>	<b>10 X 2 = 20 Marks</b>
<b>PART C</b> <b>Descriptive answer type questions</b> <b>(Either A or B)</b> <b>Question number 21 to 25</b>	<b>5 X15 = 75 Marks</b>
<b>TOTAL</b>	<b>100 Marks</b>

Note: Board Examinations will be conducted for 100 Marks and converted to 75 Marks.



## MODEL QUESTION PAPER

### 4052532 – ARTIFICIAL INTELLIGENCE AND DATA ANALYTICS

- NOTE : PART- A All questions are to be answered. Each question carries 1 mark.  
PART- B .Answer any ten questions. Each question carries 2 marks.  
PART- C Answer either A or B. Each question carries 15 marks .A and B have subdivisions.

Time : 3 Hrs

Max. Marks: 100

#### **PART – A (5 x 1 = 5 Marks)**

**All questions are to be answered. Each question carries 1 mark.**

1. Define Artificial Intelligence.
2. What is reinforcement learning?
3. What is the difference between a list and a tuple?
4. List out the different types of data structures in Pandas.
5. Write a python package used for 2D graphics.

#### **PART – B ( 10 x 2 = 20 Marks)**

**Answer any ten questions. Each question carries 2 marks.**

6. Explain Applications of Artificial Intelligence.
7. Write notes on Various types of Knowledge representation.
8. Differentiate between informed and uninformed search.
9. Draw the mathematical model of a neuron.
10. Write notes on Supervised and unsupervised learning.
11. Write short notes on automatic speech recognition.
12. List out the major elements of data analytics.
13. Explain how the filter function works in Numpy Library.
14. Briefly describe the characteristics of panda series.
15. How an Empty Dataframe is created in Pandas?
16. Explain Re-indexing In Pandas.
17. Explain the use of GroupBy objects in Pandas?
18. Write the python code to save the plot as an image with Matplotlib.
19. Read the code:

```
import matplotlib.pyplot as plt  
plt.plot(3,2)  
plt.show()
```

draw the output for the above coding.

20. Write the hist() method in data visualization.

**PART – C ( 5 x 15 = 75 Marks)**

**Answer either A or B from each Question. Each question carries 15 Marks**

- 21 A. i. Explain Breadth First search with an example. (8)  
ii. Explain the Tic-Tac-Toe problem. (8)  
(or)
- B. i. Elaborate in detail the classification of agents in AI. (7)  
ii. Explain the technological drivers of modern AI. (8)
- 22 A. i. What are the steps involved in the machine learning process? (7)  
ii Explain the artificial neural network learning model with a neat sketch. (8)  
(or)
- B. i. Explain the application of machine learning in regression problems. (8)  
ii. Explain the applications of machine learning in Automatic speech processing (7)
- 23 A. i. Explain how a series is different from a 1-D array and dictionary. (7)  
ii. How to stack two series vertically and horizontally? Give Example. (8)  
(or)
- B. i. Explain with an example how array slicing can be done using Numpy. (8)  
ii. Write the python code to print the elements of a 1D array in reverse order. (7)
- 24 A. i. Explain how a Data Frame is created using Lists of n-dimensional arrays. (7)  
ii. Explain any two ways to handle missing data in Data Frame. (8)  
(or)
- B. i. Write the python code to calculate the frequency of each element in a Pandas series (8)  
ii. Explain about adding rows and columns to the Data frame in Pandas. (7)
- 25 A. i. Draw histogram programmatically in python with the following frequency of scores 1,1,2,2,2,2,2,3,3,3,3,4,4,5 with range (bins) starting from 1 to 5. (8)  
ii. How do you plot multiple histograms in python using matplotlib. (7)  
(or)
- B. i. Describe matplotlib and its data visualization features in Python. (8)  
ii. Explain about Box plot in detail. (7)

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

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

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

**REFERENCE BOOK:**

1. J. F. DiMarzio (Author) -Beginning Android Programming with Android Studio, 4th Edition ( 2016) - Wiley
2. Wei-Meng Lee -Beginning Android 4 Application Development, 2012 - Wiley India Edition
3. Asoke K Talukder, Hasan Ahmed, Roopa R Yavagal Mobile Computing, 2005 - MGH



## Board Examination-Question Paper Pattern

**Time: 3 Hrs.**

**Max.Marks:100**

**PART - A** Five questions will be asked covering all units. All questions are to be answered. Each question carries 1 mark.

**PART- B** Fifteen questions will be asked covering all the units. Three questions from each unit. Answer any ten questions. Each question carries 2 marks.

**PART-C** Five questions will be asked Either or type. One question from every unit. Answer either A or B. Each question carries 15 marks.A and B have subdivisions. (7 + 8)

**The questions are to be numbered from 1 to 25. All the units are to be covered with equal weightage.**

<b>PART A</b> <b>Definitions and Statements.</b> <b>Question Number 1 to 5</b>	<b>5 X 1 = 5 Marks</b>
<b>PART B</b> <b>Short answer type questions</b> <b>Question Number 6 to 20</b>	<b>10 X 2 = 20 Marks</b>
<b>PART C</b> <b>Descriptive answer type questions</b> <b>(Either A or B)</b> <b>Question number 21 to 25</b>	<b>5 X15 = 75 Marks</b>
<b>TOTAL</b>	<b>100 Marks</b>

Note: Board Examinations will be conducted for 100 Marks and converted to 75 Marks.

**4053633 Mobile Computing**

**MODEL QUESTION PAPER**

Time: 3.00 Hrs.

Max.Marks:100

Note:

1. Answer all questions in PART - A. Each question carries one mark.
2. Answer any ten questions in PART - B. Each question carries two marks.
3. Answer all question in PART-C by selecting either A or B. Each question carries fifteen marks.

**PART – A (5 x 1 = 5 Marks)**

**All questions are to be answered. Each question carries 1 mark.**

1. Define Base Station
2. What is Android
3. What is AVD ?
4. Expand SMS
5. What is SQLite?

**PART – B ( 10 x 2 = 20 Marks)**

**Answer any ten questions. Each question carries 2 marks.**

6. Explain Wi-Max
7. Define Cell
8. Define Handoff
9. List out any 2 Android Versions ?
10. What is ADT Explain?
11. What is Smart TV Operating ?
12. What is an Activity?
13. What is Layout ?
14. How will you create AVD ? Explain
15. What is the use of Toggle Button ?
16. What is the use of CheckBoxGroupview ?
17. What is the use of Progress Bar View ?
18. What is reverse GeoCoding ?
19. What is Content Provider ?
20. What is LBS ?

**PART – C ( 5 x 15 = 75 Marks)**

**Answer either A or B from each Question. Each question carries 15 Marks**

21. A (I) Explain the important terminologies of Mobile Computing (8)  
(II) Explain the features of WI-FI and WI-MAX (7)  
(OR)
21. B (I) Explain the Features of 4G and 5G (8)  
(II) Write notes on RFID. (7)
22. A (I) Describe about the history and features of Apple Operating Systems(8)  
(II) Explain features Smart TV Operating System (7)  
(OR)
22. B (I) Explain the evaluation of Mobile Operating Systems (8)  
(II) Write notes on the android market application store. (7)
23. A (I) Explain Dalvik Virtual Machine (8)  
(II) Explain activity lifecycle with flow chart. (7)  
(OR)
23. B (I) Explain the architecture of Android. (8)  
(II) How to run an application in the AVD? (7)
24. A (I) Explain Options Menu with example. (8)  
(II) Explain different types of dialogs supported by Android. (7)  
(OR)
24. B.(I) Write an android code to send SMS. (8)  
(II) Write an android code to make a phone call. (7)
25. A (I) Explain the procedure to create android map API Key (8)  
(II) Explain Cross platform application development tools (7)  
and their features  
(OR)
25. B.(I) Write a program to store and retrieve records in SQLite database (8)  
(II) How to download text content using android service? (7)

# **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 of characters, 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**

<b>SCHEME OF VALUATION</b>		
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
<b>TOTAL</b>		<b>100 Marks</b>

### **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.	<b>Part – A : List of Experiments Performed for Cloud Computing</b>
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.	<b>Part – B : List of Experiments Performed for IoT</b>
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**

<b>SCHEME OF VALUATION</b>		
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
<b>TOTAL</b>		<b>100 Marks</b>

### 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	
<b>Component Based Technology Practical</b>	<b>4</b>	<b>64</b>	<b>25</b>	<b>100*</b>	<b>100</b>	<b>3 Hrs.</b>

\* 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 <span> 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 and validate 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**

### **DETAILED 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
<b>TOTAL</b>	<b>100 Marks</b>

### **LIST OF EQUIPMENTS**

<b>HARDWARE REQUIREMENT</b>	<b>SOFTWARE REQUIREMENT</b>
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. Handling 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 in the 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**

<b>SCHEME OF VALUATION</b>	
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
<b>TOTAL</b>	<b>100 Marks</b>

### **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			
	Hours / Week	Hours/ Semester	Marks			Duration
Mobile Computing Practical	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 applications for 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

<b>DETAILED ALLOCATION OF MARKS</b>	
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
<b>TOTAL</b>	<b>100 Marks</b>

# **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			Duration
	Hours/ Week	Hours/ Semester	Marks			
			Internal Assessment	Board Examinations	Total	
<b>Entrepreneurship and Start ups</b>	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	12
2	Business Idea and Banking	12
3	Start ups, E-cell and Success Stories	12
4	Pricing and Cost Analysis	12
5	Business Plan Preparation	12
Revision		04
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 of 5th 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 start ups

## DETAILED SYLLABUS

Unit	Name of the Topics	Hours
1	<p><b>Entrepreneurship – Introduction and Process</b></p> <ul style="list-style-type: none"> <li>• Concept, Functions and Importance</li> <li>• Myths about Entrepreneurship</li> <li>• Pros and Cons of Entrepreneurship</li> <li>• Process of Entrepreneurship</li> <li>• Benefits of Entrepreneur</li> <li>• Competencies and characteristics</li> <li>• Ethical Entrepreneurship</li> <li>• Entrepreneurial Values and Attitudes</li> <li>• Motivation</li> <li>• Creativity</li> <li>• Innovation</li> <li>• Entrepreneurs - as problem solvers</li> <li>• Mindset of an employee and an entrepreneur</li> <li>• Business Failure – causes and remedies</li> <li>• Role of Networking in entrepreneurship</li> </ul>	12
2	<p><b>Business Idea and Banking</b></p> <ul style="list-style-type: none"> <li>• Types of Business: Manufacturing, Trading and Services.</li> <li>• Stakeholders: sellers, vendors and consumers and Competitors</li> <li>• E- commerce Business Models</li> <li>• Types of Resources - Human, Capital and Entrepreneurial tools and resources</li> <li>• Selection and utilization of human resources and professionals, etc.</li> <li>• Goals of Business; Goal Setting</li> <li>• Patent, copyright and <i>Intellectual property</i> rights</li> <li>• Negotiations - Importance and methods</li> <li>• Customer Relations and Vendor Management</li> </ul>	12

	<ul style="list-style-type: none"> <li>• Size and capital based classification of business enterprises</li> <li>• Various sources of Information</li> <li>• Role of financial institutions</li> <li>• Role of Government policy</li> <li>• Entrepreneurial support systems</li> <li>• Incentive schemes for state government</li> <li>• Incentive schemes for Central governments</li> </ul>	
<b>3</b>	<p><b>Start ups, E-cell and Success Stories</b></p> <ul style="list-style-type: none"> <li>• Concept of Incubation centre's</li> <li>• Visit and report of DIC, financial institutions and other relevance institutions</li> <li>• Success stories of Indian and global business legends</li> <li>• Field Visit to MSME's</li> <li>• Study visit to Incubation centers and start ups</li> <li>• Learn to earn</li> <li>• Startup and its stages</li> <li>• Role of Technology – E-commerce and Social Media</li> <li>• Role of E-Cell</li> <li>• E-Cell to Entrepreneurship</li> </ul>	<b>12</b>
<b>4</b>	<p><b>Pricing and Cost Analysis</b></p> <ol style="list-style-type: none"> <li>1. Unit of Sale, Unit Price and Unit Cost - for single product or service</li> <li>2. Types of Costs - Start up, Variable and Fixed</li> <li>3. Income Statement</li> <li>4. Cash flow Projections</li> <li>5. Break Even Analysis - for single product or service</li> <li>6. Taxes</li> <li>7. Financial Business Case Study</li> <li>8. Understand the meaning and concept of the term Cash Inflow and Cash Outflow</li> <li>9. Price</li> <li>10. Calculate Per Unit Cost of a single product</li> <li>11. Operational Costs</li> </ol>	<b>12</b>

	<p>12. Understand the importance and preparation of Income Statement</p> <p>13. Prepare a Cash Flow Projection</p> <p>14. Projections</p> <ul style="list-style-type: none"> <li>• Pricing and Factors affecting pricing.</li> <li>• Launch Strategies after pricing and proof of concept</li> </ul>	
<b>5</b>	<p><b>Business Plan Preparation</b></p> <ul style="list-style-type: none"> <li>• Generation of Ideas.</li> <li>• Business Ideas vs. Business Opportunities</li> <li>• Opportunity Assessment – Factors, Micro and Macro Market Environment</li> <li>• Selecting the Right Opportunity</li> <li>• Product selection</li> <li>• New product development and analysis</li> <li>• Feasibility Study Report – Technical analysis, financial analysis and commercial analysis</li> <li>• Market Research - Concept, Importance and Process</li> <li>• Market Sensing and Testing</li> <li>• Marketing and Sales strategy</li> <li>• Digital marketing</li> <li>• Branding - Business name, logo, tag line</li> <li>• Promotion strategy</li> <li>• Business Plan Preparation</li> <li>• Social Entrepreneurship as Problem</li> <li>• Solving - Concept and Importance</li> <li>• Risk Taking-Concept</li> <li>• Types of business risks</li> <li>• Execution of Business Plan</li> </ul>	<b>12</b>

Note: (i) Unit 1, 2 & 3 contents are common for all diploma programs  
(ii) Unit 4 & Unit 5 contents are optional; HoDs are requested framing with their branch specific contents.



## **REFERNCEBOOKS:**

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 privatelimited, 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
<b>Total</b>	<b>- 25</b>

**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 the 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: 45Marks  
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

<b>UNIT - I MOTHERBOARD COMPONENTS</b>		<b>18 HOURS</b>
I	<p><b>1.1.Motherboard components:</b> 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.</p>	5 Hrs
	<p><b>1.2.Computer peripheral devices:</b> Internal and external devices</p>	2 Hrs
	<p><b>1.3.Processors:</b> Introduction —Core2 Duo processor, Quad core processor,Core i3, i5, i7 series, AMD AIO series, Xeon Processor.</p>	5 Hrs
	<p><b>1.4.Chipsets:</b> Chipset basics - North / South Bridge architecture and Hub architecture.</p>	3 Hrs
	<p><b>1.5.Bus Standards:</b> Overview and features of PCI, AGP, USB, &amp; Processor Bus.</p>	3 Hrs
<b>UNIT - II MEMORY AND I/O DEVICES</b>		<b>18 HOURS</b>
II	<p><b>2.1.Primary and Secondary Memory:</b> 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.</p>	4 Hrs
	<p><b>2.2. Removable Storage and Special Devices:</b> 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.</p>	4 Hrs
	<p><b>2.3.Keyboard and Mouse:</b> 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.</p>	4 Hrs
	<p><b>2.4. Printers and Scanners:</b> Printer: Introduction Types of printers —</p>	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.	
	<b>2.5.Special I/O Devices:</b> Trackball, Touch pad, Pointing stick, Joystick, Light pen, Graphic tablet, Camera, Bar-code reader, RFID reader	2 Hrs
<b>UNIT- III DISPLAY, POWER SUPPLY and BIOS</b>		<b>17 HOURS</b>
III	<b>3.1.Displays and Graphic Cards:</b> Displays: LCD Principles — Plasma Displays — TFT Displays - LED Displays. Graphic Cards: Video capture card - Troubleshoot display and graphics card problems	5 Hrs
	<b>3.2.SMPS:</b> 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
	<b>3.3.Bios:</b> 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
	<b>3.4.POST:</b> Error, Beep Codes, Error messages, Post — Faults related to Hardware.	2 Hrs
<b>UNIT - IV DESKTOP, LAPTOP, MOBILE AND TABLET PC</b>		<b>18 HOURS</b>
IV	<b>4.1.Upgrading of Systems:</b> 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
	<b>4.2.Installation and Troubleshooting:</b> 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
	<b>4.3.Laptop:</b> 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.	
	<b>4.4. Mobile phone:</b> 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
	<b>4.5.Introduction to Tablet PC:</b> 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
<b>UNIT – V FUTURE HARDWARE SYSTEMS</b>		<b>18 HOURS</b>
V	<b>5.1.Moore’s law :</b> 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
	<b>5.2.Emerging Non Volatile Memory Technologies</b> (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
	<b>5.3.Introduction to advanced Network technologies:</b> Remote Direct Memory Access (RDMA), Working Principle of RDMA – Limitationsand Challenges in RDMA technology	4Hrs
	<b>5.4.Embedded systems-</b> 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

## REFERENCES

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	1 <sup>st</sup> Edition (2007)

## Board Examination – Question Paper Pattern

**Time: 3 Hrs.**

**Max.Marks: 100**

PART - A Five questions will be asked covering all units. All questions are to be answered. Each question carries 1 mark.

PART - B Fifteen questions will be asked covering all the units. Three questions from each unit. Answer any ten questions. Each question carries 2 marks.

PART - C Five questions will be asked Either or type. One question from every unit. Answer either A or B. Each question carries 15 marks. A and B have subdivisions. ( 7 + 8 )

**The questions are to be numbered from 1 to 25. All the units are to be covered with equal weightage.**

<b>PART - A</b> Definitions and Statements. Question number 1 to 5	5 X 1 = 5 Marks
<b>PART - B</b> Short answer type questions. Question number 6 to 20	10 X 2 = 20 Marks
<b>PART - C</b> Descriptive answer type questions (Either A or B) Question number 21 to 25	5 X 15 = 75 Marks
<b>TOTAL</b>	100 Marks

**Note: Board Examinations will be conducted for 100 Marks and converted to 75**

## MODEL QUESTION PAPER

Time : 3 Hrs.

Max. Marks: 100

---

### PART – A ( 5 x 1 = 5 )

**Answer all Questions. Each question carries 1 mark.**

1. Define jumpers.
2. State the common failures of SMPS.
3. Distinguish desktop and laptop.
4. What is NVM technology?
5. What is SSD?

### PART – B ( 10 x 2 = 20 )

**Answer any ten questions. Each question carries 2 marks.**

6. What is a chipset?
7. Define Hardware, software and firmware.
8. List the properties of processor.
9. List the latest memory sticks with its specifications.
10. What is primary memory? What are its Characteristics?
11. What is Blu-ray?
12. What are the four main functions of BIOS?
13. What are the different types of LED display?
14. List the faults related to hardware.
15. How will you update the system software?
16. Mention the tools used for mobile servicing.
17. What is Tablet PC?
18. Define MRAM.
19. What are the limitations of RDMA technology?
20. Define active device.

**PART - C ( 5 x 15 = 75 )**

**Answer either A or B. Each question carries 15 marks. A and B have sub divisions.**

- 21 A. i. Discuss the features of different bus standards. [7]  
ii. Explain the quad core processor. [8]  
(or)
- B. i. Explain the structure of the generic motherboard. [7]  
ii. Explain features of Core i3, i5, i7. [8]
- 22 A. i. Explain the working principle of hard disk. [7]  
ii. Explain the scanner mechanism. [8]  
(or)
- B. i. Explain the Recordable DVD. [7]  
ii. Explain the common problems encountered in printer and provide its solutions. [8]
- 23 A. i. Explain the principle of LCD in detail. [7]  
ii. Explain the working of Plasma display. [8]  
(or)
- B. i. Explain the basic principles and Operations of SMPS. [7]  
ii. Write short notes on Cold and warm booting, BIOS error codes. [8]
24. A. i. What are the basic problems associated with RAM? [7]  
ii. How will you install the operating system in mobile? [8]  
(or)
- B. i. Explain the active and passive maintenance. [7]  
ii. Explain the types of diagnostics software. [8]
25. A. i. Explain the architecture of NVM technology. [7]  
ii. Discuss about Ferroelectric Random-Access Memory. [8]  
(or)
- B. i. Describe working principle of RDMA. [7]  
ii. What are the advantages and applications of Embedded devices. [8]

# **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			Duration
	Hours / Week	Hours / Semester	Marks			
			Internal Assessment	Board Examinations	Total	
<b>Computer Networks and Security</b>	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
<b>Total</b>		<b>80</b>

**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.





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

	<p>iphers – RC4 – Digest function – Public key Cryptography Principles–RSA- Diffe-Hellman algorithm – Digital Signature(Definition only)</p> <p><b>Network Security Application:</b> Authentication applications – Kerberos (concepts only) - Overview- Motivation –Encryption Techniques.</p>	2
	<p><b>4.4 Internet Security:</b> 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</p>	5
V	<p><b><u>APPLICATIONS OF NETWORK SECURITY</u></b></p> <p><b>Introduction to network security :</b> Definition and Basic concepts- Basic concepts of RAID levels(0,1,2,3,4,5).</p> <p><b>Hackers Techniques:</b> Historical hacking techniques &amp; open sharing-Bad Passwords- Advanced Techniques- Viruses-worms-Trojan horses-SPAM</p> <p><b>Security Mechanism :</b> Introduction – Types of Firewalls – Packetfilters – Application gate ways – Limitations of firewalls.</p> <p><b>Intrusion:</b> Intruders– Intruder detection – Classification of IntruderDetection systems –Honey pots.</p> <p><b>Wireless Security Issues:</b> Definition and Types -Transmission Security, Authentication ,WLAN Detection, Eaves Dropping, Active Attacks, WEP Definition and Features.</p> <p><b>Network Security Appliances:</b> Overview of Network security appliances: IPSec, DDoS, NAT, IPS gateways.</p>	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.

**Board Examination-Question Paper Pattern**

Time: 3 Hrs.

Max.Marks:100

PART – A Five questions will be asked covering all units. All questions are to be answered.

Each question carries 1 mark.

PART- B Fifteen questions will be asked covering all the units. Three questions from each unit.

Answer any ten questions. Each question carries 2 marks.

PART-C Five questions will be asked Either or type. One question from every unit. Answer either

A or B. Each question carries 15 marks. A and B have subdivisions. (7 + 8)

**The questions are to be numbered from 1 to 25. All the units are to be covered with equal weightage.**

<b>PART A</b> Definitions and Statements. Question Number 1 to 5	5 X 1 = 5 Marks
<b>PART B</b> Short answer type questions Question Number 6 to 20	10 X 2 = 20 Marks
<b>PART C</b> Descriptive answer type questions (Either A or B) Question number 21 to 25	5 X15 = 75 Marks
<b>TOTAL</b>	<b>100 Marks</b>

Note: Board Examinations will be conducted for 100 Marks and converted to 75 Marks.

**MODEL QUESTION PAPER**  
**4052620 Computer Networks and Security**

**PART – A ( 5 x 1 = 5 )**

**Answer all Questions. Each question carries 1 mark.**

1. Define Routing and Switching
2. Define IP encryption and decryption
3. List different types of network attacks
4. List different types of compute network topology
5. List different IGP protocols

**PART – B ( 10 x 2 = 20 )**

**Answer any ten questions. Each question carries 2 marks.**

6. Explain different computer network topologies and give examples.
7. Explain different physical media types in network
8. Explain functionality of routers and switches.
9. Explain TCP/IP protocol and its purpose
10. Explain Unicast, Broadcast, Multicast techniques
11. Explain MAC address and IP address subnetting and supernetting techniques
12. Explain Broadband NextGen (BNG) and its usecase
13. Why security is important in computer networks?
14. Explain different types of network attacks.
15. Explain different cryptography techniques.
16. List different hacking techniques.
17. Explain Email security and different techniques used.
18. Explain Web security and various protocols uses.
19. Explain MACSEC and its purpose
20. What is denial of service attack and how it is mitigated?

**PART - C ( 5 x 15 = 75 )**

**Answer either A or B. Each question carries 15 marks. A and B have sub divisions.**

21.A. i. Explain the different types of connections in networks. (8)

ii. Describe in detail about service provider networks. (7)

OR

21.B. i. Explain about the different network guided media types in detail. (8)

ii. Write down the features of wired and wireless routers (7)

22.A. i Explain functionality of all OSI layers in detail. (8)

ii. Explain the concepts and PDU format of CSMA/CD. (7)

OR

22.B.i. Compare the features of 802.4 and 802.5.. (8)

ii. Explain about the protocols involved in WAN networks. (7)

OR

23.A.i. Write notes on connection oriented and connection less oriented service. (8)

ii. Compare TCP and UDP sockets. (7)

OR

23.B.i Explain in detail the functionality and importance of OAM. (8)

ii. Explain about the protocols and techniques involved in traffic engineering. (7)

24.A.i. Write notes on software supply chain attacks. (8)

ii. Compare AES and DES. (7)

OR

24.B.i Explain in detail about the public key cryptography principles. (8)

ii. Explain about the IP Security architecture. (7)

25.A.i. Write notes on historical hacking techniques. (8)

ii. Compare RAID Level 1 and RAID level 3. (7)

OR

25.B.i Explain in detail about the transmission security. (8)

ii. Explain about the DDOS,IPS gateways and NAT.. (7)

# **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		Examination			Duration
	Hours / Week	Hours / Semester	Internal Assessment	Board Examination	Total	
<b>Software Engineering</b>	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	<b>15</b>
II	SOFTWARE DESIGN AND PLANNING	<b>15</b>
III	SOFTWARE MAINTENANCE AND RISK MANAGEMENT	<b>15</b>
IV	SOFTWARE TESTING	<b>15</b>
V	SOFTWARE RELIABILITY AND QUALITY ASSURANCE	<b>13</b>
TEST AND REVISION		<b>07</b>
TOTAL		<b>80</b>



## **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 manage 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

<b>UNIT I INTRODUCTION TO SOFTWARE ENGINEERING</b>		<b>.. 15 HOURS</b>
1.1	<b>Basics of Software Engineering</b> : Need for Software Engineering – Definition – Software Characteristics – Software Myths – Program versus Software Products	3
1.2.	<b>Software Development Life Cycle Models:</b> 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	<b>Software Requirement Analysis (SRS):</b> 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
<b>UNIT – II SOFTWARE DESIGN AND PLANNING</b>		<b>15 HOURS</b>
2.1.	<b>Software Design</b> : 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.	<b>CODING:</b> 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.	<b>Software Planning:</b> 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	<b>CASE :</b> 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 disadvantages of CASE tools.	3
<b>UNIT – III SOFTWARE MAINTENANCE AND RISK MANAGEMENT</b>		<b>15 HRS</b>
3.1.	<b>Software Maintenance:</b> 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.	<b>Risk management :</b> Definition of risk – Basics for different types of software risks – Monitoring of risks – Risk management – Risk avoidance – Risk detection – Risk control – Risk recovery – Sources of risks – Types of risks	5
3.3.	<b>Project scheduling :</b> 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
<b>UNIT – IV SOFTWARE TESTING</b>		<b>15 HRS</b>

4.1.	<b>Software Testing</b> : 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.	<b>Levels of testing:</b> Integration tests – System testing – Types.	3
4.3.	<b>Software Testing strategies:</b> 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	<b>Software Testing Tools:</b> 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	<b>Code of Ethics for Software Professionals:</b> 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
<b>UNIT – V SOFTWARE RELIABILITY AND QUALITY ASSURANCE</b>		<b>13 HRS</b>
5.1.	<b>Software Quality Assurance</b> : 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	<b>Software Reliability</b> : Definition – Reliability terminologies – Classification of failures – Reliability metrics – Reliability growth modeling - Reliability measurement process	3
5.3	<b>Reverse Software Engineering:</b> 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	Pearson Education	Sixth Edition
2.	Fundamentals of Software Engineering	Rajib Mall	PHI Learning Pvt Limited, New Delhi	28 <sup>th</sup> 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.	Software 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

## Board Examination-Question Paper Pattern

Time: 3 Hrs.

Max.Marks:100

PART - A Five questions will be asked covering all units. All questions are to be answered.  
Each question carries 1 mark.

PART- B Fifteen questions will be asked covering all the units. Three questions from each unit. Answer any ten questions. Each question carries 2 marks.

PART-C Five questions will be asked Either or type. One question from every unit. Answer either A or B. Each question carries 15 marks.A and B have subdivisions. (7 + 8)

**The questions are to be numbered from 1 to 25. All the units are to be covered with equal weightage.**

<b>PART A</b> Definitions and Statements. Question Number 1 to 5	5 X 1 = 5 Marks
<b>PART B</b> Short answer type questions Question Number 6 to 20	10 X 2 = 20 Marks
<b>PART C</b> Descriptive answer type questions (Either A or B) Question number 21 to 25	5 X15 = 75 Marks
<b>TOTAL</b>	100 Marks

Note: Board Examinations will be conducted for 100 Marks and converted to 75 Marks.

**MODEL QUESTION PAPER**

**PART – A ( 5 x 1 = 5 )**

**Answer all Questions. Each question carries 1 mark.**

1. What software engineering?
2. What is the main objective of software design?
3. What is the need for maintenance?
4. What is software testing?
5. What is SQA?

**PART – B ( 10 x 2 = 20 )**

**Answer any ten questions. Each question carries 2 marks**

6. What is software myth?
7. What is SDLC? Mention any 2 models.
8. What is SRS?
9. What is Internal documentation?
10. What is architectural design?
11. What is software metrics?
12. What is maintenance cost?
13. What is risk?
14. When is flow graph used?
15. What is a test case?
16. Why is code walkthrough is necessary?
17. What is performance/load testing tools?
18. Define Software Quality.
19. List out the classification of failures?
20. What is re-engineering process?



**PART - C ( 5 x 15 = 75 )**

**Answer either A or B. Each question carries 15 marks. A and B have sub divisions.**

- 26 (A) i. What are the characteristics of software engineering? (8)  
ii Differentiate program vs software products. (7)

OR

- (B) i. Explain waterfall model with neat diagram? (8)  
ii. What are the advantages of prototyping and spiral model. (7)

- 27(A) i. What are the objectives of software design?. (8)  
ii. Explain about human computer interface. (7)

OR

- (B) i. Write about the architecture of CASE environment. (8)  
ii. How to execute sprints for agile model? (7)

- 28.(A) i. Explain about software configuration management activities. (8)  
ii. What are the categories of Maintenance? (7)

OR

- (B) i. Explain in detail about risk management? (8)  
ii. Write notes on Gant chart. (7)

- 29.(A) i. Explain in detail about white box testing. (8)  
ii. Write notes on test plan. (7)

OR

- (B) i. Write about the Characteristics of bugs. (8)  
ii. Explain the life cycle of a debugging task. (7)

- 30.(A) i. Write about the software quality attributes. (8)  
ii. What are the important qualities of software products. (7)

OR

- (B) i. Explain in about detail the reliability metrics and measurement process. (8)  
ii. Explain in detail about reverse engineering tasks. (7)

# **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			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
<b>Multimedia Systems</b>	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
<b>Total</b>		<b>80</b>

**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	<p><b>Introduction:</b> Definition of Multimedia, Multimedia Basics, Multimedia Elements, Multimedia Applications, Delivering Multimedia.</p> <p><b>Multimedia Systems Architecture:</b> Multimedia Workstation Architecture, High resolution Graphic displays, The IMA Architectural Framework, Network architecture for Multimedia systems.</p> <p><b>Evolving Technologies For Multimedia Systems:</b> Hypermedia Documents, Hypertext, Hyper Speech, HDTV and UDTV, 3D Technologies and Holography.</p> <p><b>Defining Objects for Multimedia System:</b> Text, Images, Audio and Voice, Full-Motion and Live Video, Multimedia Data Interface Standards, Video Processing Standards.</p> <p><b>Multimedia Software:</b> Overview of Multimedia Software Tools, Open Source Replacements, Multimedia OS, VRML, OpenGL, Windows and Open Source API.</p>	2 3 2 2 2
II	<p><b>Text:</b> About Fonts and Faces, Using Text in Multimedia, Hypermedia and Hypertext, Using Hypertext, Hypermedia Structures, Hypertext Tools.</p> <p><b>Images:</b> Making Still Images, Bitmaps, 1 bit images, 8-bit gray level images, 8-bit color 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.</p> <p><b>Sound :</b> 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.</p> <p><b>Animation,</b> the Power of Motion, Principles of Animation, Animation by Computer, Animation Techniques. Animation using OpenGL.</p> <p><b>Video:</b> Using Video, How Video Works and Is Displayed, Analog</p>	2 4 3 3

	Video, Digital Video, Displays, Digital Video Containers, Codec, Video Format Converters, Obtaining Video Clips, Shooting and Editing Video.	3
III	<p><b>3.1 Data Compression:</b> 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.</p> <p><b>3.2 Compression Schemes and standards:</b>(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.</p> <p><b>3.3 Data and File Format Standards:</b> Popular File Formats, RTF, RIFF, GIF, PNG, TIFF, MIDI, JPEG, JFIF, AVI, WAV, BMP, WMF, MIX, MPEG standards. TWAIN.</p> <p><b>3.4 Database System:</b> Data Types in Multimedia Databases, Storage and Retrieval, Database Management System, Database Organization and Transaction Management for Multimedia System.</p> <p><b>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.</b></p>	3 4 3 3 3
IV	<p><b>4.1 Multimedia Input/output Technologies:</b> 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.</p> <p><b>4.2 Making Multimedia:</b> 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.</p> <p><b>4.3 Multimedia Skills:</b> The Team, Project Manager, Multimedia Designer, Interface Designer, Writer, Video Specialist, Audio Specialist,</p>	5 4 3

	Multimedia Programmer, Producer of Multimedia for the Web. <b>4.4 Designing and Producing</b> , Designing, Designing the Structure, Designing the User Interface, Producing–Tracking, Copyrights.	3
V	<b>5.1 The Internet and Multimedia</b> : The Bandwidth Bottleneck, Internet Services, MIME Types, Multimedia on the Web, Web Page Makers and Site Builders, Plug-ins and Delivery Vehicles.	3
	<b>5.2 Designing for the World Wide Web</b> : 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.	3
	<b>5.3 Multimedia Communication</b> : 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.	4
	<b>5.4 Streaming</b> : Introduction - Applications of Streaming- The Streaming Architecture, Stream Serving: Webcasting – On-Demand Servicing – Voice and Video Conferencing - Internet Telephony - Virtual Reality.	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.

## Board Examination-Question Paper Pattern

Time: 3 Hrs.

Max.Marks:100

- PART - A Five questions will be asked covering all units. All questions are to be answered. Each question carries 1 mark.
- PART- B Fifteen questions will be asked covering all the units. Three questions from each unit. Answer any ten questions. Each question carries 2 marks.
- PART-C Five questions will be asked either or type. One question from every unit. Answer either A or B. Each question carries 15 marks. A and B have subdivisions. (7 + 8)

**The questions are to be numbered from 1 to 25. All the units are to be covered with equal weightage.**

<b>PART A</b> Definitions and Statements. Question Number 1 to 5	5 X 1= 5 Marks
<b>PART B</b> Short answer type questions Question Number 6 to 20	10 X 2 = 20 Marks
<b>PART C</b> Descriptive answer type questions (Either A or B) Question number 21 to 25	5 X15 = 75 Marks
TOTAL	100 Marks *

Note: Board Examinations will be conducted for 100 Marks and converted to 75 Marks.



**MODEL QUESTION PAPER**  
**MULTIMEDIA SYSTEMS**

**Time: 3 Hrs**

**Max.Marks:100**

**PART – A ( 5 x 1 = 5 )**

**Answer all Questions. Each question carries 1 mark.**

1. Define Multimedia.
2. What is computer animation?
3. Expand: JPEG and MPEG.
4. Write any two sound editing tools.
5. What is virtual reality?

**PART – B ( 10 x 2 = 20 )**

**Answer any ten questions. Each question carries 2 marks**

6. What is 3D technology? How holography is related to 3D technology?
7. Define hypermedia document.
8. What is OpenGL?
9. Differentiate vector image and bit map image.
10. What is object based animation?
11. What are the characteristics of digital audio?
12. List down the advantages and disadvantages of fractal compression.
13. Write the data types used in multimedia database.
14. Differentiate color layout and texture layout.
15. List the limitations of traditional input devices.
16. What is OCR software?
17. Write the role of multimedia designer.
18. Define media on demand.
19. What is bandwidth bottleneck for multimedia data transmission?
20. What is internet telephony?

**PART - C ( 5 x 15 = 75 )**

**Answer either A or B. Each question carries 15 marks. A and B have sub divisions.**

21.A i) Explain the various multimedia elements. (7)

ii) Explain in detail the structure of VRML file (8)

OR

B i) Explain the Multimedia workstation architecture (8)

ii) Explain in detail about Hypermedia document (7)

22.A i) Explain color image processing and enhancement. (8)

ii) Explain the various audio formats supported by Internet. (7)

OR

B i) Explain any two animation techniques. (8)

ii) Explain how video works are displayed. (7)

23 A i) Explain TWAIN architecture (7)

ii) Write about search by Illumination Invariance in C-BIRD (8)

OR

B i) Explain about JPEG compression. (8)

ii) Explain about multimedia file format. (7)

24 A i) Explain the architecture of video capture board. (8)

ii) Explain the types of authoring tool.

(7)

OR

B i) Explain briefly voice recognition system. (7)

ii) What are the roles of different team members in multimedia development?

(8) 25 A i) How sound is embedded in a web document? (7)

ii) Explain briefly about E-learning and education (8)

OR

B i) Explain the streaming architecture. (8)

ii) Define plug-in. Explain its types . (7)

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

\* 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, their sources, 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
<b>I</b>	<b>Introduction to Data Science</b>	<b>15</b>
	<b>1.1.Data Science</b> - 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
	<b>1.2.Data sources</b> - 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
	<b>1.3 Working with Excel:</b> Loading data- Statistical functions- Text Functions- Lookup Functions- Sorting- Filtering- Data Analysis: Correlation, covariance, Descriptive statistics, Regression.	5
<b>II</b>	<b>Fundamentals of Data Modelling</b>	<b>15</b>

	<b>2.1.Linear Algebra:</b> Data representation - Data as a Matrix - Samples and Attributes- Classification of attributes- Concept of Rank-Identify the relationship among attributes	5
	<b>2.2.Predictive models:</b> Regression Models - Linear regression - Simple and Multiple Regression-Correlation-Mean squared Error- Testing goodness of fit-Model Equation	5
	<b>2.3.Classification models:</b> Two class- Multi class classification- Separability- Performance measures- Terminology- Confusion Matrix-Types (Concepts only): Neural Network- Decision Trees- Nearest Neighbors.	5
<b>III</b>	<b>Fundamentals of Big Data</b>	<b>15</b>
	<b>3.1Data</b> - 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
	<b>3.2 Impact of ICT developments</b> 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
	<b>3.3.Big Data Analytics Life Cycle:</b> 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
<b>IV</b>	<b>Big Data Storage</b>	<b>14</b>
	<b>4.1.Storage Concepts:</b> Clusters, File Systems, Distributed File System, NoSQL, Sharding, Replication, Master Slave, Peer to Peer, CAP Theorem	4

	<b>4.2. Big Data Storage Technologies:</b> 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
	<b>4.3.Hadoop:</b> 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
<b>V</b>	<b>Big Data Processing</b>	<b>14</b>
	<b>5.1.Parallel data processing-</b> 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.	<b>5</b>
	<b>5.2.Big Data Analysis Techniques:</b> 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	<b>5</b>
	<b>5.3.Big Data Analytics Applications and case studies:</b> Big data in Marketing and sales- Big data and Healthcare- Big data in Medicine- Big Data in Advertising.	<b>4</b>

#### 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".

**Board Examination-Question Paper Pattern**

**Time: 3 Hrs.**

**Max.Marks:100**

PART - A Five questions will be asked covering all units. All questions are to be answered. Each question carries 1 mark.

PART- B Fifteen questions will be asked covering all the units. Three questions from each unit. Answer any ten questions. Each question carries 2 marks.

PART-C Five questions will be asked Either or type. One question from every unit. Answer either A or B. Each question carries 15 marks. A and B have subdivisions. (7 + 8)

**The questions are to be numbered from 1 to 25. All the units are to be covered with equal weightage.**

<b>PART A</b> <b>Definitions and Statements.</b> <b>Question Number 1 to 5</b>	<b>5 X 1 = 5 Marks</b>
<b>PART B</b> <b>Short answer type questions</b> <b>Question Number 6 to 20</b>	<b>10 X 2 = 30 Marks</b>
<b>PART C</b> <b>Descriptive answer type questions</b> <b>(Either A or B)</b> <b>Question number 21 to 25</b>	<b>5 X15 = 75 Marks</b>
<b>TOTAL</b>	<b>100 Marks</b>

Note: Board Examinations will be conducted for 100 Marks and converted to 75 Marks.

## MODEL QUESTION PAPER

**Time: 3.00 Hrs.**

**Max.Marks:100**

**Note:**

- 1. Answer all questions in PART A. Each question carries one mark.**
- 2. Answer any ten questions in PART B. Each question carries two marks.**
- 3. Answer all question by selecting either A or B. Each question carries 15 marks.**

### **PART – A ( 5 x 1 = 5 )**

**Answer all Questions. Each question carries 1 mark.**

- 1.What is data analytics?
- 2.How do you classify data in data science?
- 3.Define Correlation.
- 4.What is sharding?
- 5.Define clustering.

### **PART – B ( 10 x 2 = 20 )**

**Answer any ten questions. Each question carries 2 marks**

- 6.Write short notes on various characteristics of Big data.
- 7.List some features of python.
- 8.List some data formats for loading and saving files.
- 9.Write a python program to add a new item to the end of the array.
- 10.How will you add a column to a pandas Data Frame?
11. What is linear regression?
- 12.Draw the confusion matrix for two class classification problem.
- 13.What are the core Hadoop components used in big data analytics?
14. Write short notes on replication in big data storage.
- 15.Differentiate between parallel and distributed data processing.
- 16.Write the features of NoSQL.
17. List out the applications of semantic analysis.
18. Write short notes on JSON file format for data storage.
19. Write short notes on In memory storage.device.
20. List some applications of big data in Medicine.

**PART - C ( 5 x 15 = 75 )**

**Answer either A or B. Each question carries 15 marks . Each have subdivision.**

21 A. i. Explain how VLOOKUP works in Excel? (7)

ii. Explain about handling missing values in a dataset. (8)

(or)

B .i. Explain any two descriptive statistical measures used in data analysis. (7)

ii. Explain about any four data preprocessing steps. (8)

22 A. i. Explain the simple linear regression model. (8)

ii. Describe how you will identify the relationship among the attributes. (7)

(or)

B. i. Explain the Decision tree classification model. (8)

ii. Explain multi class classification in machine learning. (7)

23 A. i. Explain the life cycle of big data analytics with a neat sketch. (8)

ii. Discuss about various sources of Big data and its need. (7)

(or)

B. i. Discuss briefly about Hyper Connected Communities and Devices. (8)

ii. Explain why data quality is important in data analytics. (7)

24 A.i . Describe Consistency, Availability, and Partition tolerance theorem. (8)

ii. Write note on NoSQL Databases and its types. (7)

(or)

B. i. Explain various Hadoop ecosystem tools used in Big data analytics. (7)

ii. Explain the Hadoop distributed file system architecture. (8)

25 A. i. Explain the importance of clustering in machine learning. (7)

ii. Explain the various map and reduce tasks involved in batch processing. (8)

(or)

B. i Describe briefly about natural language processing and sentiment analysis. (8)

ii. Explain how big data helps in healthcare systems. (7)

# **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	
<b>Computer Hardware and Networking Practical</b>	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

	<p>Identification of system layout (Study Exercise)</p> <ul style="list-style-type: none"><li>a) Front panel indicators &amp; switches and front side &amp; rear side connectors.</li><li>b) Familiarize the computer system Layout: Marking positions of SMPS, Motherboard, HDD, DVD and add on cards.</li><li>c) Configure bios setup program and troubleshoot the typical problems using BIOS utility.</li></ul>
1	<p>HARD DISK</p> <ul style="list-style-type: none"><li>a) Install Hard Disk.</li><li>b) Configure CMOS-Setup.</li><li>c) Partition and Format Hard Disk.</li><li>d) Identify Master /Slave / IDE Devices.</li><li>e) Practice with scan disk, disk cleanup, disk De-fragmentation, Virus Detecting and Rectifying Software.</li><li>f) Creating System restore points in windows for system recovery.</li></ul>
2	<ul style="list-style-type: none"><li>a) Install and Configure a DVD Writer &amp; Blu-ray Disc Writer.</li><li>b) Recording a Blank DVD &amp; Blu-ray Disc.</li></ul>
3	<p>Printer Installation and Servicing</p> <ul style="list-style-type: none"><li>a) Install and configure Dot matrix printer, Ink jet and Laser printer.</li><li>b) Troubleshoot the above printers</li></ul>
4	<p>Install and configure Scanner, Web cam, and bio-metric device with system and troubleshoot the problems</p>
5	<p>Do the following cabling works in a network</p> <ul style="list-style-type: none"><li>a) Cable Crimping</li><li>b) Standard Cabling</li><li>c) Cross Cabling</li><li>d) Testing the Crimped cable using a Cable tester</li></ul>
6	<ul style="list-style-type: none"><li>a) Configure Host IP, Subnet Mask and Default Gateway in a system in LAN(TCP/IP Configuration).</li><li>b) Configure Internet connection and use IPCONFIG, PING / Tracert and Netstat utilities to Debug the Network issues.</li></ul>
7	<ul style="list-style-type: none"><li>a) Install and configure Network Devices: HUB, Switch and Routers</li><li>b) Install and Configure Wired and Wireless NIC and transfer files between systems</li></ul>

8	Transfer files between systems in LAN using FTP Configuration. Install a printer in LAN and share it in the network.
<b>PART B – SYSTEM ADMINISTRATION PRACTICAL</b>	
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.

### DETAILED ALLOCATION OF MARKS

<b>SCHEME OF VALUATION</b>	
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
<b>TOTAL</b>	<b>100 Marks</b>



<b>LIST OF EQUIPMENTS</b>	
<b>Hardware Requirements :</b>	
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	
<b>Software Requirements:</b>	
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			Duration
	Hours / Week	Hours / Semester	Marks			
			Internal Assessment	Board Examinations	Total	
<b>Software Engineering Practical</b>	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

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

## DETAILED ALLOCATION OF MARKS

<b>SCHEME OF VALUATION</b>	
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
<b>TOTAL</b>	<b>100 Marks</b>
<b>REQUIREMENTS</b>	
<b>Hardware Requirements :</b>	
Desktop Systems	30 Nos
<b>Software Requirements :</b>	
Microsoft office (Word, Excel, Powerpoint), MS – Project or JIRA for miniproject Relational Database(SQL Server Express or MYSQL, JAVA/IDE, <b>JUNIT</b> (open source) for unit testing <b>SELENIUM</b> (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			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
<b>Multimedia Systems Practical</b>	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 effect using 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 Converter 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**

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			Duration
	Hours / Week	Hours / Semester	Marks			
			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.	<p>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.</p> <ol style="list-style-type: none"><li>a. Arrange the data branch wise within the branch and arrange register numbers. Replace all names with CAPITAL.</li><li>b. Count the number of students in each branch and semester</li><li>c. Calculate the total fee paid by students of each branch.</li><li>d. Find the minimum and the maximum fee paid by the student.</li><li>e. Find the sum, average, max, min of fee paid in each branch</li></ol>
2.	<p>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.</p> <p>Perform the following operations using Excel.</p> <ol style="list-style-type: none"><li>a. Check the file for any missing data in the columns.</li><li>b. Count the number of students appeared for the exam.</li><li>c. Count the number of papers (subjects) submitted by each student (Using register number)</li><li>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.</li><li>e. Count the number of students appeared (submitted) for each subject.</li><li>f. Count the number of different (unique) subject_codes that have been submitted.</li></ol>
3.	<p>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.</p>
4.	<p>Read the dataset from the Auto-MPG repository and</p> <ol style="list-style-type: none"><li>a) Identify the relationship between the variables using correlation.</li><li>b) Identify the independent and the dependent variables.</li><li>c) Perform the linear regression on the related variables and find the regression equation.</li><li>d) Estimate the performance of the regression model.</li></ol>

5.	<p>Load any external csv data file and store it in a Pandas DataFrame.</p> <ol style="list-style-type: none"> <li>Check the shape and column types of the DataFrame (rows and columns). [Note: Use df.info () and df.shape()]</li> <li>Subset the data column by names, by index, by range.</li> <li>Subset data based on index label, row index, multiple rows.</li> <li>Subset based on rows and columns</li> </ol>
6.	<p>DESCRIPTIVE STATISTICS using Python-Pandas</p> <ol style="list-style-type: none"> <li>Write a Python script to find basic descriptive statistics on AUTO-MPG dataset.</li> <li>Find the values of the descriptive statistics.</li> <li>Determine the measures of a central location, such as mean, markers such as quartiles or percentiles, and measures of variability or spread, such as the standard deviation.</li> </ol>
7.	<p>READING AND WRITING DIFFERENT TYPES OF DATASETS</p> <ol style="list-style-type: none"> <li>Reading different types of data sets (.txt, .csv) from Web and disk and writing in file in specific disk location.</li> <li>Reading Excel data sheet using Pandas</li> <li>Export the values from the DataFrame to several other formats.</li> </ol>
8.	<p>DATA VISUALIZATION</p> <ol style="list-style-type: none"> <li>Load the Auto-MPG dataset from csv file into pandas.</li> <li>Analyze the Behavior of the Number of Cylinders and Horsepower Using aBoxplot</li> <li>Find the relationship between horsepower and weight using the scatter plot using the data from Auto-MPG:</li> <li>Find the outliers using plot.</li> <li>Plot the histogram, bar chart and pie chart on sample data.</li> </ol>
9.	<p>COVARIANCE and CORRELATION</p> <ol style="list-style-type: none"> <li>Find the correlation and covariance between two variables.</li> <li>Plot the correlation plot on the dataset and visualize giving an overview of relationships among data.</li> <li>Fit a simple linear regression model using libraries such as Numpy or Scikit-learn. ( import LinearRegression from sklearn.linear_model) <ul style="list-style-type: none"> <li>Import the packages and classes you need.</li> <li>Provide data for independent and dependent variables.</li> </ul> </li> </ol>



	<ul style="list-style-type: none"> <li>• Create a regression model and fit it with existing data.</li> <li>• Check the results of model fitting to know whether the model is satisfactory.</li> </ul>
10.	<p><b>OUTLIER Detection</b></p> <p>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.</p> <p>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.</p>
11	<p><b>Text Processing</b></p> <ol style="list-style-type: none"> <li>Open a text file and read all the lines of the file.</li> <li>Tokenise (separate the words) the text.</li> <li>Count the total number of lines, total number of words and unique words</li> <li>Sort the words alphabetically.</li> <li>Find the most frequent and least frequent words.</li> <li>List the words having certain suffixes.</li> </ol> <p>Note: You can open a Tamil text file using 'UTF-16' encoding.</p>
12	<p><b>Text Processing-II</b></p> <p>Load a text file containing a list of words into a DataFrame. Apply the following functions and verify the results.</p> <p>Replace(), repeat(), count(pattern), startswith(pattern), endswith(pattern), find(pattern), findall(pattern).</p>
	<p><b>Mini Project: Develop any data science application using Python/Excel for processing your college data.</b></p>

## 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 from 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			Duration
	Hours /Week	Hours/ Semester	Marks			
			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.

<b>Detail of assessment</b>	<b>Period of assessment</b>	<b>Max.Marks</b>
First Review	6 <sup>th</sup> week	10
Second Review	12 <sup>th</sup> week	10
Attendance	Entire semester	5
<b>Total</b>		<b>25</b>

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:

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