SYLLABUS

DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING / MECHATRONICS

FULL TIME AND SANDWICH

Course Code: 1049/1047 & 2047

2011-2012

L - SCHEME

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

DIPLOMA COURSES IN ENGINEERING/TECHNOLOGY

(SEMESTER SYSTEM)

(Implemented from 2011- 2012)

L – SCHEME

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

* *Applicable to the Diploma Courses other than Diploma in Hotel Management & Catering Technology and the Diploma Courses offered through MGR Film Institute, Chennai.*

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 4th and/or during 7th 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 Course and 18 hrs. / Week for Part-Time Diploma Course.

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 2011 – 2012 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, Tamilnadu.

(Or)

The Anglo Indian High School Examination with eligibility for Higher Secondary Course in Tamilnadu

(Or)

The Matriculation Examination of Tamil Nadu.

(Or)

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

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 Tamilnadu affiliated to the Tamilnadu Higher Secondary Board with eligibility for university Courses of study or equivalent examination, & Should have studied the following subjects

Sl. No	Courses	H.Sc Academic	H.Sc Vocational	
		Subjects Studied	Subjects Studied	
			Related subjects	Vocational subjects
1.	All the Regular and Sandwich Diploma Courses	Maths, Physics & Chemistry	Maths / Physics / Chemistry	Related Vocational Subjects Theory & Practical
2.	Diploma Course in Modern Office Practice	English & Accountancy English & Elements of Economics English & Elements of Commerce	English & Accountancy, English & Elements of Economics, English & Management Principles & Techniques, English & Typewriting	Accountancy & Auditing, Banking, Business Management, Co-operative Management, International Trade, Marketing & Salesmanship, Insurance & Material Management, Office Secretary ship.

Subject to the approval of the AICTE

- 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 Modern Office 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. 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, Tamilnadu, when joined in First Year and two years if joined under Lateral Entry scheme in the second year and passed the prescribed examination.

The minimum and maximum period for completion of Diploma Courses are as given Below:

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

6. 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**

7. 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 and 75 marks are allotted for Board Examination.

8. Continuous Internal Assessment:

A. <u>For Theory Subjects:</u>
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. Out of which the best one will be taken and the marks to be reduced to: 05 marks

The Test – III is to be the Model test covering all the five units and the marks so obtained will be reduced to : 05 marks

Total 10 marks

TEST	UNITS	WHEN TO CONDUCT	MARKS	DURATION
Test I	Unit – I & II	End of 6th week	50	2 Hrs
Test II	Unit – III & IV	End of 12th week	50	2 Hrs
Test III	**Model Examination** - **Compulsory** Covering all the 5 Units. (Board Examinations-question paper-pattern).	End of 16th week	75	3 Hrs

 # - From the Academic year 2011-2012 onwards.

Question Paper Pattern for the Periodical Test :(Test - I & Test- II)

	14 Questions X 1 mark	… …	14 marks
	6 Questions X 6 marks	… …	36 marks
(OR)	3 Questions X 12 marks		
	Total		50 marks

iii) Assignment **10 Marks**

For each subject Three Assignments are to be given each for 20 marks and the average marks scored should be reduced for 10 marks

All Test Papers and Assignment notebooks after getting the signature with date from the students must be kept in the safe custody in the Department for verification and audit. It should be preserved for 2 Semesters and produced to the flying squad and the inspection team at the time of inspection/verification.

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

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

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

- *All the Experiments/Exercises indicated in the syllabus should be completed and the same to be given for final Board examinations.*
- The Record for every completed exercise should be submitted in the subsequent Practical classes and marks should be awarded for 20 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 and the marks awarded for attendance is to be added to arrive at the internal assessment mark for Practical. (20+5=25 marks)
- The students have to submit the duly signed bonafide record note book/file during the Practical Board Examinations.
- *All the marks awarded for assignments, Tests and attendance should be entered in the Personal Log Book of the staff, who is handling the subject. This is applicable to both Theory and Practical subjects.*

9. Communication and Life Skills Practical:

The Communication and Life Skills Practical with more emphasis is being introduced in IV Semester for Circuit Branches and in V Semester for other branches of Engineering. Much Stress is given on:

- ❖ Monodic Communication
- ❖ Dyadic Communication
- ❖ Professional Communication
- ❖ Pronunciation
- ❖ Writing Resumes
- ❖ Interview Techniques

Internal Assessment Mark **….. 25 Marks**

10. Project Work:

The students of all the Diploma Courses **(except Diploma in Modern Office Practice)** 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, Tamilnadu. 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.**

a) Internal assessment mark for Project Work & Viva Voce:

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

Proper record to be maintained for the two Project Reviews, and It should be preserved for 2 Semesters and produced to the flying squad and the inspection team at the time of inspection/verification.

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

Viva Voce	…	**25 marks**
Demonstration/Presentation	…	**20 marks**
Total	…	**45 marks**

c) Written Test Mark (from 3 topics for 1 hour duration): $

i) Entrepreneurship	5 questions X 2 marks	=	**10 marks**
ii)Environment Management	5 questions X 2 marks	=	**10 marks**
iii)Disaster Management	5 questions X 2 marks	=	**10 marks**
			30 marks

$ **-** Selection of Questions should be from Question Bank, by the External Examiner. No choice need be given to the candidates.

Project Work & Viva Voce in Board Examination	--	**45 Marks**
Written Test Mark (from 3 topics for 1 hour duration)	--	**30 Marks**
TOTAL	--	**75 Marks**

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

11. Scheme of Examinations:

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

12. 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 *30 marks out of 75 marks in the Board Theory Examinations and a minimum of 35 marks out of 75 marks in the Board Practical Examinations.*

13. Classification of successful candidates:

Classification of candidates who passed out the final examinations from April 2014 onwards (Joined in first year in 2011-2012) will be done as specified below.

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 semesters put together except I and II semesters and passes all the above semesters in the first appearance itself and completes all subjects including that of I & II semesters within the stipulated period of study 3/ 3½/ 4 years (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 semesters put together except I & II semesters and completes all subjects including that of the I & II semesters within the stipulated period of study 3/ 3½ / 4 years (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 mentioned classifications are also applicable for the Sandwich / Part-Time students who passed out Final Examination from October 2014 /April 2015 onwards (both joined in First Year in 2011-2012)

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

The duration of each period of instruction is1 hour and the total period of instruction hours excluding interval and Lunch break in a day should be uniformly maintained as 7 hours corresponding to 7 periods of instruction (Theory & Practical).

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Chairperson

Thiru. Ramesh Chand Meena, I.A.S.,

Commissioner of Technical Education
Directorate of Technical Education
Chennai – 600 025.

Co-ordinator

Dr. K. SundaramoorthyPh.D,
Principal,
Central Polytechnic College,
Chennai – 113

Convener

Tmt. J. Rama,
Lecturer(Selection Grade)
Government Polytechnic College
Puraswalkam, Chennai – 113

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Head of the Department ,
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5) Tmt.LakshmiBai T HOD/ECE.,
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7)Thiru. Gandhi.,B.E.,
MTAB Pvt. Ltd.,
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Chennai

8) Thiru.Nagamuthu.,
Manager.,
Toshini-Tek International Application
Chennai

ANNEXURE –I
CURRICULUM OUTLINE

DIPLOMA IN ELECTRONICS (ROBOTICS) ENGINEERING /MECHATRONICS
(FULL TIME)

THIRD SEMESTER

SUBJECT CODE	SUBJECT	HOURS PER WEEK			
		Theory Hours	Tutorial/ Drawing	Practical Hours	Total Hours
24031	Electronic Devices and Circuits #	5			5
24232	Electrical Circuits and Machines$	5			5
24733	Manufacturing Technology	5			5
24734	Electronic Devices and Circuits Practical			5	5
24735	Electrical Circuits and Machines Practical			5	5
24736	Manufacturing Technology Practical			6	6
20001	Computer Applications Practical^^			4	4
	TOTAL	15		20	35

 # Common with ECE *^^ common with all the branches*
$ Common with ICE

FOURTH SEMESTER

SUBJECT CODE	SUBJECT	HOURS PER WEEK			
		Theory Hours	Tutorial/ Drawing	Practical Hours	Total Hours
24241	Analog and Digital Electronics $	5			5
24742	Mechanics of Materials	5			5
24743	Programming in C	5			5
24744	Measuring Instruments and Sensors	4			4
24245	Analog and Digital Electronics Practical$			6	6
24746	Programming in C Practical			6	6
20002	Communication and Life skill Practice^^			4	4
	TOTAL	19		16	35

^^ Common with all the branches *$ Common with ICE*

FIFTH SEMESTER

SUBJECT CODE	SUBJECT	HOURS PER WEEK			
		Theory Hours	Tutorial/ Drawing	Practical Hours	Total Hours
24751	Industrial Instrumentation and Automation	5			5
24052	Microcontroller #	5			5
24753	Hydraulic and Pneumatic systems	5			5
24754	CAD/CAM	5			5
24055	Microcontroller Practical#			5	5
24756	Hydraulics, Pneumatics and PLC Practical			5	5
24757	CNC Practical			5	5
	TOTAL	20		15	35

 # Common with ECE

SIXTH SEMESTER

SUBJECT CODE	SUBJECT	HOURS PER WEEK			
		Theory Hours	Tutorial/ Drawing	Practical Hours	Total Hours
22061	Industrial Engineering and Management %	5			5
24762	Process control	6			5
24763	Robotics and Auto Electronics	5			5
24764	Process Control Practical			5	5
24765	Robotics and Auto Electronics Practical			5	5
24766	CAD Practical			5	5
24767	Project Work			4	4
	TOTAL	16		19	35

 # Common with ECE
$ Common with ICE
% Common with MECH

ANNEXURE – II
SCHEME OF THE EXAMINATION

DIPLOMA IN ELECTRONICS (ROBOTICS) ENGINEERING /MECHATRONICS
(FULL TIME)

THIRD SEMESTER

Subject Code	SUBJECT	Examination Marks			Minimum for pass	Duration of Exam Hours
		Internal assess-ment Marks	Board Exam. Marks	Total Mark		
24031	Electronic Devices and Circuits	25	75	100	40	3
24232	Electrical Circuits and Machines	25	75	100	40	3
24733	Manufacturing Technology	25	75	100	40	3
24734	Electronic Devices and Circuits Practical	25	75	100	50	3
24735	Electrical Circuits and Machines Practical	25	75	100	50	3
24736	Manufacturing Technology Practical	25	75	100	50	3
20001	Computer Applications Practical	25	75	100	50	3
		175	**525**	**700**		

FOURTH SEMESTER

Subject Code	SUBJECT	Examination Marks			Minimum for pass	Duration of Exam Hours
		Internal assess-ment Marks	Board Exam Marks	Total Mark		
24241	Analog and Digital Electronics	25	75	100	40	3
24742	Mechanics of Materials	25	75	100	40	3
24743	Programming in C	25	75	100	40	3
24744	Measuring Instruments and Sensors	25	75	100	40	3
24745	Analog and Digital Electronics Practical	25	75	100	50	3
24746	Programming in C Practical	25	75	100	50	3
20002	Communication and Life Skill Practice	25	75	100	50	3
TOTAL		**175**	**525**	**700**		

FIFTH SEMESTER

Subject Code	SUBJECT	Examination Marks			Minimum for pass	Duration of Exam Hours
		Internal assess-ment Marks	Board Exam. Marks	Total Mark		
24751	Industrial Instrumentation and Automation	25	75	100	40	3
24052	Microcontroller	25	75	100	40	3
24753	Hydraulic and Pneumatic systems	25	75	100	40	3
24754	CAD/CAM	25	75	100	40	3
24055	Microcontroller Practical	25	75	100	50	3
24756	Hydraulics, Pneumatics and PLC Practical	25	75	100	50	3
24757	CNC Practical	25	75	100	50	3
		175	**525**	**700**		

SIXTH SEMESTER

Subject Code	SUBJECT	Examination Marks			Minimum for pass	Duration of Exam Hours
		Internal assess-ment Marks	Board Exam Marks	Total Mark		
22061	Industrial Engineering and Management	25	75	100	40	3
24762	Process control	25	75	100	40	3
24763	Robotics and Auto Electronics	25	75	100	40	3
24764	Process Control Practical	25	75	100	50	3
24765	Robotics and Auto Electronics Practical	25	75	100	50	3
24766	CAD Practical	25	75	100	50	3
24767	Project Work	25	75	100	50	3
TOTAL		**175**	**525**	**700**		

DIPLOMA IN ELECTRONICS (ROBOTICS) ENGINEERING / MECHATRONICS

(SANDWICH)

L - SCHEME

2011 - 2012

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

ANNEXURE -I
CURRICULUM OUTLINE
DIPLOMA IN ELECTRONICS (ROBOTICS) ENGINEERING /MECHATRONICS (SANDWICH)

THIRD SEMESTER

SUBJECT CODE	SUBJECT	HOURS PER WEEK			
		Theory Hours	Tutorial/Drawing	Practical Hours	Total Hours
24031	Electronic Devices and Circuits	5			5
24232	Electrical Circuits and Machines	4			4
24742	Mechanics of Materials	5			5
24733	Manufacturing Technology	3			3
24744	Measuring Instruments and Sensors	4			4
24734	Electronic Devices and Circuits Practical			6	6
24735	Electrical Circuits and Machines Practical			4	4
20001	Computer Applications Practical			4	4
	TOTAL	21		14	35

FOURTH SEMESTER

SUBJECT CODE	SUBJECT	HOURS PER WEEK			
		Theory Hours	Tutorial/Drawing	Practical Hours	Total Hours
24245	Analog and Digital Electronics Practical				
24736	Manufacturing Technology Practical				
24791	Industrial Training-I				

CURRICULUM OUTLINE

FIFTH SEMESTER

SUBJECT CODE	SUBJECT	HOURS PER WEEK			
		Theory Hours	Tutorial/Drawing	Practical Hours	Total Hours
24241	Analog and Digital Electronics	5			5
24743	Programming in C	5			5
24052	Microcontroller	5			5
24753	Hydraulic and Pneumatic systems	4			4
24746	Programming in C Practical			4	4
24055	Microcontroller Practical			4	4
24756	Hydraulics, Pneumatics and PLC Practical			4	4
20002	Communication and Life Skill Practice			4	4
	TOTAL	19		16	35

SIXTH SEMESTER

SUBJECT CODE	SUBJECT	HOURS PER WEEK			
		Theory Hours	Tutorial/Drawing	Practical Hours	Total Hours
22061	Industrial Engineering and Management	4			4
24762	Process control	4			4
24751	Industrial Instrumentation and Automation	4			4
24763	Robotics and Auto Electronics	4			4
24754	CAD/CAM	4			4
24764	Process Control Practical			3	3
24765	Robotics and Auto Electronics Practical			4	4
24766	CAD Practical			4	4
24757	CNC Practical			4	4
	TOTAL	20		15	35

SEVENTH SEMESTER

SUBJECT CODE	SUBJECT	HOURS PER WEEK			
		Theory Hours	Tutorial/Drawing	Practical Hours	Total Hours
24767	Project Work				
24792	Industrial Training-II				

L Scheme Alternate Papers for K Scheme subjects

III Semester

K SCHEME		L SCHEME	
Subject code	Subject	Subject Code	Subject
14031	Electronic Devices and Circuits	24031	Electronic Devices and Circuits
14233	Electrical Circuits and Machines	24232	Electrical Circuits and Machines
12031	Mechanics of Materials	24742	Mechanics of Materials
14734	Electronic Devices and Circuits ,Machines lab	24734	Electronic Devices and Circuits Practical
14735	Manufacturing Technology Lab	24746	Manufacturing Technology Practical
11011	English Communication Lab	20002	Communication and Life skill Practice

IV Semester

K SCHEME		L SCHEME	
Subject Code	Subject	Subject Code	Subject
14041	Analog and Digital Electronics	24241	Analog and Digital Electronics
14742	Hydraulics and Pneumatics Systems	24753	Hydraulics and Pneumatics Systems
14033	'C' Programming and OOPS	24743	Programming in C
14044	Analog and Digital Electronics Lab	24245	Analog and Digital Electronics Practical
14745	Hydraulics and Pneumatics Systems Lab	24756	Hydraulics, Pneumatics and PLC Practical
14036	'C' Programming Lab.	24746	Programming in C Practical

V Semester

K SCHEME		L SCHEME	
Subject Code	Subject	Subject Code	Subject
14051	Microprocessor and Microcontroller	24052	Microcontroller
14261	Electronic Instrumentation	24751	Industrial Instrumentation and Automation
14073	Robotics and Auto Electronics	24763	Robotics and Auto Electronics Practical
14054	Microprocessor and Microcontroller lab	24055	Microcontroller Practical
14755	AutoCAD Lab		No Equivalent
14076	Robotics and Auto Electronics Lab	24765	Robotics and Auto Electronics Practical

VI Semester

K SCHEME		L SCHEME	
Subject Code	Subject	Subject Code	Subject
14252	Process Control and Instrumentation	24762	Process Control
12062	Computer aided Design and Manufacturing	24754	CAD/CAM
12042	Machine Shop Technology	24733	Manufacturing Technology
14255	Process Control and instrumentation Lab	24764	Process Control Practical
12064	Computer aided Design and Manufacturing Lab	24766	CAD Practical
14766	Project Work & Entrepreneurship	24767	Project Work

III SEMESTER

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code: 1047
Subject code : **24031**
Semester : III Semester
Subject title : **ELECTRONIC DEVICES & CIRCUITS**

TEACHING AND SCHEME OF EXAMINATION:

No of Weeks/ Semester : 16 weeks

Subject Title	Instruction		Examination			
	Hrs. Week	Hrs Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
Electric Devices and Circuits	5	80	25	75	100	3Hrs

Topics and allocation of hours

UNIT	TOPIC	TIME(HRS)
I	Semiconductor and Diodes	14
II	Bipolar Junction Transistor	14
III	Transistor oscillators and FET and UJT	15
IV	SCR,DIAC,TRIAC,MOSFET and IGBT	13
V	Opto Electronic Devices and Wave shaping Circuits	14
	Revision and test	10
Total		80

RATIONALE:

Every Electronics Engineer should have sound knowledge about the components used in Electronics Industry. This is vital in R&D Department for chip level troubleshooting. To meet the industrial needs, diploma holders must be taught about the most fundamental subject, Electronic devices and Circuits. By studying this subject, they will be skilled in handling all types of electronic devices and able to apply the skill in electronics system

OBJECTIVES:

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

Study the working principle of PN junction diode and transistor

Understand the working principle of different types of rectifiers

Understand the different transistor configurations

Differentiate various types of amplifiers

Study the performance of special devices like UJT, FET

Study the performance of different transistor oscillators

Study the performance of SCR, DIAC, and TRIAC

Study the performance of MOSFET and IGBT

Know the construction and working principle of optoelectronic devices

Study the performance of solar cell

Explain the concept of wave shaping circuits

Study the working principle of clippers and clampers

24031 - ELECTRONIC DEVICES AND CIRCUITS
DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I	**Semiconductor and Diodes:** **Semiconductor** – Definition, Classification, Intrinsic and Extrinsic N type & P type -Drift current & Diffusion current Diodes-PN junction diode-Forward and Reverse bias characteristics-Specification-Zener diode-Construction & working principle-Characteristics-Zener break down-Avalanche break down-Zener diode as a voltage regulator - Applications-Specifications **Rectifier**-Introduction-Classification of Rectifiers-Half wave rectifier-Fullwave rectifier (Center tapped, Bridge) – Efficiency – Ripple factor – comparison - Applications – Filters – C, LC, and PI Filters .	**14 Hrs**
II	**Bipolar Junction Transistor:** Transistor – NPN and PNP transistor – operation- Transistor as an amplifier – Transistor biasing – Fixed bias, Collector base bias, Self bias – CB, CE, CC Configurations – Characteristics – Comparison between three configurations in terms of input impedence, Output impedence, Current gain, Voltage gain – (simple problems using α & β) RC coupled amplifier – Load characteristic analysis – Emitter follower and its application – Negative feedback – Basic concept, effect of negative feedback, Types of Negative feedback connections – Transistor as a switch.	**14 Hrs**
III	**Transistor Oscillators and FET and UJT:** **Transistor oscillator** – Classifications – Condition for oscillations (Barkhausen criterion) – General form of LC oscillator – Hartley Oscillator – Colpitts Oscillator – RC Phase shift oscillator, Crystal oscillator. **Field Effect Transistor** – Construction – Working principle of FET – Difference between FET and BJT – Characteristics of FET – Applications – FET amplifier(Common source amplifier). **Uni JunctionTransistor** – Construction – Equivalent circuit – Operation – Characteristics – UJT as a relaxation oscillator.	**15 Hrs**
IV	**SCR, TRIAC, DIAC, MOSFET:** **SCR** – Introduction – Working – Two transistor analogy of SCR – VI Characteristics – SCR as a switch, Controlled rectifier – Specifications. TRIAC – Basic working principle – Characteristics – Speed control of fan using DIAC and TRIAC. DIAC – Construction – working – characteristics – DIAC as bi-directional switch. MOSFET – Construction – characteristics – MOSFET as a switch.	**13 Hrs**

V	**Opto Electronics Devices and waveshaping circuits:** LDR, LED, 7 Segment LED, LCD, Opto coupler, Opto interrupter – Infrared transmitter and receiver - Laser diode(Simple treatment) – Solar cell – Avalanche Photo diode - Photo transistor. Clipper, Clamper – Voltage doubler, Astablemultivibrator, Monostable and Bistable Multivibrators using Transistor – Schmitt Trigger.	**14 Hrs**
	Revision and test:	**10 Hrs**

Text Books:

1. Eelctronic Devices and Circuits by Boylstead, Tata McGraw Publication
2. Principle of Electronics by V.K.Mehta, S.Chand & Company ltd.
3. Electronics Devices & Circuits by Sallaivahanan, N.Suresh Kumar, A.Vallavaraj Tata McGraw Publication

Reference Books:

1. Electronics principles by Malvino, Tata McGraw Publication
2. Electronics Devices & Circuits by Allen Mottershed Tata McGraw – Hill Publication
3. Electronics Devices & Circuits by Jacob Millman and Halkias Tata McGraw – Hill publication
4. Optical Fiber Communication by Gerd Keise

24031 ELECTRONIC DEVICES AND CIRCUITS

MODEL QUESTION PAPER – I

Time : 3 Hrs. **Max Marks : 75**

PART A

Answer any FIFTEEN questions **(15 x 1 = 15)**

1. Give an example for donor impurity.
2. What is the cut in voltage for silicon diode?
3. What is the peak inverse voltage of full wave rectifier?
4. Name a component used for filtering.
5. Draw the symbol of NPN transistor.
6. What is the formula for current gain in common emitter configuration?
7. Which bias is normally used in applications?
8. What is the need for negative feedback?
9. What is the condition for oscillation?
10. What is the output frequency of Hartley oscillator?
11. Mention the relationship between the parameters of JFET.
12. State any two applications of UJT
13. Give an example for unidirectional switch.
14. Draw the symbol of TRIAC.
15. Name the terminals of DIAC.
16. Expand MOSFET.
17. In which bias, LED emits light?
18. Expand LASER.
19. What is the other name for Astable Multivibrator?
20. Draw the output waveform of negative clipper.

PART B (5 x 12 = 60)

Note : i) Answer all Questions choosing either (A) or (B) from each question.

21 A) Explain the operation of Zener diode and draw its characteristics.(12)

(OR)

B) Explain the operation of full wave rectifier and draw its output waveforms. List out its applications.(12)

22 A) i) Explain the operation of NPN transistor.(6)
ii) Compare three different configurations of transistors.(6)

(OR)

B) Explain the operation of RC coupled amplifier and draw its frequency response.(12)

23 A) i)Explain the operation of Hartley oscillator(6).
ii) Differentiate FET with BJT(6)

(OR)

B) Explain the construction and operation of UJT.(12)

24 A) i)Explain SCR as a controlled rectifier.(6)
ii) Discuss about the specifications of SCR.(6)

(OR)

B) Explain the operation ofMOSFET with neat diagram.(12)

25 A) Explain the operation of Solar cell and Photo Transistor.(12)

(OR)

B) Explain the operation of Schmitt Trigger and draw its output waveform.(12)

24031 ELECTRONIC DEVICES AND CIRCUITS

MODEL QUESTION PAPER – II

Time : 3 Hrs. **Max Marks : 75**

PART A **(15 x 1 = 15)**

Answer any FIFTEEN questions

1. Give an example for intrinsic semiconductor.
2. Draw the symbol of Zener diode
3. What is the efficiency of half-wave rectifier?
4. How many filtering components are used in pi filter?
5. In which region transistor has to be operated for faithful amplification?
6. What is the output impedance of common base configuration?
7. What is Q-point?
8. Name the types of feedback
9. What are the components used in tank circuit?
10. State the advantages of crystal oscillator.
11. Give an example for voltage controlled device.
12. What is the formula for intrinsic standoff ratio?
13. What is the family name of SCR?
14. How many terminals are present in TRIAC?
15. Expand DIAC.
16. What are the types of MOSFET?
17. Draw the symbol of LDR.
18. What is solar cell?
19. Draw the output waveform of negative clamper.
20. How many stable states are present in Astable Multivibrator?

PART B (5 x 12 = 60 Marks)

Note : i) Answer all Questions choosing either (A) or (B) from each question.
ii) All questions carry equal marks

21 A) Explain the operation and characteristics of PN junction diode with suitable diagram.(12)

(OR)

B) Explain the operation of C and pi filter and draw its waveform.(12)

22 A) i) Explain the operation of transistor as an amplifier(6).
ii) Write short notes on fixed bias.(6)

(OR)

B) i) Explain the operation of emitter follower.(6)
ii) Explain how transistor is used as a switch(6)

23 A) i) Discuss about the conditions for oscillation..(6)
ii) Explain the operation of RC phase shift oscillator. (6)

(OR)

B) Explain the working principle of JFET and draw its characteristics. (12)

24 A) With neat diagram explain the working principle of SCR and draw the transistor analogy of SCR(12)

. (OR)

B) i) Explain the operation of DIAC with its characteristics. (6)
ii) Explain the construction details of MOSFET. (6)

25 A) Explain the operation of i)Opto interrupter ii)avalanche photo diode. (12)

(OR)

B) Explain the operation of positive and negative clamper.(12)

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code: 1047
Subject code : **24232**
Semester : III Semester
Subject title : ELECTRICAL CIRCUITS AND MACHINES

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester : 16 Weeks

Subject Title	Instruction		Examination			
	Hrs. Week	Hrs Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
Electrical circuits and Machines	5	80	25	75	100	3Hrs

Topics and Allocation of Hours :

UNIT	TOPICS	TIME (hrs)
I	DC circuits and DC Networks Theorems	14
II	AC circuits	14
III	Resonance and 3 phase AC circuits	12
IV	DC Machines and AC Machines	14
V	Transformers	14
	Revision / Test	12
	Total	80

Rationale

The fundamental knowledge about Electrical circuits both AC and DC is essential for all diploma holders.The working principle of DC AND AC machines,transformer is a prerequisite for technicians in their workplace.This subject helps in this way.

Objectives

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

- Define voltage, current, resistance, resistivity, power, energy and their units.
- State and explain ohm's law and Kirchhoff's law and solve simple problems.
- Derive equivalent resistance of series and parallel circuits.
- Solve problems in mesh current and nodal voltage method.
- State and explain super position theorem, Thevinin's theorem. Norton's theorem maximum power theorem transfer theorem and solve problems in theorems.
- Define period, frequency, amplitude, average value, RMS value, form factor and peak factor.
- Derive voltage and current in R, L and C.
- Derive power in AC circuit.
- Solve problems and draw vector diagram of RL, RC and RLC series and parallel circuits.
- Define Q factor and bandwidth.
- Understand 3ф supply and advantages of 3ф over 1ф system.
- Derive relation between line and phase quantity in star and Delta connections.
- Explain 3ф power measurement by two wattmeter method.
- Explain the constructional details of DC machines.
- Explain the principle and working of DC generator and DC motor.
- Derive EMF equation of DC generator.
- Explain the characteristics and applications of DC generators.
- Draw and explain 3 and 4 point starters.
- Explain the characteristics, applications and speed control of DC motor.
- Explain the principle and working of 3ф alternator.
- Explain the construction, working and starting methods of 3ф induction motor.
- Explain the principle and working of different types of 1ф induction motor.
- Explain the principle and working of transformer.
- Derive EMF equation and solve simple problems.
- Explain OC and SC test on transformer.
- Explain the construction, working and applications of auto transformer.

24231 ELECTRICAL CIRCUITS AND MACHINES

DETAILED SYLLABUS

UNIT	NAME OF THE TOPIC	HOURS
I	**DC CIRCUITS AND DC NETWORK THEOREMS** Concept of electrical quantities – Voltage – Current – Resistance - Power – Energy – Ohm's law – Resistances in series – resistances in parallel – Series parallel circuits – Kirchhoff's laws Simple problems Mesh current– Two loops only. Simple problems Super position, Thevenin'sand Maximum power transfer theorems – Statement and explanations – Two loops only. Simple problems	**14 hrs.**
II	**AC CIRCUITS** Ac fundamentals – Ac waveform – Sinusoidal and non-sinusoidal – Period – Frequency – Cycle – Amplitude – Phase – Peak value – Average value – RMS value (effective value) – Form factor – Crest factor – Rectangular and Polar forms for complex number. Ac through pure resistor, Inductor and Capacitor, Concept of Capacitor – Concept of Impedance – vector diagram. Capacitors in series and parallel – energy stored in a capacitor, inductor – Derivation - simple problems. Power in AC circuits – power factor – RL, RC and RLC series and parallel circuits – simple problems.	**14 hrs**
III	**RESONANCE AND 3 ϕ AC CIRCUITS** Resonance – condition for resonance – series and parallel resonance – resonance curve – Applications of resonance – simple problems in resonance. Concept of 3ϕ supply – Line and phase voltage and current in star and Delta connected circuits - 3ϕ power – Measurement of 3ϕ power by two watt meter method – simple problems – Advantages of 3ϕ over 1ϕ system.	**12hrs**

UNIT	NAME OF THE TOPIC	HOURS
IV	**DC MACHINES AND AC MACHINES** Dc machines – Types – Constructional details of DC machines – DC generators – Principle - Types – Principles – EMF equation – characteristics of shunt, series and compound generators – applications (simple problems) DC motor – Types – Motor action – Back EMF – Torque speed characteristics – Starting of motors using 4 point starters – Speed control of DC motor – Applications. Ac machines - 3ϕ Alternator – Construction and working – Relation between speed and frequency. 3ϕ induction motor – construction – Types – Principle of operation – Methods of starting of 3ϕ Induction motor – Slip.1ϕ induction motor – Principle of operation – Capacitor start – Applications	**14 Hrs**
V	**TRANSFORMER** Transformer – Ideal Transformer – Principle of working – Constructional details – EMF equation – Turns ratio – Core loss – Copper loss – Efficiency – Regulation – SC and OC tests –Simple problems. Transformer on NO load – Transformer on load – Condition for maximum efficiency.Auto transformer – Construction and working – Applications.	**14 hrs**

TEXT BOOK

1. B. L. THERAJA, “A text book of Electrical Technology Vol. I & II”, S. Chand & Co.

REFERENCE BOOKS

1. ARUMUGAM &PREMKUMAR , “Circuit Theory”, Khanna Publishers.
2. NAGOOR KANI, “Circuit Theory”, RBA Publications.
3. M. V. DESPANDE, “Electrical Machines” PHI learning Private Ltd.
4. M. M. Louis, “Elements of Electrical Engg. ”, Khanna Publishers.
5. M. L. Gupta, “elementary of Electrical Engg. “, S.K. Kataria& Sons.

ELECTRICAL CIRCUITS AND MACHINES
MODEL QUESTION PAPER – I

TIME: 3 hours **Maximum Marks: 75**

PART A

Note : Answer any Fifteen Questions. **Marks: 15X1=15**
All Questions carry equal marks.

1. State Kirchhoff's current law.
2. Define power.
3. State the unit of energy.
4. What is the equivalent resistance when two resistors are connected in parallel?
5. Define period.
6. Define crest factor.
7. Give the formula for inductive reactance.
8. Define power factor?
9. State the condition for series resonance.
10. Define quality factor.
11. Distinguish between impedance and admittance.
12. State any one advantage of three phase system over single phase system.
13. Give an application of shunt motor.
14. What is the necessity of starter?
15. Write the EMF equation of a DC generator.
16. What is slip?
17. What are the losses in transformer?
18. Define regulation of transformer.
19. Write the formula for turn's ratio of the transformer.
20. State any one advantage of auto transformer.

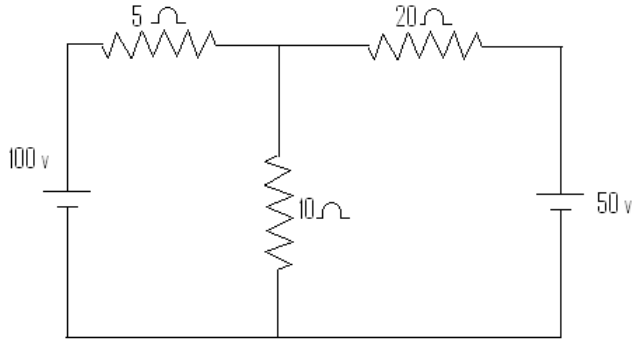
PART B **Marks: 5*12=60**

II Answer all questions choosing either A or B from each question.
Each question carries 12 marks.

21. a] State Superposition theorem. Explain the step by step procedure for superposition theorem with an example. [12]

(Or)

b] i) Draw the Thevenin's equivalent circuit. [2]
ii) Find the current through 10Ω resistor using Thevenin's theorem. [10]



22. a] i) Define RMS value. Prove $V_{rms} = 0.707\ V_m$. [6]

ii) Derive expression for impedance in RL series circuit. [6]

(Or)

b] A coil has a resistance of 40 Ω and inductance of 0.2 Henry is connected to a 250 V, 50 Hz supply. Find the impedance, current, power factor and power. [12]

23. a] Derive the relationship between [i] line and phase voltage and [ii] Line and phase current in a 3ф star and delta connected system. [12]

(Or)

b] Derive the expression for measurement of 3ф power by two watt meter method. [12]

24. a] Describe the construction and working of a DC generator with neat diagram and mention its types. [12]

(Or)

b] Draw and explain the working of four point starter [12]

25. a] Explain in detail the OC and SC test on a 1ф transformer with neat circuit diagram. [12]

(Or)

b] i) Define transformer efficiency and derive the condition for maximum efficiency. [8]

ii) Define core loss and copper loss. [4]

ELECTRICAL CIRCUITS AND MACHINES
MODEL QUESTION PAPER – II

TIME: 3 hours **Maximum Marks: 75**

PART A

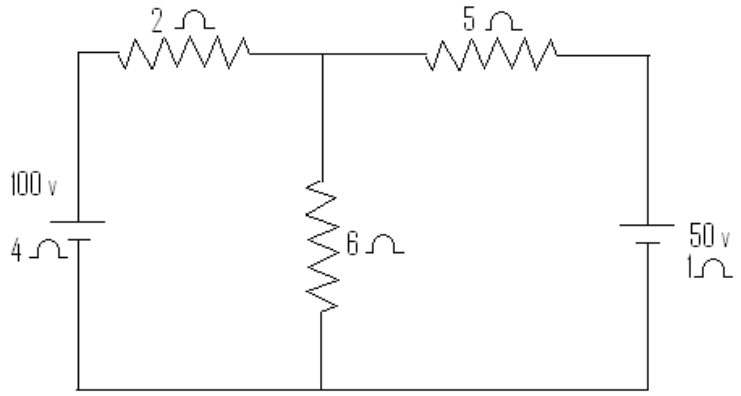
Note : Answer any Fifteen Questions. **Marks: 15X1=15**
All Questions carry equal marks.

1. Define current.
2. Write the formula for total resistance when three resistors R1, R2, & R3 are connected in series.
3. State Ohm's law.
4. State Thevenin's theorem.
5. Define Frequency.
6. Give the value of form factor for a sine wave.
7. Convert 3 + j4 to polar form.
8. Define Bandwidth.
9. What is meant by resonance?
10. Write the expression for 3ϕ power.
11. Define line voltage.
12. Mention any one advantage of 3ϕ system over 1ϕ system.
13. State the purpose of commutator in DC generator.
14. State any one application of DC series motor.
15. Classify the single phase induction motors.
16. Write the torque equation of a DC motor.
17. Define transformer.
18. Which test gives core loss?
19. Define efficiency of the transformer.
20. Define transformation ratio in transformer.

PART B **Marks: 5X12=60**

II] A**nswer all questions choosing either A or B from each question.**
Each question carries 12 marks.

21. a] Find the current through 6Ω resistance using Superposition theorem. [12]



(Or)

b] i) State KCL and KVL. [4]

ii) State maximum power transfer theorem and derive the condition for maximum power transfer [8]

22. a] i) Derive expression for the energy stored in a capacitor. [6]

ii) Derive formula for impedance in RC series circuit. [6]

(Or)

b] i) A series RLC circuit with a resistance of 50 Ω, a capacitance of 40μf and an inductance of 0.15 H are connected across 230 V, 50 Hz supply. Determine inductive reactance,capacitive reactance, impedance, current, power factor and power. [12]

23. a] State the condition for series resonance. Derive the series resonance frequency and also draw the resonance curve. Compare series and parallel resonance circuits. [12]

(Or)

b] Three coils each having a resistance of 20 Ω and inductive reactance of 15 Ω are connected in (i) star (ii) delta to 400 V 3ϕ, 50 Hz supply. Calculate line current, power factor, power drawn from the supply in each case. [12]

24. a] (i) What are the types of DC motor. [2]

(ii) Explain the different methods for speed control of DC motor. [10]

(Or)

b] Explain with neat diagram, the principle and operation of capacitor start single phase induction motor. [12]

25. a] Explain the working principle of transformer and derive its EMF equation. [12]

(Or)

b] i) Explain the working principle of auto transformer with a neat sketch. [8]

ii) The number of turns of the primary and secondary windings of a single phase transformer are 500 and 50 respectively. If the primary is connected to 220 V 50 Hz supply, determine the secondary voltage. [4]

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code: 1047
Subject code : **24733**
Semester : III Semester
Subject title : **MANUFACTURING TECHNOLOGY**

TEACHING AND SCHEME OF EXAMINATION:

No of Weeks/ Semester : 16 weeks

Subject Title	Instruction		Examination			
	Hrs. Week	Hrs Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
MANUFACTURING TECHNOLOGY	5	80	25	75	100	3Hrs

Topics and Time Allocation

UNIT	TOPICS	TIME (hrs)
I	LATHE,PLANER,SHAPER	14
II	DRILLING MACHINES, MILLING MACHINES	14
III	GRINDING MACHINE, BROACHING	12
IV	GEAR MANUFACTURING PRACTICE-FORMINGAND GENERATING PROCESSES	14
V	FUNDAMENTALS OF MEASUREMENT	14
	REVISION/ TEST	12
	TOTAL	80

RATIONALE :

The working of various machines like Planer ,Shaper , Slotter ,drilling ,milling is necessity for supervisors in manufacturing industries. Knowledge in many varieties of gears, figs and fixtures is necessary for a floor level manager.

- Explain the working of machine tools planar ,Shaper and slotter
- Compare various work holding devices
- Explain the working of machine tools drilling machine and milling machine.
- Distinguish various types of milling cutter.
- Classify different types of grinders and grinding wheels.
- Explain the broaching operation and boring operation and their application.
- Explain the milling procedure for spur, helical and bevel gears.
- Explain the various types of gear generating processes.
- Compare the various types of jigs and fixtures.
- Explain the different types press working operations.
- Appreciate the use of non –conventional

24743-MANUFACTURING TECHNOLOGY

DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I	**Lathe:** Types, specification, sketch, principle parts-headstock, tailstock, carriage, and tool post. Operations performed on Lathe: turning, thread cutting, drilling, boring, reaming, tapping, knurling, forming, thread cutting, taper turning. **Planer:** Types of planers-description of double housing planer – specifications-principles of operation-drives-quick return mechanism-feed mechanism-types, work holding devices and special fixtures-types of tools-various operation. **Shaper:** Types of shapes-specifications-standard-plain-universal-principles of operations-drives-quick return mechanism –crank and slotted link-feed mechanism-work holding devices-tools and fixtures.	**14 Hrs**
II	**Drilling machines:** Drills-flat drills-twist drills-nomenclature-types of drilling machines-bench type-floor type-radial type-gang drill-multispindle type-principle of operation in drilling-speeds and feeds for various materials-drilling holes- methods of holding drill bit-drill chucks-socket and sleeve-drilling-reaming-counter sinking-counter boring-spot facing-tapping-deep hole drill-drill jigs. **Milling machines:** Types-column and knee type-plain-universal milling machine-vertical milling machine-specification of milling machines-principles of operation-work and tool holding devices-arbor-stub arbor-spring collets-adaptors-milling cutters-plain milling cutter-slab milling cutter-slitting saw-side milling cutter-angle milling cutter-T-slot milling cutter woodruff milling cutter-fly cutter-nomenclature of milling cutter-milling process-conventional milling-climb milling-milling operations-straddle milling-gang milling-vertical milling attachment-types of milling fixtures.	**14 Hrs**

III	**Grinding machines:** Types and classification-specifications-rough grinders-floor mounted hand grinders-portable grinders-belt grinders-precision grinders-cylindrical, surface, centre less grinders-internal grinders-planetary grinders-principles of operations-grinding wheels-abrasives-natural and artificial-dressing and truing of wheels-balancing of grinding wheels-diamond wheels-types of bonds-grit, grade and structure of wheels-wheels shapes and sizes-standard marking systems of grinding wheels-selection of grinding wheel-mounting of grinding wheels. **Broaching:** Types of broaching machine-horizontal vertical and continuous broaching-principles of operation-types of broaches-classification-broach tool nomenclature-broaching operations-simple examples.	**12 Hrs**
IV	**Gear manufacturing practice-Forming and Generating processes:** Gear forming process in milling-dividing head-principles of operation-indexing-linear indexing-rapid, simple-differential and angular indexing-problems-gear milling-cutter selection-nomenclature-module-pressure angle-milling procedure for spur, helical and bevel gears-problems-other forming processes for manufacturing of gears. Generating process-gear shaper-gear hobbing-principle of operation only- gear materials-cast iron, steel, alloy steels, brass, bronze, alluminium, nylon, fibre-no problems.	**14 Hrs**
V	**Fundamentals of Measurement** Introduction –Metrology – Inspection – Defintion of terms-Accuracy – Precision – Tolerance – Surface finish – Quality – Reliability – Interchangeability – optical fundamentals – optical instruments – principles of operation- interference band - Measurement of Length – Classification of measuring instruments – Radius measurement – Measurment of Angles – Sine bar and slip gauges, Sine bar and spirit level , Angle gauges-Measurment of Tapers –vernier bevel protractor, Tool room microscope, Autocollimator, External taper – Ring gauge measurement by balls and slip gauges –ring gauge masurment by unequal balls – Screw threads Inspection –Elements of a thread-guaging of screw threads – thread gauges – Measurment of individual elements of a screw thread – Measurement of External threads.	**14 Hrs**

Text Books

1. HajraChoudhry “work shop technology” Vol.II Media Promoters and Publishers Pvt Ltd.,
2. Jain R.K “Production Technology” Khanna Publishers
3. M I khan ,ErajulHaque “Manufacturing Science” PHI Learning Pvt Ltd.

Reference Books:

1. Chapman W A J “workshop technology” Vol I, II and III ELBS
2. Begeman M L “Manufacturing Process” John Wiley Publishers
3. HMT “Production Technlology”

MODEL QUESTION PAPER - I

MANUFACTURING TECHNOLOGY

PART A

Note : Answer any Fifteen Questions. **Marks: 15X1=15**
All Questions carry equal marks.

1 What is the function of a clapper box in a shaper?

2 Mention the different tools used in shaper

3 What are the different drive mechanisms used to drive the table of a planer?

4 What is Quick return mechanism of slotter

5 What is reaming

6 What are the different types of drilling machine

7 List out 4 types of milling cutters

8 What is meant by down milling

9 List out the boring tools

10 What is grit in a grinding wheel manufacturing

11 What is the purpose of dressing the grinding wheel

12 What are the types of boring machine?

13 What si pressure angle of a gear

14 What is the use of an indexing head

15 What is meant by gear hobbing

16 What are different types of indexing method

17 Define jig

18 What is lancing

19 What is Press tool

20 What is Non-conventional Machining

PART B Marks 5 X 12=60

Answer all questions choosing either A or B from each question.
Each question carries 12 marks.

21 A (i) Write short notes on work holding devices in planer (6)
(ii) Explain with neat sketch of crank and slotted link quick return mechanism of shaper (6)

(or)

B (i) Compare shaper and planer (6)
(ii) Describe the functions of double housing planer with neat sketch (6)

22 A (i) Write short notes on Nomenclature of Drill (6)
(ii) Explain the construction of radial drilling machine with neat sketch (6)

(or)

B (i) Explain the following 1) Face milling 2)Ratchet miling 3) Cam milling (6)
(ii) Draw a neat sketch of knee type horizontal milling machine and explain its working (6)

23 A What are the different types of bonds used in manufacturing of grinding wheel.

(or)

B Explain the following with a neat sketch 1) Dressing and truing of wheels 2) Balancing of grinding wheel

24 A Describe the following indexing a) Differential indexing b) Angular indexing

(or)

B What are the different materials used for manufacturing of gears and list its advantages.

25 A Write the notes on 1) bending 2) lancing 3) Shaving 4) Curling

(or)

B Describe the construction and working operation of LASER beam machining process and also list advantages and applications

MODEL QUESTION PAPER - II

PART A

Note : Answer any Fifteen Questions. **Marks: 15X1=15**
All Questions carry equal marks.

1 List out the different types of planers

2 What is the different drive mechanisms used to drive the table of a planer?

3 Define the depth of the drilling machine

4 What are the types of slotting machines used in the industry ?

5 What is Counter Sinking?

6 What is the purpose of gang drilling machine?

7 What are the tool holding devices to mount the milling cutters?

8 What is meant by up milling ?

9 What is centerless grinder?

10 What are the two types of Abrasives?

11 What are the different types of grinding wheel shapes?

12 What is the purpose of broaching machine?

13 What is gear forming process?

14 What is module?

15 What is meant by gear shaving?

16 What are the advantages of steel as a gear material?

17 Define fixture

18 What is slitting?

19 What is Knock out?

20 What is ECG?

PART B Marks 5 X 12=60

Answer all questions choosing either A or B from each question.
Each question carries 12 marks.

21 A (i) Explain with a neat sketch the whit worth quick return mechanism of a slotter(6)

(ii) Sketch a double housing planer and label the principle parts of a planer(6)

(or)

B (i) Explain with a neat sketch the automatic feed mechanism of a shaper (6)
(ii) List out the work holding devices used in a planer (6)

22 A List out the drilling operations. Explain with a neat sketch any four operations(12)

(or)

B (i) Nomenclature of a cylindrical milling cutter (6)
(ii) Explain with a neat sketch the milling processes (6)

23 A (i) Explain with a neat sketch the jig boring machine (6)
(ii) Explain the Nomenclature of pull broach (6)

(or)

B (i) What are the criteria while selecting a grinding wheel? (6)
(ii) List out the different methods of locating a hole in jig boring machine. Explain any one method. (6)

24 A (i) Explain with a neat sketch the differential indexing method. (6)
(ii) Explain with a neat sketch the gear hobbing process. Write its advantages.(6)

(or)

B What are different methods of gear finishing processes? Explain any two processes.(12)

25 A (i) What is locating elements? Explain with neat sketch any two locators. (6)
(ii) Explain with a neat sketch the ultrasonic machining process. (6)

(or)

B Explain with a neat sketch the different drive mechanism used in presses.(12)

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code: 1047
Subject code : **24734**
Semester : III Semester
Subject title : **ELECTRONIC DEVICES AND CIRCUITS PRACTICAL**

Subject Title	Instruction		Examination			
	Hrs. Week	Hrs Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
ELECTRONIC DEVICES AND CIRCUITS PRACTICAL	5	80	25	75	100	3Hrs

24734 - ELECTRONIC DEVICES AND CIRCUITS PRACTICAL

Note: At least 10 experiments should be constructed using breadboard / soldering

1. VI characteristics of Zener diode.
2. Bridge rectifier with and without filters.
3. Frequency response of RC coupled amplifier
4. Frequency response of Emitter follower.
5. Negative feedback amplifier
6. RC phase shift oscillator.
7. Hartley and Colpitts oscillator.
8. JFET characteristics
9. Common source amplifier.
10. UJT characteristics.
11. UJT relaxation oscillator.
12. SCR characteristics
13. DIAC and TRIAC characteristics
14. Clipper, Clamper and voltage doublers.
15. LDR, Photo diode and photo transistor characteristics.
16. Solarcell and Opto coupler.
17. Astable and Monostablemultivibrators using transistors.
18. Schmitt trigger using transistor.

EQUIPMENT REQUIRED:

S.NO	Name of the Equipments	Range	Required Nos.
1.	Dual power supply	0-15V	10
2.	High Voltage Power Supply	0-250V	2
3.	Signal Generator	1MHz	10
4.	Dual trace CRO	20 MHz & 60 MHz	5 + 5
5.	Transformer	12-0-12V	5
6.	Digital Multi meter	-	10

Circuit diagram – 20 marks

Connections – 20 marks

Reading & Graph – 20 marks

Result – 10 marks

Viva voce – 5 marks

Total – 75 marks

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code: 1047
Subject code : **24735**
Semester : III Semester
Subject title : **ELECTRICAL CIRCUITS AND MACHINES PRACTICAL**

Subject Title	Instruction		Examination			
	Hrs. Week	Hrs Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
ELECTRICAL CIRCUITS AND MACHINES PRACTICAL	5	80	25	75	100	3Hrs

24735 - ELECTRICAL CIRCUITS AND MACHINE PRACTICAL

1. MEASUREMENT OF RESISTANCE AND CAPACITANCE USING COLOUR CODES.
2. MEASUREMENT OF INDUCTANCE RL BY DOING AN EXPERIMENT.
3. MEASUREMENT OF CAPACITANCE RC BY DOING AN EXPERIMENT.
4. MEASUREMENT OF RESISTANCE BY OHMS LAW.
5. VERIFICATION OF KIRCHOFF'S CURRENT LAW.
6. VERIFICATION OF KIRCHOFF'S VOLTAGE LAW.
7. VERIFICATION OF THEVENIN'S THEOREM.
8. VERIFICATION OF MAXIMUM POWER TRANSFER THEOREM.
9. FREQUENCY RESPONSE OF SERIES RESONANCE.
10. MEASUREMENT OF IMPEDENCE IN A RLC SERIES CIRCUIT.
11. LOAD TEST ON SINGLE PHASE TRANSFORMER.
12. OPEN CIRCUIT AND SHORT CIRCUIT TEST ON SINGLE PHASE TRANSFORMER.
13. VERIFICATION OF SUPER POSITION THEOREM.
14. MEASUREMENT OF POWER IN 3ϕ USING 2 WATT METER METHOD.
15. SPEED CONTROL OF DC MOTOR USING DIAC AND TRIAC.
16. SPEED CONTROL OF AC MOTOR USING DIAC AND TRIAC.

EQUIPMENTS REQUIRED FOR THIRTY STUDENTS

1. REGULATED POWER SUPPLY (0-30V) - 4 Nos
2. AUDIO OSCILLATOR - 1 No
3. SINGLE PHASE TRANSFORMER - 2 Nos
4. AUTOTRANSFORMER - 2 Nos

Circuit diagram – 20 marks

Connections – 20 marks

Reading & Graph – 20 marks

Result – 10 marks

Viva voce – 5 marks

Total – 75 marks

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code: 1047
Subject code : **24736**
Semester : III Semester
Subject title : **Manufacturing Technology Practical**

Subject Title	Instruction		Examination			
	Hrs. Week	Hrs Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
Manufacturing Technology Practical	6	96	25	75	100	3Hrs

Objectives:

- Identify the parts of a Lathe and Shaper.
- Identify the Parts of a Milling machine.
- Machine a component using Lathe
- Machine a component using Shaper
- Grind a job to the given specification
- Use a dividing head and indexing plate
- Maintenance of Machines

Exercises in Lathe:

1. Plain turning
2. Step turning
3. Step and Taper turning
4. Knurling and thread cutting
5. Boring (Straight and taper)

Exercises in Milling machine

1. Plain milling
2. Spur gear milling
3. Pocket milling

Exercises in Cylindrical grinding:

1. Shaft grinding
2. Plug gauge grinding

Exercises in Surface Grinding:

1. Square surface grinding

Exercises in Tool and Cutter Grinding:

1. Single point cutting tool grinding

Exercises in Shaper:

1. Shaping round to square
2. Shaping a ‘V’ block

EQUIPMENTS REQUIRED FOR THIRTY STUDENTS

Lathe	15 No s
Milling machine	3 No s
Cylindrical grinding machine	1No
Surface grinding machine	1 No
Tool and cutter grinding machine	1 No
Shaper	2 No s

Scheme of Valuation

LATHE/MILLING	45 MARKS
DRILLING/SHAPING/GRINDING	25 MARKS
VIVA VOCE	5 MARKS
TOTAL	75 MARKS

COMMON TO ALL BRANCHES

L - SCHEME

2011 - 2012

COMPUTER APPLICATIONS PRACTICAL

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : COMMON TO ALL BRANCHES
Subject Code : 20001
Semester : III Semester
Subject Title : COMPUTER APPLICATIONS PRACTICAL

TEACHING AND SCHEME OF EXAMINATION:

No of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
COMPUTER APPLICATIONS PRACTICAL	4 Hrs	64 Hrs	25	75	100	3 Hrs

RATIONALE:

The application of Computer knowledge is essential to the students of all disciplines of Engineering in addition to their respective branch of study. The Computer Application Practical course facilitates the necessary knowledge and skills regarding creating, working and maintaining the documents, analyzing the data with charts manipulation of databases and presentation of documents with audio visual effects in a computer.

The learning of internet provides students with unprecedented opportunities to obtain information engage in discussion and liaise with individuals, organizations and groups world-wide. It provides the latest tools and technologies in helping the students to fetch better employment.

OBJECTIVES:

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

- Understand the Windows operating systems
- Familiarize and customize the desktop
- Use the different facilities available in the word processor
- Analyze the data sheet
- Create and manipulate the database
- Prepare PowerPoint presentation
- Understand Internet concepts and usage of e-mail

GUIDELINES:

- All the eighteen experiments given in the list of experiments should be completed and all the experiments should included for the end semester practical examination.
- The end semester practical examination question paper contains two questions- the first question from section-I and the second question from section-II. Each question carries 35 marks and viva voce carries 5 marks.
- The computer systems should be 1:2 ratio for practical classes

ALLOCATION OF MARKS

1. Internal Assessment – 25 Marks

DESCRIPTION	MARKS ALLOTTED
Record with Printout	10
Assignment	5
Attendance	5
Model Examination	5
Total	**25 MARKS**

2. Board Examinations – 75 Marks

Content	Max. Marks	
	Section I	**Section II**
Writing steps	15	15
Execution of exercise	15	15
Result with Printout	5	5
Viva voce	5	
Total	**75 Marks**	

PRACTICAL EXERCISES

SECTION – I

WINDOWS

Introduction- History of Windows- screen saver and monitor resolution – Wallpaper setting- Folder manipulation – properties of a folder – Recycle bin – Short cuts – Sorting Folder – Switching between Application – Copying in CD/DVD settings – Recording Audio files.

Exercises

1. a. Installing screen saver and change the monitor resolution by 1280X960
   b. Setting wall papers
   c. Creating, moving, deleting and renaming a folder
   d. Copy, paste and cut a folder/file
   e. Displaying the properties for a file or folder
2. a. Restoring files and folders from Recycle bin
   b. Creating short cuts for folder/file
   c. Finding a file or folder by name
   d. Selecting and moving two or more files/folders using mouse
   e. Sorting folders/files.
3. a. Copying files into CD/DVD
   b. Switching between applications
   c. Making the taskbar wider and hiding the taskbar
   d. Recording and saving an audio file
   e. Set/Change the date and time.

WORD PROCESSING

Introduction – Menus – Tool bar – Create – Edit – Save – Alignment – Font Size – Formatting – Tables – Fill Colors – Mail Merge – Page Setup - Preview – Water marking – Header – Footer – Clip art.

Exercises

4. Create the following table and perform the operations given below

ABC PVT. LTD.

Chennai

Production Summary of various Units in every Quarter

Uunit	Product - ID	Jan-Mar	Apr-june	July-Sept.	Oct-Dec.
Unit - I	56	234.	50	74	125
Unit - II	142	236	126	175	251
Unit - III	213	541	216	60	43
Unit - IV	125	243	127	250	136
Unit - V	143	152	138	80	45

- Arrange Unit name as left align and other columns as right align.
- Use doubled Border to the Summary Title and fill with 15% gray colour.
- Implement merging and splitting two or more cells
- Give alternative fore colour for columns.
- Print the above table.

5. Create a standard covering letter and use mail merge to generate the customized letters for applying to a job in various organizations. Also, create a database and generate labels for the applying organizations.

6. Create a news letter of three pages with two columns text. The first page contains some formatting bullets and numbers. Set the document background colour and add ‘confidential’ as the watermark. Give the document a title which should be displayed in the header. The header/ footer of the first page should be different from other two pages. Also, add author name and date/ time in the header. The footer should have the page number.

SPREADSHEET

Introduction – Menus – Tool bar – Create – Edit – Save – Formatting cells – Chart wizard – Fill Colors – Creating and using formulas – Sorting – Filtering.

Exercises

7. Create a result sheet containing Candidate's Register No., Name, Marks for six subjects. Calculate the total and result. The result must be calculated as below and failed candidates should be turned to red.

   Result is Distinction if Total >= 70 %

   First Class if Total > = 60 % and < 70 %

   Second Class if Total >= 50 % and < 60 %

   Pass if Total >= 35 % and < 50 %

   Fail otherwise

   Create a separate table based on class by using auto filter feature.

8. Create a table of records with columns as Name and Donation Amount. Donation amount should be formatted with two decimal places. There should be at least twenty records in the table. Create a conditional format to highlight the highest donation with blue colour and lowest donation with red colour. The table should have a heading.

9. Prepare line, bar and pie chart to illustrate the subject wise performance of the class for any one semester.

SECTION – II

DATABASE

Introduction – Menus – Tool bar – Create – Edit – Save – Data types – Insert – Delete – Update – View – Sorting and filtering – Queries – Report – Page setup – Print.

Exercises

10. Create Database to maintain at least 10 addresses of your class mates with the following constraints

    - Roll no. should be the primary key.
    - Name should be not null

11. Prepare a payroll for employee database of an organization with the following details:

    Employee Id, Employee name, Date of Birth, Department and

    Designation, Date of appointment, Basic pay, Dearness Allowance,

    House Rent Allowance and other deductions if any.

    Perform simple queries for different categories.

12. Design a pay slip for a particular employee from the above database.

PRESENTATION

Introduction – Menus – Tool bar – Create – Edit – Save – Slide transition – Insert image – Hyper link – Slide numbers – View slide show with sound – Photo album – Clip art.

Exercises

13. Make a marketing presentation of any consumer product with at least 10 slides. Use different customized animation effects on pictures and clip art on any four of the ten slides.
14. Create a Presentation on “Communication Skills” with three different slide transitions with sound effect.
15. Create a photo album in PowerPoint.

INTERNET

Introduction – Browsers – Open a website – Email: Send, receive and delete – Email with Attachments Google docs – Search Engines – Searching topics

Exercises

16. Create an e-mail id and perform the following

    - Write an e-mail inviting your friends to your Birthday Party.
    - Make your own signature and add it to the e-mail message.
    - Add a word attachment of the venue route
    - Send the e-mail to at least 5 of your friends.

17. Create a presentation on Google docs. Ask your friend to review it and comment on it. Use “Discussion” option for your discussions on the presentation.
18. Find out the direction and distance about road travel from Delhi to Agra using the Internet search. Also make a report of the Map and other details like place to stay and visit at Agra.

MODEL QUESTION PAPER

Year / Sem: **II / III**	Subject: **COMPUTER APPLICATIONS PRACTICAL**	Code: **20001**
Answer all the questions		**Max.Marks:75**
1	**Section - I** Prepare line, bar and pie chart to illustrate the subject wise performance of the class for any one semester.	
2	**Section - II** Create an e-mail id and perform the following • Write an e-mail inviting your friends to your Birthday Party. • Make your own signature and add it to the e-mail message. • Add a word attachment of the venue route • Send the e-mail to at least 5 of your friends.	

LIST OF EQUIPMENTS AND THE QUANTITY REQUIRED FOR A BATCH OF 30 STUDENTS

SOFTWARE REQUIREMENTS

Operating System	Windows XP or Windows Vista or Windows 7 / Linux
Office Package	Microsoft office 2000 or Office 2003 or Office 2007/Open Office

HARDWARE REQUIREMENTS

Desktop Computer System with latest configuration	30 Nos
Power Backup (UPS)	10 KVA
Laser Printer	3 Nos

SAFETY PRECAUTIONS TO BE FOLLOWED BY STUDENTS

- Do not touch, connect or disconnect any plug or cable without teacher's permission
- Don't attempt to touch any live wires
- Systems should be shutdown properly after completion of work

REFERENCES

TITLE	AUTHOR	PUBLISHER	Year of Publication
Computer Applications Practical Manual	Dr.V.Karthikeyan Mr.D.Arulselvan	Learning Resource Centre, Thiagarajar Polytechnic College, Salem- 636 005	2012
Windows 7 in easy steps	Harshad kotecha	Tata McGrawHill	2011
A First Course in Computer 2003	Sanjay Sasena	Vikas Publications	2009
MS Office – 2003	Ramesh Bangia	Kanna Book Publication	2005
Introduction to Computers with MS-Office 2000	Alexis Leon & Mathews Leon	Tata McGraw-Hill	2002
Mastering Microsoft Office 2000	Gini Courter & Annette Marquis	BPB Publications	1999

IV SEMESTER

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code: 1047
Subject code : **24241**
Semester : IV Semester
Subject title : **ANALOG AND DIGITAL ELETRONICS**

TEACHING AND SCHEME OF EXAMINATION:

Number of Weeks/ Semester : 16 weeks

Subject Title	Instruction		Examination			
	Hrs. Week	Hrs Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
ANALOG AND DIGITAL ELECTRONICS	5	80	25	75	100	3Hrs

Topics and Time Allocation

UNIT	TOPICS	TIME (hrs)
I	Linear ICs : op.amp, Timer and their applications	14
II	Boolean Algebra	14
III	Combinational Logic	14
IV	Sequential Logic	12
V	D/A, A/D and Memory	14
	Revision / Test	12
	Total	80

Rationale

Digital electronics replaces the analog circuits in many fields.Using digital circuits is easier . Diploma holders must have knowledge about the fundamental laws used in digital electronics and the working principle of digital circuits.Operational amplifiers find application in timer circuits . This subject deals with both analog and digital electronic circuits.

Objectives

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

- Explain the characteristics of Op-amp.
- Explain the various applications of Op-amp.
- Explain the functional block diagram of 555 Timer IC.
- Explain Astable, Monostablemultivibrator.
- Explain the various number systems Binary, BCD, Octal and Hexadecimal.
- State and explain DeMorgan's theorem.
- Write the truth table and symbol of Logic gates OR, AND, NOT, NAND, NOR, EX-OR.
- Simplification of Logic functions using Karnaugh's map.
- Explain the operation of Half-adder, Full-adder, Half-subtractor, Full-subtractor.
- Explain Parity generator and checker.
- Explain Decoder and Encoder.
- Explain Multiplexer and Demultiplexer.
- Explain Asynchronous Binary counter, Decade counter, Synchronous counter.
- Explain shift register.
- Explain weighted register and R -2R ladder type D/A converter.
- Explain Successive Approximation, Dual slope techniques.

unit	Name of the Topic	Hours
I	**LINEAR ICS: OP. AMPS, TIMERS AND THEIR APPLICATIONS** Operational amplifier –Ideal Characteristics of Operational amplifier- Minus input follows Plus input and NO current through Minus and Plus input – Op-amp parameters – CMRR – Slew rate – Virtual ground – Applications of Op.Amp inverting amplifier – Summing amplifier – Non inverting amplifier – Voltage follower – Comparator – Zero crossing detector – Integrator – Differentiator – Op. Amp specifications – 555 timer – Functional block diagram – Astable and Monostable – Sequence timer.	**14 hrs**
II	**BOOLEN ALGEBRA** Number system – Decimal – Binary – Octal – Hexadecimal – BCD – Conversion from one number system to other – Boolean Algebra – Basic laws and Demorgan's theorems –Logic gates – OR – AND – NOT – NAND-NOR – EX-OR symbols. Truth table and Boolean expression – Realization of gates using universal gates NAND and NOR – Problems using 2, 3 and 4 variables – Boolean expression for output – Simplification of Boolean expression using Karnaugh's map (up to 4 variables) – Constructing logic circuits for the Boolean expressions.	**14 hrs**
III	**COMBINATIONAL LOGIC** Arithmetic circuits – Binary addition – Binary subtraction – 1's complement and 2's complement – signed binary numbers – Half adder – Full adder – Half subtractor – Full subtractor –Parity generator and checker – Digital comparator – Arithmetic Logic unit – Decoder – 3 to 8 decoder – BCD to 7 segment decoder – Encoder – Multiplexer – De-multiplexer	**14 hrs**
IV	**SEQUENTIAL LOGIC**Circuit, working, truth table of Flip- Flops – RS – D – T – JK – Master slave Flip Flop – Edge triggered F/F –Block diagram truth table timing diagram of Asynchronous Binary counter - Synchronous Binary counter –Decade counter – Shift register – 4 bit shift register.	**12hrs**
V	**D/A , A/D AND MEMORY** D/A converter – Basic concepts – Weighted resistor D/A converter – R-2R ladder converter - Specification of DAC 5725 – Sampling and quantization – A/D using Successive Approximation method – Dual slope method – Voltage to frequency conversion – Frequency to voltage conversion – Specifications of ADC 7609 – Memory – Static memory – Dynamic memory – SDRAM – DDRRAM.	**14 hrs**

TEXT BOOK

1. R. P. JAIN - Modern Digital Electronics, TMH 2003.
2. K. MEENA – Principles of Digital Electronics - PHI learning Pvt. Ltd.

REFERENCE BOOKS

1. ALBERT PAUL MALVINO and DONOLD P. LEACH - Digital principles and applications – 1991
2. ROGER. L TOKHEIM MACMILLAN - Digital electronics McGraw Hill- 1994.
3. WILLIAM H GOTHMANN - Digital electronics an introduction to theory and practical – PHI 1998
4. SATNAM P. MATHUR and others - Electronic devices, applications and integral circuits Umesh Publications – 1982.

ANALOG AND DIGITAL ELECTRONICS
MODEL QUESTION PAPER – I

TIME: 3 hours **Maximum Marks: 75**

PART A

Note: Answer any Fifteen Questions. **Marks: 15*1=15**
All Questions carry equal marks.

1. What is an OP-Amp?
2. What is voltage follower?
3. Define Slew rate.
4. Show the pin details of 555 timer IC.
5. Convert decimal number 9 to binary
6. What is Boolean algebra?
7. Expand BCD code.
8. Draw the logic symbol of a two input OR gate
9. What is a combinational logic circuit?
10. What is a demultiplexer?
11. Write the logic equations of half adder
12. What is parity generator?
13. How many FFs are required to construct a Decade counter?
14. What is meant by edge triggering?
15. What is a T flip flop?
16. Explain how a flip flop can store a data bit?
17. Define A/D conversion.
18. List various D/A conversion techniques?
19. State the difference between static and dynamic memory.
20. What is meant by quantization?

PART B **Marks: 5*12=60**

II] A**nswer all questions choosing either A or B from each question.**
Each question carries 12 marks.

21. a] Explain the working of an op-amp as [i] summer [ii] differentiator(12)

[or]

b] Draw the functional block diagram of 555 timer and explain its operation.(12)

22. a] State and prove Demorgan's Theorems. (12)

[or]

b] Deduce different logic gate function using NAND gates only. (12)

23. a] Draw and explain the working of ALU. (12)

[or]

b] What is MUX? Explain with neat diagram 1 of 8 multiplexer. (12)

24. a] Explain the working of a 4 bit binary Asynchronous counter with a neat diagram and waveforms. (12)

[or]

b] Explain the working of JK MS flip-flop with a neat diagram. (12)

25. a] Explain the working of a 4 bit R-2R ladder D/A converter with a neat diagram. (12)

[or]

b] Explain with a neat diagram, the Successive approximation type A/D converter.(12)

ANALOG AND DIGITAL ELECTRONICS
MODEL QUESTION PAPER – II

TIME: 3 hours **Maximum Marks: 75**

PART A

Note : Answer any Fifteen Questions. **Marks: 15*1=15**
All Questions carry equal marks.

1. Define CMRR of an op-amp.
2. What is virtual ground?
3. What are the two modes of operation of a timer IC 555?
4. Give any one application of 555 ICs
5. What is a logic gate?
6. Explain the term 'universal gate'
7. Convert binary 011011_2 to Hexadecimal.
8. State logic equation for EX-OR gate
9. State the difference between half adder and full adder
10. Define a multiplexer
11. What is meant by decoder?
12. What is 2's complement?
13. What is a D-type Flip-Flop?
14. Give the advantage of JK flip flop over an S-R flip flop?
15. What is race around condition?
16. State the difference between Synchronous and Asynchronous counter
17. Define D/A conversion.
18. What is meant by sampling?
19. Define resolution of a DAC
20. What is a volatile memory?

PART B **Marks: 5*12=60**

II] Answer all questions choosing either (a) or (b) from each question.
All sub divisions carry equal marks.

21. a][i] Explain the working of a Comparator using op-amp. [6]
[ii] With a neat diagram and waveforms, explain Zero Crossing detector using op-amp. [6]

[or]

b] Draw and Explain a Monostable multi-vibrator using 555 IC. (12)

22. a] Simplify the given Boolean expression using karnaugh's map and stimulate its output using basic logic gates.
F=ABC'D'+A'BC'D'+A'BCD'+ABCD'+A'B'C'D'+A'B'C'D+AB'CD'(12)

[or]

b] Deduce different logic gate functions using NOR gates only. (12)

23. a] Draw the logic diagram of a half adder and Full adder and explain its working with Truth table. (12)

[or]

b] Explain BCD to Seven segment decoder with a neat diagram. (12)

24. a] Explain the working of a decade counter with neat diagram and waveforms. (12)

[or]

b] Explain serial in serial out 4 bit shift register with a neat diagram. (12)

25. a] Draw and Explain the working of 4 bit weighted resister D/A converter. (12)

[or]

b] Explain with a neat diagram, the Dual slope A/D converter. (12)

L -SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code: 1047
Subject code : **24742**
Semester : IV Semester
Subject title : **MECHANICS OF MATERIALS**

TEACHING AND SCHEME OF EXAMINATION:

No of Weeks/ Semester : 16 weeks

Subject Title	Instruction		Examination			
	Hrs. Week	Hrs Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
MECHANICS OF MATERIALS	5	80	25	75	100	3Hrs

Topics and Time Allocation

UNIT	TOPICS	TIME (hrs)
I	MECHANICAL PROPERTIES OF MATERIALS AND SIMPLE STRESSES AND STRAINS	14
II	GEOMETRICAL PROPERTIES OF SECTIONS AND THIN CYLINDERS AND THIN SPHERICAL SHELLS	14
III	SHEAR FORCE AND BENDING MOMENT DIAGRAMS AND THEORY OF SIMPLE BENDING	12
IV	TORSION AND SPRINGS	14
V	FRICTION, GEAR DRIVES AND BELT DRIVES	14
	REVISION/ TEST	12
	TOTAL	80

RATIONALE :

Technicians must have knowledge about mechanical properties of materials, deformation of materials, which are subjected to axial load and shear.This helps them to design the structures.Power transmission by various methods is a prerequisite for a mechanical engineer.

OBJECTIVES:

* Define various mechanical properties of materials
* Calculate the deformation of materials, which are subjected to axial load and shear
* Determine the moment of inertias of various section used in the industry.
* Estimate the stresses used in thin and thick cylinder under internal pressure
* Draw the graphical representation of shear force and bending moment of the beam subjected to different loads.
*Construct SFD and BMD.
*Calculate the power transmitted by the solid & hollow shafts
* Distinguish different types of spring and their applications.
*Define Types of friction.
*Describe the power transmission by the belt ,chain and gear drives.

24742 - MECHANICS OF MATERIALS

DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I	**MECHANICAL PROPERTIES OF MATERIALS AND SIMPLE STRESSES AND STRAINS** **Mechanical properties of materials:** Introduction - Definition of mechanical properties such as strength – elasticity, plasticity, ductility, malleability, stiffness, toughness, brittleness, hardness, wear resistance, machinability, cast ability and weld ability – Fatigue, Fatigue strength, creep – temperature creep – cyclic loading and repeated loading – endurance limit. **Simple stresses and strains:** Introduction – Definition – Load, stress and strain – Classification of force systems – tensile, compressive and shear force systems – Behavior of mild steel in tension upto rupture – Stress – Strain diagram – limit of proportionality – elastic limit – yield stress – breaking stress – Ultimate stress – percentage of elongation and percentage reduction in area – Hooke's law – Definition – Young's modulus working stress, factor of safety, load factor, shear stress and shear strain modulus of rigidity. Linear strain – Deformation due to tension and compressive force – Simple problems in tension, compression and shear force. Definition – Lateral strain – Poisson's ratio – volumetric strain – bulk modulus – volumetric strain of rectangular and circular bars – problems connecting linear, lateral and volumetric deformation – Elastic constants and their relationship (No derivation) – Problems on elastic constants. Definition – Composite bar – Problem in composite bars subjected to tension and Compression	**14 Hrs**

II	**GEOMETRICAL PROPERTIES OF SECTIONS AND THIN CYLINDERS AND THIN SPHERICAL SHELLS** **Geometrical properties of sections:** Introduction – definition – center of gravity and centroid-position of centroids of plane geometrical figures such as rectangle, triangle, circle and trapezium-problems to determine the centroid of angle, channel, T and I sections only (No problems on removed sections)- Definition-centroidal axis-Axis of symmetry. Moment of Inertia – Statement of parallel axis theorem and perpendicular axis theorem. (No derivation)-moment of Inertia of lamina of rectangle, circle, triangle, I and channel sections-(No derivations)-Definition-Polar moment of Inertia-radius of gyration – Problems computing moment of inertia and radius of gyration for angle, T, Channel and I sections.(No problems on removed (sections). **Thin Cylinders and Thin Spherical Shells:** Introduction – Definition – Thin and thick cylindrical shell – Failure of thin cylindrical shell subjected to internal pressure – Derivation of Hoop and longitudinal stress causes in a thin cylindrical shell subjected to internal pressure – simple problems – change in dimensions of a thin cylindrical shell subjected to internal pressure – problems – Derivation of tensile stress induced is a thin spherical shell subjected to internal pressure – simple problems – change in diameter and volume of a thin spherical shell due to internal pressure –problems.	**14 Hrs**

II I	**SHEAR FORCE AND BENDING MOMENT DIAGRAMS AND THEORY OF SIMPLE BENDING** **Shear force and Bending moment diagrams:** Introduction – classification of beams – Definition – shear force and Bending moment – sign conventions for shear force and bending moment – types of loadings – Relationship between load, force and bending moment at a section – shear force diagram and bending moment diagram of cantilever and simple supported beam subjected to point load and uniformly distributed load – Determination of Maximum bending moment in cantilever beam and simple supported beam when they are subjected to point load and uniformly distributed load. **Theory of simple bending:** Introduction – theory of simple bending – Assumptions – Neutral axis – bending stress distribution – moment of resistance – bending equation – M/I=f/y=E/R(No Derivation) – Definition – section modulus - rectangular and circular sections – strength of beam –simple problems involving flexural formula for cantilever and simple supported beam.	**12 Hrs**

IV	**Torsion** Introduction – theory of torsion – Assumptions – torsion equation – T/J=fs/R=Cθ/l(No Derivation) – strength of solid and hollow shafts – power transmitted – Definition – Polar modulus – Torsional rigidity – strength and stiffness of shafts – comparison of hollow and solid shafts in weight and strength considerations – Advantages of hollow shafts over solid shafts – Problems. **Springs** Introduction – Types of springs – Laminated and coiled springs – Types of coiled springs –Difference between open and closely coiled helical springs – closely coiled helical spring subjected to an axial load – problem to determine shear stress, deflection, stiffness and resilience of closed coiled helical springs.	**14 Hrs**
V	**FRICTION, GEAR DRIVES AND BELT DRIVES** **Friction:** Introduction – Definition – Force of friction – Limiting friction – Static Friction – Dynamic friction – Angle of friction – co-efficient of friction – cone of friction – Laws of static and dynamic friction. **Gear drives and Belt Drives:** Introduction – classification of gears – Nomenclature of a gear – Explanation and application of spur, helical and bevel gears, worm and worm wheel, rack and pinion –Velocity ratio of a gear drive – merits and demerits of gear drive – problems on simple gear train and Power transmitted by gear. Belt drive – types-open belt drive – cross belt drive – flat belt drive – v belt drive -problems on power transmitted. (Problems not involving centrifugal tension Condition for maximum power transmission and initial tension).	**14 Hrs**

Text Books:

1. A. K. Upadhyay, Applied Mechanics, pyblished by Charotar Publishing House, Opp. Amul Dairy, Court Road, Anand 388 001, India 2002.
2. R. S. Khurmi, Strength of Materials, S.Chand& Co., Ram Nagar, New Delhi – 2002.

Reference Books:

1. SB Junnarkar, Dr. HJ Shara, Applied Mechanics, 16th Edn 2001, Charator publishing house, Anand 388001.
2. S. Ramamrutham, Strength of Materials, 15th Edn 2004, DhanpatRai Pub. Co., New Delhi.

MODEL QUESTION PAPER-I

MECHANICS OF MATERIALS

PART A

Note : Answer any Fifteen Questions. Marks: 15X1=15
All Questions carry equal marks.

1. Define Endurance Limit
2 State Hooks's Law
3 Define Bulk Modulus
4 Define Poisson's ratio
5 Define Centroid
6 Define First moment of area
7 State Perpendicular axis theorem
8 Define Thin cylinder
9 Define Shear force
10 What is the maximum bending moment of a cantilever beam of length l, with point load W at its free end?
11 Define pure bending
12 Define flexural rigidity
13 Define the stiffness equation of a shaft
14 Define Polar modulus
15 Write the formula for polar M.I of a hollow shaft
16 Define Stiffness of a spring
17 Define : force of friction
18 Define addendum
19 Define Pitch circle diameter
20 Define angle of contact

PART B Marks 5 X 12=60

Answer all questions choosing either A or B from each question.
Each question carries 12 marks.

21 A A Specimen of 20mm diameter with 100mm gauge length was tested for tensile strength. The following observations were noted: Proportional limit load=78.4 KN, Extension at proportional limit load=0.2 mm, yield point load=83.3 KN, Ultimate load=147 KN, Final length =140 mm, Neck dia =16mm. Calculate (a) young's modulus of the material (b) proportional limit stress (c) yield point stress (d) Ultimate stress (e) Percentage elongation and (f) Percentage reduction in area

(OR)

B A reinforced concrete column of square section has to be designed to carry an axial load of 350 KN. The reinforcement consisting of vertical rods, one at each corner. The sectional area of reinforcement may be 3% of sectional area of the column. If the Permissible compressive stress in concrete is 4.5 N/mm^2 and the modular ratio of steel and concrete is 15, determine the dimensions of the column and the diameter of the reinforcing rods.

22 A (i)State and Explain perpendicular axis theorem. (6)

(ii)A Channel section is of size 300 X 100 mm overall. The web as well as the flange of the channel is 10 mm thick. Determine the values of I_{xx} and I_{yy} (6)

(OR)

B The Cylindrical shell 3mm long, 500mm in diameter is made up of 20mm thick plate. If the cylinder is subjected to an internal pressure of $5N/mm^2$, find the resulting change in diameter, change in length and change in volume. Take Poisson's ratio as 0.2 and E=0.2 X 10^6 N/mm^2

23 A (i) What are the assumptions made in the theory of simple bending? (6)

(ii) A simply supported beam of 16 m effective span carries the concentrated loads of 4KN, 5 KN, and 3 KN at distances of 3m, 7m, and 11m respectively from left support. Calculate the max shearing force and max bending moment. Draw the searing force and bending moment diagram. (6)

(OR)

B A test beam of square section 25mm X 25 mm is broken by a transverse load of 750 N applied at the centre of a span 1m. Using a factor of safety of 4, calculate the safe UDL for a beam of 120mm width and 300 mm depth, freely supported over a span of 5m.

24 A (i) Explain polar modulus and torsional rigidity. (6)
(ii) A solid shaft 20mm diameter transmits 10 KW at 1200 rpm. Calculate the maximum intensity of shear stress induced and angle of twist in degrees in a length of 1m, if modulus of rigidity for the shaft material is 8 X 10^4 N/mm^2. (6)

(OR)

B A vehicle weighing 3000 Kg and running at 2 m/s has to be brought to rest by a buffer spring. Find the number of springs of 15 coils each required to absorb the energy of motion during a compression of 250mm. Each spring is made of 26 mm diameter rod forming a coil of 200 mm mean diameter. Take N= 90 KN/mm^2.

25 A (a) Explain :velocity ratio of a gear drive (6)

(b) Two parallel shafts are to be connected by a spur gearing. One shaft is to run at 120 rpm and the other at 360 rpm. The axes of the shafts are to be 0.6 m apart as nearly as possible. Find the number of teeth on each wheel, if the circular pitch is to be 25 mm (or module is 8 mm) and the exact distance apart of the shafts. (6)

(OR)

B (a) State the laws of dynamic friction (6)

(b) A belt transmits 4.2 KW when running at a speed of 620 meters per minute. The angle of lap is 180^0 and the co-efficient of friction is 0.23. Calculate the tension on the tight and slack sides. The permissible pull in the belt is 13.8 N per width. The belt is rectangular in cross section with a cross sectional area of 615 mm^2. Determine the required thickness of the belt. (6)

MODEL QUESTION PAPER - II

MECHANICS OF MATERIALS

PART A Marks 15 X 1=15

Note: Answer any fifteen questions

All Questions carry equal marks

1 Define Elasticity

2 Define Modulus of Elasticity

3 Define Volumetric strain

4 Define Load factor

5 Define Centre of gravity

6 Define radius of gyration

7 State Parallel axis theorem

8 Define Thick cylinder

9 Define Bending moment

10 What is the maximum bending moment of a cantilever beam of length l, carrying a udl, w throughout its length?

11 Define Neutral layer

12 Define Limiting moment of resistance

13 Write the torsion equation

14 Define Torsional shear

15 Write the formula for polar modulus of a hollow shaft

16 Define Torsional rigidity

17 Define Limiting friction

18 Define Dedendum

19 Define Module

20 Define angle of lap

PART B Marks 5 X 12=60

Answer all questions choosing either A or B from each question.
Each question carries 12 marks.

21 A (i)State and Explain Hooke's law (6)
(ii)A steel rod of 2m long and 20 mm diameter is subjected to an axial pull of 45 KN. Find the changes in 1.lenght 2. Diameter 3. Volume of the rod. Given E= 0.2 X 10^6 N/mm^2, 1/m=0.3 (6)

(OR)

B A steel tube 100 mm internal diameter and 1.25 mm thick is surrounded by a brass tube of the same thickness in such a way that the axes of the two tubes coincides. The compound tube is loaded by an axial compressive load of 5 KN. Determine the load carried by each and also the stresses and strains developed in each tube. Assume that there is no buckling of the tubes. Take young's modulus for steel as 0.2 X 106 N/mm^2 and that for brass as 0.1 X 106 N/mm^2. The length of the compound tube is 1m. (12)

22 A An unequal I section having top flange 150 X 25 mm, bottom flange 250 X 50 mm and web 225 X 25 mm. Determine the position of CG and the values of moment of inertia about centroidal axes. (12)

(OR)

B The Cylindrical shell 3m long has 1m internal diameter and 15 mm metal thickness. Calculate the circumferential and longitudinal stresses induced and also changes in diameter, length and volume of the shell, if it is subjected to an internal pressure of 1.5 N/mm^2. Take E=0.2 X 105 N/mm^2 and 1/m =0.3 (12)

23 A (i) Mention the different types of loads that are acting on a beam. (6)

(iii) A SS beam of a 6m span carries a udl of 2KN/m over the middle 2m length and point loads of 1 and 4 KN at distances of 1m and 5m from the left end. Draw SFD and BMD and determine the magnitude and position of the Max B M. (6)

(OR)

B (i) Define: Section modulus. What is the expression for a rectangular section. (6)

(ii) A timber joint having 6m span carries a brick wall 230 mm thick and 3m height. Design the joist if the max permissible stress is to be limited to 8 N/mm^2 in timber. The weight of brick is 20 KN/mm^3 Assume the depth of joist is twice its width. (6)

24 A (i) What are the assumptions made in the theory of pure torsion? (6)

(ii) A solid steel shaft has to transmit 5.9 KW at 200 rpm. The max torque transmitted in each revolution exceeds the mean by 30%. If the shear stress is not to exceed 80 N/mm^2, find a suitable diameter of the solid shaft. Calculate the angle of twist for a length of 2m. (6)

(OR)

B (i) Compare closely coiled and open coiled springs. (6)

(ii) A closely coiled helical spring is made out of 10mm diameter steel rod, the coil consisting of 10 complete turns with a mean diameter of 120 mm. The spring carries an axial pull of 200N. Find the max shear stress induced in the section of the rod. If N=0.8 X105 N/mm^2, find the deflection of the spring, the stiffness and strain energy stored by the spring. (6)

25 A A belt transmits 4.2 KW when running at a speed of 620 m/min the angle of lap is 180^0 and the co-efficient of friction is 0.23. Calculate the tension on the tight and slack sides. The permissible pull in the belt is 13.8 N/mm width. The belt is rectangular in section with a cross sectional area of 615 mm^2. Determine the required thickness of the belt (12)

(OR)

B A compressor requiring 80 KW is to run at about 150 rpm. The drive is by V-belts from an electric motor running at 750 rpm. The diameter of the pulley on the compressor shaft not to greater than 1m. Determine the number of v belts required to transmit the power, if each belt has a cross sectional area of 375 mm^2, density 1000kg/m^3 and an allowable tensile stress of 2.5 N/mm^2. The groove angle of the pulley is 35^0, the angle of contact of the belt is 160^0, the coefficient of friction between the belt and the pulley is 0.26 (12)

L-SCHEME

(Implements from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code: 1047
Subject code : **24743**
Semester : IV Semester
Subject title : **PROGRAMMING IN C**

TEACHING AND SCHEME OF EXAMINATION:

Number of Weeks/ Semester : 16 weeks

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Subject Title	Instruction		Examination			
	Hrs. Week	Hrs Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
PROGRAMMING IN "C"	5	80	25	75	100	3Hrs

TOPICS AND ALLOCATION OF HOURS

Unit No	Topic	No of Hours
I	KEYWORDS,CONSTANTS,VARIABLES,AND DATATYPES	16
II	DECISION MAKING,BRANCHING AND LOOPING	13
III	CHARACTER STRING AND FUNCTIONS	14
IV	ARRAY,STRUCTURES AND UNIONS	14
V	POINTERS AND FILE MANAGEMENT	13
TEST AND REVISION		10
TOTAL		80

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.

OBJECTIVES

At the end of the Course, the students will be 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.
- 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.
- Concepts of File Management.

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24743 - C PROGRAMMING

DETAILED SYLLABUS

UNIT – I Keywords, Constants, Variables, Datatypes and Predefined Functions: ……. 16 HOURS		
	UNIT – I: Keywords, Constants, Variables, Datatypes and Predefined Functions: Character Set – Constants – Integer Constants – Character Constants – String Constants; Variables – Declaration of Variables; Assigning value to Variables. **Operations and Expressions:** Arithmetic, Relational, Logical, Assignment, Increment, Decrement, Conditional, Bitwise Operator, Arithmetic Expressions, Evaluation of Expression. **I/O Statements:** Printf() and Scanf() functions (Unformat and formatted), getchar() and putchar() functions. **Functions:** Predefined functions – isdigit, isupper, islower and ispunct functions in header file<ctype.h> ; cos, tan, exp, ceil, floor, abs, pow and sqrt functions in header file <math.h>; Strlen, strcpy, strcmp and strcat in header file <string.h>.	16 Hrs
UNIT – II DECISION MAKING, BRANCHING AND LOOPING ……. 13 HOURS		
	Decision making and Branching : Introduction –simple if - if-else - else-if ladder, nested if-else - Switch statement - go to statement - Simple programs. **Looping Statements :** while, do-while statements, for loop, break & continue statement –- Simple programs.	

UNIT – III CHARACTER STRING AND USER DEFINED FUNCTIONS 14 HOURS		
	Strings: Declaration and initialization of string variables, Reading strings, Writing strings, - String handling functions (strlen(), strcpy(), strcat(), strcmp()) - String manipulation programs.	
	User defined Functions: Need of user defined functions, Defining functions, Function call (call by value, call by reference), Return values, . Category of function (No argument No return value, No argument with return value, Argument with return value , Argument with no return value) – Recursion – Simple programs	

UNIT IV ARRAYS,STUCTURES,UNIONS ……. 14 HOURS		
	Arrays : Declaration and initialization of One dimensional, Two dimensional and Character arrays, Accessing array elements – Programs using arrays. **Structures and Unions:** Structure - Definition, Initialization, Arrays of Structures, Arrays within structures, Structures within structures, Structures and functions – Unions – Structure of Union - Difference between Union and structure – Simple programs	

UNIT V POINTERS AND FILE MANAGEMENT 14 HOURS		
	Pointers: Introduction – Advantages of Pointers - Accessing the address of a variable - Declaring and initializing pointers - Accessing a variable through its pointer - Pointers expressions, Increments and scale factor - Array of pointers - Relation between Pointers and Arrays **File Management:** Introduction - Defining and opening a File – Closing a file- Input /Output operations on files (getc, putc, getw, putw ,fprintf and fscanf functions) Error handling during I/O operations .	

TEXT BOOKS

S.No	Title	Author	Publisher	Year of Publishing / Edition
1.	Programming in ANSI C	E.Balagurusamy	Tata Mc-Graw Hill, New Delhi	2006, 3rd Edition

REFERNCES

S.No	Title	Author	Publisher	Year of Publishing / Edition
1.	Programming and Problem solving using C	ISRD Group , Lucknow	Tata Mc-Graw Hill, New Delhi	Sixth Reprint 2010
2.	Let us C	Yeswanth Kanetkar	BPB Publications	Fourth Revised Edition

3.	A Text Book on C	E.Karthikeyan	PHI Private Limited, New Delhi	2008
4.	Programming in C	D.Ravichandran	New Age International Publishers, Chennai	First Edition 1996 Reprint 2011
5.	Computer Concepts and Programming in C	Dr.S.S.Khandare	S.Chand & Company Ltd. New Delhi	First Edition 2010
6.	Complete Knowledge in C	Sukhendu Dey, Debobrata Dutta	Narosa Publishing House, New Delhi	Reprint 2010

SEMESTER - III

24743 – C PROGRAMMING

MODEL QUESTION PAPER - I

Time : 3 Hrs Max. Marks: 75

PART – A (15 x 1 = 15 Marks)

Answer any Fifteen Questions. Each question carries 1 mark.

1. Define constants
2. What is an identifier?
3. What is an operator?
4. Write down the syntax of scanf() function.
5. What is the use of goto statement?
6. When the statement continue is used ?
7. Write down the syntax of if else statement.
8. State the use of break statements
9. What is User defined functions?
10. What do you mean by call by reference?
11. How string variable is declared?
12. Write any two string handling functions.
13. Write the syntax for Declaring one dimensional array.
14. What is Multidimensional array
15. What is structure?
16. What is Union?
17. Define pointer.
18. How pointer is accessed?
19. Define a file.
20. What is the use of getc().

PART – B (5 x 12 = 60 Marks)

Answer all questions choosing either A or B from each question. Each question carries 12 Marks

21 A. i. Explain in detail about the structure of a C program with an example. [6]

ii. Explain the various operators in C with one example for each operator. [6]

[OR]

B.		.	Explain about the formatted and unformatted I/O statements in C.	[12]
22	A.	i.	Explain for statement with syntax and an example.	[6]
		ii.	How does switch statement differ from if statement. Give examples	[6]
			[OR]	
	B	i.	Discuss the different types of if statements with example.	[12]
23	A.		Explain String handling functions with Syntax.	[12]
			[OR]	
	B		Explain how function is defined and called with an example.	[12]
24	A.		Explain initialization & declaration of two dimensional array.	[12]
			[OR]	
	B		Explain about structure within structure with example.	[12]
25	A.		Explain Accessing a Variable through its pointer	[12]
			[OR]	
	B		Explain about error handling in files.	[12]

24743 – C PROGRAMMING

MODEL QUESTION PAPER - II

Time : 3 Hrs Max. Marks: 75

PART – A (15 x 1 = 15 Marks)

Answer any Fifteen Questions. Each question carries 1 mark.

1. What is integer constants?
2. What are keywords?
3. Differentiate constant and variables.
4. What is Arithmatic operator?
5. What is the use of switch statement?
6. Differentiate while & do .. while statement.
7. Give syntax for for loop.
8.. Give syntax for goto statement.
9. State the use of functions.
10. Is it possible to call library functions recursively?
11. What is String?
12. Write the function used to compare two Strings.
13. What is array?
14. What is the feature of Structure?
15. How is data stored in Union?
16. List the Differences between Union and structure?
17. State any one advantage of Pointers?
18. What are the operators associated with Pointers?
19. What are the different modes of files?
20. Write function used to close a File.

PART – B (5 x 12 = 60 Marks)

Answer all questions choosing either A or B from each question.
Each question carries 12 Marks

21 A. Explain about the various data types in C language with Example [12]

[OR]

B Write in detail about different types of operators with an Example [12]

22	A.	Write a program to print the Fibonacci series upto 100.	[12]
		[OR]	
	B.	Write in detail about the difference between break and continue statements with example.	[12]
23	A.	What are String handling functions? State the use of each function with examples.	[12]
		[OR]	
	B	Explain about user defined function with an example .	[12]
24	A.	Explain One dimensional array declaration and accessing array with example.	[12]
		[OR]	
	B	Explain Arrays of Structure with an example.	[12]
25	A.	Explain pointer and character String with an Example.	[12]
		[OR]	
	B	How to open and close a file? Explain different modes of files.	[12]

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code: 1047
Subject code : **24744**
Semester : IV Semester
Subject title : **MEASURING INSTRUMENTS AND SENSORS**

TEACHING AND SCHEME OF EXAMINATION:

No of Weeks/ Semester : 16 weeks

Subject Title	Instruction		Examination			
	Hrs. Week	Hrs Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
MEASURING INSTRUMENTS AND SENSORS	5	80	25	75	100	3Hrs

Topics and Time Allocation

UNIT	TOPIC	TIME (Hrs)
I	Analog Instruments	13
II	CRO and Bridges	14
III	Digital Instruments, Displays & Recorders	14
IV	Basic Sensors	15
V	Advanced Sensors	14
Revision and test		10
Total		80

RATIONALE:

The fundamental knowledge about instruments and measuring methods is necessary for an engineer. Transducer types ,sensors and signal conditioning circuits is a prerequisite.

OBJECTIVES:

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

- Define the characteristics of instruments.
- List out the classification of instruments.
- Explain the principle and working of analog instruments.
- Draw and explain the block diagram of CRO.
- Understand the functioning of Digital Storage Oscilloscope.
- Explain the working of various bridges.
- Understand the various types of Digital instruments.
- Explain the principle of operation of various recorders and displays.
- Understand various types of sensors.
- Explain inductive, capacitive, ultrasonic, hall effect, pyroelecrtic sensors for various measurements.
- Study advanced sensors for various measurements.
- Understand recent trends in sensors technologies.

24744 – MEASURING INSTRUMENTS AND SENSORS

DETAILED SYLLABUS

UNIT	NAME OF THE TOPIC	HOURS
I	**ANALOG INSTRUMENTS:** **Characteristics of Instruments** – True value, Accuracy, Precision, Sensitivity, Reproducibility, Drift, Static Error and Correction, Resolution. **Classification of Instruments** – Primary and Secondary Instruments – Indicating, Recording & Integrating instruments. **Operating forces** – Deflecting, Controlling and Damping force. **Instruments -** Permanent Magnet Moving Coil instrument, Moving Iron Instrument – attraction and repulsion type, Analog Multimeter, Dynamometer Watt meter, Single phase induction type Energy meter.	**13 HRS**
II	**CRO & BRIDGES:** **CRO -** Block diagram of oscilloscope, construction and working of CRT, Horizontal deflection, Vertical deflection, Delay line, Time base generator, Electrostatic focusing and Electrostatic deflection(No derivation), applications of CRO, Digital Storage Oscilloscope. **Bridges –** Construction, working, balance equation (derivation not required) & applications of – measurement of resistance by wheat stone bridge, measurement of capacitance by Schering Bridge, measurement of inductance by Maxwell's bridge.	**14 HRS**
III	**DIGITAL INSTRUMENTS, DISPLAYS AND RECORDERS:** **Digital Instruments** – Digital Vs Analog Instruments – Auto ranging – Auto zeroing – Auto Polarity – Block diagram of Digital Multimeter, Digital frequency counter, Digital Tachometer. **Displays** –Seven Segment Display, Alpha Numeric display, Liquid Vapour display (LVD). **Recorders** – Strip-chart recorder, X-Y recorder, CD recording and reproduction.	**14 HRS**
IV	**BASIC SENSORS:** Sensors and Transducers – definition, difference between sensors and transducers, classification – Active and Passive sensors. **Inductive Sensors:** LVDT, RVDT, Proximity Switch **Capacitive Sensors:** The parallel plate capacitive sensors, Variable permittivity capacitive sensors, advantages and disadvantages, Capacitive sensors for liquid level measurement. **Ultrasonic Sensors:** for Level Measurement and Distance Measurement. **Hall effect Sensors**: Hall effect, Hall effect sensors for Displacement measurement, Fluid level measurement. **Pyroelectric Sensors:** Pyroelectric Sensors as Thermal Detector	**15 HRS**

V	**ADVANCED SENSORS:** **Fiber optic Sensors:** Temperature sensors, Liquid level sensing, Fluid flow sensing, Micro bend sensors, Advantages of fiber optic sensors **Smart Sensors:** Primary sensors, Excitation, Amplification, filter, converters, information coding/processing, data communication, the automation. **Automotive Sensors (On-Board automobile sensors):** - Flow-rate sensors, pressure sensors, oxygen sensors, torque and position sensors. **Recent trends in Sensor Technologies:** - Film sensors- Thick film and Thin film sensors. - MEMS – Advantages and Applications of MEMS, micro machining, MEMS Accelerometer. Nano sensors.	**15 Hrs**

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Text book:

1. A Course in Electrical and Electronics Measurements and Instrumentation – A.K.Sawhney, Dhanpat Rai & Co private limited, Eighteenth Edition 2007.

2. Sensors and Transducers - D.Patranabis, PHI Learning Private Limited, New Delhi – 110 001,
Second Edition 2010.

Reference Books:

1. Electrical and Electronics Measurement and Instrumentation – R.K. Rajput, S.Chand & co.,

2. Electrical and Electronics Measurement and Instrumentation – Umesh Sinha, Satyaprakasan, Tech. India Pub 1992.

3. Modern Electronics Instrumentation and Measurement Techniques – Albert D. Helfrick.

4. A Treatise on Instrumentation Engineering – Prof. K. Padmanabhan and S.Ananthi, Ik International Publishers, New Delhi, 2010.

MEASURING INSTRUMENTS AND SENSORS
MODEL QUESTION PAPER – I

TIME: 3 hours **Maximum Marks: 75**

PART A

Note : Answer any Fifteen Questions. **Marks: 15*1=15**
All Questions carry equal marks.

1. Define True value.
2. What do you understand by the term reproducibility?
3. Give an example for Integrating Instrument.
4. What are the forces required by indicating instruments?
5. What is CRO?
6. Explain the purpose of using delay line in CRO.
7. List any two applications of CRO.
8. Give the uses of Maxwell's Bridge.
9. Differentiate Analog and Digital instruments.
10. What is Auto polarity?
11. List the advantages of strip-chart recorders.
12. List advantages of X-Y recorder.
13. Define sensors.
14. What is active and passive sensor?
15. Define Hall Effect.
16. What are the advantages of capacitive sensors?
17. Write the advantages of fiber optic sensors.
18. What do you mean by smart sensors?
19. Expand MEMS.
20. What is a thin film sensor?

PART B **Marks: 5*12=60**

II] A**nswer all questions choosing either A or B from each question. Each question carries 12 marks.**

21. a] Describe the Constructional features and operating principle of PMMC instrument with neat diagram. [12]

(Or)

b] i) Compare attraction and repulsion type MI instrument. [4]
ii) Draw and Explain the working of Dynamo meter wattmeter. [8]

22. a] i) Explain the operation of CRT in detail. [6]
ii) Describe Electrostatic Focusing [6]

(Or)

b] i) Draw and explain the block diagram of digital storage oscilloscope. List its advantages. [12]

23. a] i) Write about Auto Zeroing [2]

ii) Explain the operation of digital Tachometer with neat diagram. [10]

(Or)

b] With neat diagram explain how CD recording and reproduction is done. Also list the advantages of CD recorder. [12]

24. a] i) Differentiate sensors and transducers [4]

ii) What is LVDT? Explain the working of LVDT with neat diagram. [8]

(Or)

b] i) Explain how Hall effect sensors are used for fluid level measurement. [6]

ii) Describe Pyroelectric sensors as thermal detector. [6]

25. a] Brief about (i) oxygen sensors (ii) pressure sensors in automobiles. [12]

(Or)

b] i) Explain MEMS accelerometer with diagram. [6]

ii) Explain micro machining. [6]

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MEASURING INSTRUMENTS AND SENSORS
MODEL QUESTION PAPER – II

TIME: 3 hours **Maximum Marks: 75**

PART A

Note : Answer any Fifteen Questions. **Marks: 15*1=15**
All Questions carry equal marks.

1. Define the term resolution.
2. What is meant by accuracy?
3. Differentiate primary and secondary instruments.
4. List the uses of multi-meter.
5. What is CRT?
6. What is the use of Time base generator?
7. Draw wheat stone bridge.
8. List the advantages of Schering Bridge.
9. What is Auto zeroing?
10. Draw Seven Segment LED display.
11. Expand LVD.
12. Give the advantages of CD recording.
13. Differentiate sensors and transducers.
14. Write the advantages of capacitive sensors.
15. What is Pyroelectric effect?
16. What is RVDT?
17. What is the use of filters in smart sensors?
18. Give the advantages of fiber optic sensors.
19. List the application of MEMS.
20. What is a nano sensor?

PART B **Marks: 5*12=60**

II] A**nswer all questions choosing either A or B from each question. Each question carries 12 marks.**

21. a] i) Explain the operation of multi-meter with schematic diagram. [6]
ii) Draw and Explain the working of repulsion type MI instrument. [6]

(Or)

b] Explain the construction and working of single phase induction type energy meter with diagram [12]

22. a] Draw and explain the block diagram of oscilloscope. List the applications of CRO. [12]

(Or)

b] i) How a Maxwell's bridge is used to measure inductance. [6]

ii) How the capacitance of a capacitor is measured using bridge. [6]

23. a] Draw and explain digital frequency counter. [12]

(Or)

b] i) Explain the working of strip chart recorder with neat diagram. [8]

ii) Describe Alpha numeric display. [4]

24. a] i) Explain the working of proximity switch. [6]

ii) Explain variable permittivity capacitor sensor with necessary diagram. [6]

(Or)

b] i) Explain ultrasonic sensors for level measurement. [6]

ii) Draw and explain displacement measurement using Hall Effect sensors. [6]

25. a] Explain how fiber optic sensors are used for (i) temperature measurement. (ii) Fluid flow sensing. [12]

(Or)

b] Write short notes on smart sensors. [12]

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code: 1047
Subject code : **24245**
Semester : IV Semester
Subject title : **ANALOG AND DIGITAL ELECTRONICS PRACTICAL**

Subject Title	Instruction		Examination			
	Hrs. Week	Hrs Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
ANALOG AND DIGITAL ELECTRONICS PRACTICAL	6	96	25	75	100	3Hrs

1. Construct and test a) Inverting b) Non-inverting amplifier using Op.Amp.
2. Construct and test a) Differentiator circuit b) Integrator circuit using Op.Amp
3. Construct and test a Astable Multivibrator using 555 IC and test its performance.
4. Construct and test a Monostable Multivibrator using 555 IC and test its performance.
5. Verify the Truth table of the following gates AND, OR, NOT, NAND, NOR, EX-OR using 74xx ICs
6. Construct other gates using NAND gates.
7. Construct a half Adder/Full adder using 7408, 7432, 7486, 7404 ICs and verify its truth table.
8. Construct Half Subtractor/full substractor and verify the Truth table
9. Construct and verify the Truth table of RS,D and JKMS FF
10. Construct a 4 bit BCD counter using 7473 ICs and observe the output waveform.
11. Construct a R-2R resistor D/A converter and test its performance.
12. Verify the operation of ADC using 0808 IC.

EQUIPMENTS REQUIRED FOR THIRTY STUDENTS

S.No	NAME OF THE EQUIPMENT	QUANTITY REQUIRED
1.	IC TRAINER WITH POWER SUPPLY FACILITY	10
2.	CATHODE RAY OSCILLOSCOPE	1
3.	AUDIO OSCILLATOR	1

Circuit diagram – 20 marks

Connections – 20 marks

Reading & Graph – 20 marks

Result – 10 marks

Viva voce – 5 marks

Total – 75 marks

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code: 1047
Subject code : **24745**
Semester : IV Semester
Subject title : **PROGRAMMING IN C PRACTICAL**

Subject Title	Instruction		Examination			
	Hrs. Week	Hrs Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
PROGRAMMING IN C PRACTICAL	6	96	25	75	100	3Hrs

OBJECTIVES

At the end of the Course, the students will be 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 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.
- Write programs using command line arguments.
- Create a file.
- Write programs using file handling functions.
- Write programs using compiler control directives.

PRACTICAL EXERCISES

PROGRAMMING IN C PRACTICAL.

On completion of the experiment students should be able to write programs in C and execute it.

1. Program to calculate simple and compound interest.
2. Solution of a Quadratic Equation.
3. Program for Pay bill calculation.
4. Program to compute sum of series using While loop.
5. Printing of multiplication table using Do…While loop.
6. Program to find whether the given number is a positive number, negative number or zero.
7. Program to sort a list of numbers
8. Program to sort the strings.
9. Program to implement matrix addition
10. Write a program to implement matrix multiplication.
11. Program to implement Fibannoci series.
12. Program to find factorial of given N numbers without recursion.
13. Program to find factorial of given N numbers with recursion.
14. Program to count number of characters, words & lines in a text.
15. Program to develop a pattern (eg.: pyramid, square)

SCHEME OF VALUATION	
Writing program	25 Marks
Executing program	30 Marks
Result	10 Marks
Vivavoce	5 Marks
Total	75 Marks

Note : Student : Computer ratio in lab should be strictly 1:1

HARDWARE REQUIREMENT

- Desktop Computers – 36 Nos
- Laser Printer – 4 Nos

SOFTWARE REQUIREMNT

- C – Compiler with Editor

DIPLOMA IN ENGINEERING/TECHNOLOGY

L - SCHEME

2011 - 2012

COMMUNICATION AND LIFE SKILLS PRACTICAL

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME

(Implemented from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ENGINEERING/TECHNOLOGY

Subject Code : **20002**

Semester : **IV SEMESTER**

Subject Title : **COMMUNICATION AND LIFE SKILLS PRACTICAL**

TEACHING AND SCHEME OF EXAMINATION:

No. of Weeks per Semester: 16 Weeks

Subject Title	Instructions		Examination			
			Marks			Duration
	Hours/ Week	Hours/ Semester	Internal assessment	Board Examination	Total	
COMMUNICATION AND LIFE SKILLS PRACTICAL	4 Hours	64 Hours	25	75	100	3 Hours

Topics and Allocation of Hours:

Sl. No.	Section	No. of Hours
1	**Part-A:Monodic Communication**	**16**
2	**Part-B:Dyadic Communication**	**16**
3	**Part-C:Professional Communication**	**16**
4	**Part-D:Life Skills**	**16**
Total		**64**

RATIONALE

Nowadays, effective and errorfree communication is a basic need. Communication through English is the order of the day for entry and survival in any corporate. Training in Monodic communication (one man communication) Dyadic communication (a pair communication) and Professional communication (may be Monodic, Dyadic or Group communication) is attempted through these practical modules. One can improve one's communication skills by enriching one's vocabulary ,particularly active vocabulary and standard everyday expressions and using them in various contexts. Practice alone, both on the campus and outside the campus, can help a learner to grow proficient in the art of Communication.

Language is the most commonly used and effective medium of self-expression in all spheres of human life - personal, social and professional. A student must have a fair knowledge of English language use and various communicative functions. He/she must be able to pursue the present course of study and handle the future jobs in industry. The objective of the course is to assist the diploma holders to acquire proficiency in monodic, dyadic and professional communication skills and selective but most important life skills. At the end of the course, the student will be able to communicate his ideas fearfree and errorfree, in social and professional spheres of life and imbibe life skills.

SPECIFIC INSTRUCTIONAL OBJECTIVES

Communication is crucial as it influences every aspect of one's personal development. Having a sound grounding in reading and writing techniques allows a student to progress on to higher level literacy skills. Many students struggle because their basic decoding is so inaccurate that advanced comprehension is difficult for them. Because of their poor exposure and poor use of English language in various spheres of life they suffer proper communication. They also tend to be 'afraid' of words and in turn they are not able to develop their personal vocabulary. In other words, without solid literacy skills, the student's prospects and life chances are limited. It is a fact that Communication skills and Life Skills shapes one's personality.

MONODIC COMMUNICATION

The student is able to:

1. Practise using departmental words and terminology in sentences.
2. Prepare and perform oral presentations.
3. Introduce oneself and others.
4. Deliver welcome address and vote of thanks.

5. Compare a program.
6. Describe the visuals.
7. Take notes, answer very short questions.
8. Comprehend an auditory/oral passage.

DYADIC COMMUNICATION

The student is able to:

1. Adopt various communicative functions.
2. Prepare and perform a dialogue.
3. Adopt the basics of telephone etiquette.

PROFESSIONAL COMMUNICAITON

The student is able to:

1. Prepare a resume.
2. Take part in a group discussion.
3. Communicate through body language.
4. Adopt the interview skills with professional presence.
5. Perform mock interview.

LIFE SKILLS

The student is able to:

1. Prepare for and deal with change.
2. Adopt motivation, goal-setting and self-esteem.
3. Adopt Teamwork skills.
4. Adopt Time management.
5. Adopt Emotional intelligence skills.
6. Assert Positively.
7. Adopt Interview etiquette.
8. Plan career.
9. Understand Strength, weakness (long term, short term).

LEARNING STRUCTURE

To enable the students to practise monodic communication, dyadic communication professional communication and imbibe life skills through various modes of practical learning and assignments.

PROCEDURE	MONODIC COMMUNICATION	DYADIC COMMUNICATION	PROFESSIONAL COMMUNICATION	LIFE SKILLS
PRINCIPLES	Identifying various platforms	Exposure to dialogue situations, exposure to telephone etiquette.	Exposure to resume writing, group discussion, interviews.	Exposure to selective life skills/problem solving skills.
CONCEPTS	Sharing opinions, feeling, with or without audience.	Understanding the basic communicative functions. Conversing with a neighbour	Writing resume, performing group discussion, facing interviews.	Imbibe and practise the selective life skills.
FACTS	Oral presentation, art of introduction, enhancing the list of active vocabulary, listening skills, note taking skills, describing skills.	Audio tapes, compact disk, mikes, various contexts.	FAQ, Resume models, Audio tapes, compact disk, mikes.	Stories, anecdotes, incidences, case studies and assignments.

COMMUNICATION AND LIFE SKILLS PRACTICAL

SYLLABUS

PART A: MONODIC COMMUNICATION (16 hours/ periods)

a) **Vocabulary enrichment**: recording important words and terminology alphabetically connected to the concerned department – playing antakshari.
b) **Introducing oneself**: using greeting phrases – opening and closing with courteous notes – supplying personal information.
c) **Introducing others**: using greeting phrases – opening and closing with courteous notes – with information.
d) **Welcome address, vote of thanks and compering a program:** keeping notes – and personal information of the dignitaries – concerned.
e) **Making an Oral Presentation**: Preparing the presentation - Talking about people, animals and places – Keywords technique and the rehearsal – Presentation outline – Performing the presentation – answering the questions.
f) **Oral description**: a picture from an English magazine – a visual ad – a natural scene.
g) **Auditory/Oral comprehension** – small passage – small dialogue -very short story – note - taking skill.
h) **News Caption**: giving caption for a news item from an English daily.

PART B: DYADIC COMMUNICATION: COMMUNICATIVE FUNCTIONS (16 hours/ periods)

a) **Dialogue**: preparing and performing - Meeting people, exchanging greetings and taking leave – Giving instructions and seeking clarifications – Thanking someone and responding to thanks - minimum seven exchanges including the courteous openings and closings – ten common contexts.
b) **Telephonic dialogue**: telephonic etiquette - Answering the telephone and asking for someone – Dealing with a wrong number – Taking and leaving messages – Making enquiries on the phone-ordering for supply-bookings and arrangements-handling the complaints – calling for appointment.

PART C: PROFESSIONAL COMMUNICATION (16 hours/ periods)

a) Group Discussion - Taking part in a Group Discussion – focus on team spirit.
b) Interview - Frequently asked questions in an interview – Mock interview - Body language.
c) Resume Writing – components.

PART D: LIFE SKILLS (16 hours/ periods)

a) Preparing for and dealing with change.
b) Motivation, goal-setting and self-esteem.
c) Teamwork skills.
d) Time management
e) Emotional intelligence skills
f) Career planning.
g) Assertive Skills.
h) Interview skills.

References :-

1) Malcolm Goodale, Professional Presentations with VCD, Cambridge University Press
2) B.Jean Naterop and Rod Revell, Telephoning in English with 2 Audio CDs Cambridge University Press
3) Priyadarshi Patnaik, Group Discussion and Interview Skills with VCD, Cambridge University Press
4) Kamalesh Sadanand and Susheela Punitha, Spoken English: A Foundation Course for Speakers of Tamil, Orient BlackSwan.
5) S. P. Dhanavel, English and Soft Skills, Orient BlackSwan
6) Robert Sherfield and et al, Developing Soft Skills, Pearson Education.
7) Poly Skills: A course in communication skills and Life skills, Cambridge University Press.
8) English and Communication Skills for Students of science and Engineering by S.P.Dhanavel , Orient BlackSwan.
9) Speak Well, edited by Kandula Nirupa Rani, Jayashree and Indira,OrientBlackSwan.
10) Fifty ways to improve your telephoning and teleconferencing Skills by Ken Taylor -

COMMUNICATION AND LIFE SKILLS PRACTICAL

Model Question Paper - 1

Time: 3 hrs Max Marks: 75

PART –A (35 Marks)

Monodic Communication:

1. Introduce one self (5)
2. Use the mentioned words orally in sentence (2x2 ½ =5)
3. Prepare and present a welcome address for your college annual day programme. (5)
4. Listen to the passage read out from the English daily of the week of the examination.
   Please note: No prerecorded passage (10)
5. Write a news caption for the passage given from the English daily. (5)
6. a) Describe orally the visual or the picture found in the English daily of the week of the examination. (5)

   (Or)

   b) Make an oral presentation about an animal.

PART – B (15 Marks)

Dyadic Communication:

1. Play antakshari of five pairs of departmental words with your partner. (5)
2. Prepare and perform a dialogue with your partner on the given situation (10)

   (minimum seven exchanges)

   Or

   Prepare and perform a telephonic dialogue on a flight booking.

   (minimum seven exchanges)

PART-C (25 Marks)

Professional Communication:

1. Form a group of six members and perform a discussion on the given theme. (10)

2.Imagine you are V.Gokulraj ,a diploma holder. Prepare a resume for the post of supervisor in Oberoi computers Ltd.Chennai.
(10)

Professional appearance: Interview etiquette-dress code- Body language (5)

COMMUNICATION AND LIFE SKILLS PRACTICAL

Model Question Paper - 2

Time: 3 hrs Max Marks: 75

PART –A (35 Marks)

Monodic Communication:

1. Introduce your friend S.Mohan an a excutive engineer to a group of audience. (5)
2. Use the mentioned words in sentence orally. (2x2 ½ =5)
3. Prepare and present a Vote of thanks in your college sports day programme. (5)
4. Listen to the passage read out from the English daily of the week of the examination.
   Please note: No prerecorded passage (10)
5. Write a news caption for the passage given from the English daily. (5)
6. a) Describe the visual or the picture found in the English daily of the week of the conduct of the examination. (5)

   (Or)

   b) Make an oral presentation about your polytechnic college.

PART – B (15 Marks)

Dyadic Communication:

1. Play antakshari of five pairs of your departmental words with your partner. (5)
2. Prepare and perform a dialogue with your partner on the given situation (10)

   (minimum seven exchanges)

   (Or)

   Prepare and perform a telephonic dialogue on ordering the supply of a computer

   (minimum seven exchanges)

PART-C (25 Marks)

Professional Communication:

1.Form a group of six members and perform a discussion on the given theme. (10)

2. Imagine you are M.Kishore a diploma holder. Prepare a resume for the post of operating engineer in REC Electricals Ltd.Madurai. (10)

   Professional appearance: Interview etiquette-dress code- Body language (5)

NOTES OF GUIDANCE

Role of the media:

To equip a learner with vocabulary, particularly active vocabulary and standard everyday expressions ,using English dailies and watching selective English T.V. channels both in the classroom and outside the classroom is focused. Such a provision is recommended for the students to establish familiarity with the English dailies and selective English T.V. channels.

Minimum two copies of two English dailies in the laboratory room (students can bring their own copies also).Minimum two systems with net connection for information collection in the laboratory itself.

Synopsis of the news item:

During every lab work day, students must choose a news item from the English daily or weekly or monthly, and write a synopsis of the chosen news item, in not more than five lines. The news item should be pasted on the left page and synopsis on the right page (the chosen news item should not be politically, socially or communally controversial). Students should exercise care in choosing the news items. Teachers have to advise them on this aspect. This can be done outside the class hours also but every record exercise should begin with the synopsis of news item of the date of the lab session.

For example, first lab exercise namely departmental vocabulary and antakshari is performed on 15/12/2011. The student should choose a news item from any English daily of 15/10/2011 and record the synopsis on the right page (in not more than 5 lines) under the caption **Synopsis of the news item of the day/date 15/10/2011.**There is no harm in repeating or copying the lines form the passage. The essence of the passage should be there. The cutout news item for presenting the synopsis should be pasted on the left page of the record notebook.

This is to be done with interest for developing one's personality. This work **does not carry any marks** but without which the record exercise should not be valued. This is the precondition for valuing the record exercise. Each record exercise follows the synopsis of the chosen news item.

At the bottom of the synopsis, the student should record the **dictionary meaning** of atleast **one strange word** found in the chosen news item. At the end of every month, a minimum of 10 Headlines of 10 different days i.e. one Headline a day from anyone English daily should be pasted on the right or left page of the Record Note Book. (This work does not carry marks but this is the precondition for marking the record exercises)

External examiner**,** before signing the record notebook, should verify whether the Newspaper works were recorded/pasted in the record notebook.

Verbal communication in any language begins with sounds in isolation, union and word formation. Learning everyday words and expressions is the primary factor. Grammar comes next. One can enrich one's every day vocabulary by reading English magazines and listening to

or watching an English channel on television. So an English laboratory should be equipped with a minimum of two copies of two English dailies and English weeklies or monthlies.

Watching English channels helps the students improve their vocabulary and expressions. If there is a provision, students may be permitted to watch selective, mind corruption free English channels (sports, education, news, animal channels and so on) for at least 15 min. during the English lab sessions. This will serve as motivation for the students and help them shed their inhibition.

What is antakshari? (Polar word game)

This game can be played on the stage by two or three students using the departmental words. Suppose Mr. A belongs to Dept.of Electrical and Electronics and he says his departmental word ' **ampere** 'Mr. B has to supply a word beginning with the ending letter of Mr. A's word. The word **ampere** ends with the letter **' e'** so Mr. B says **' electrical** '.Mr. A has to continue with the letter **' l '.** Like that five pairs of words are to be spoken.(**Letter ending only, not sound ending.)** Suppose departmental words are not available in some English letters like

' x ' ' y ' ' z ' the students may be permitted to use common words.

ANTAKASHARI (Five Exchanges)

(Dept. of Mechanical Engineering.)

EXAMPLE:

	Mr. A	Mr. B
1.	Governo**r**	**R**eservoi**r**
2.	**R**ac**k**	**K**elvi**n**
3.	Nu**t**	**T**oo**l**
4.	**L**athe	**E**missio**n**
5.	Naphth**a**	**A**nvil

Introducing oneself:

One is not expected to introduce one's family. One or two sentences on his family will do. Care must be taken to include general proficiency, titles and merits, awards possessing or secured in academic activities like paper presentation, participation in inter polytechnic or intra polytechnic competitions, sports activity, forums like NCC,NSS, hobby, ambition, strengths and weaknesses.

Introducing others – merits – credentials—one or two points on his family.

Vote of thanks / Welcome address.No doubt it should be all-covering but Focus should be on the important persons/invitees/chief guest and the message of the speaker.

Description (pictures from English weekly/daily) Pictures may be displayed through projector or Magazine cuttings may be used. Just five lines on the picture will do.

Auditory/oral comprehension: A Passage from any English daily of the week of the examination is to be read out for two to three minutes in the end examination. Display of recorded passages can be used as an addition in the class room. The use of pre-recorded passage discouraged in the end examination.

Oral presentation: Students must be encouraged to use English magazines and internet for collecting information on the topic, noting keywords and use them in their presentation in his own language. One must be able to talk extempore for 2 min on any topic, given a time of two minutes for organizing his/her thoughts. The topics can be kept simple and general (current events of interest like sporting event for headline of the day). It must be totally an oral activity without the aid of any other media.

News Caption: A news item ,without heading,of not more than ten lines from an English daily of the week of the conduct of Examination is to be given. The caption may be a passive construction or a catchy phrase on the given news item.

Face to face dialogue: Selective nine situations / topics are to be performed in the class room. (Minimum seven exchanges with courteous openings and closings).

Telephonic dialogue: Selective seven situations to be given. (Minimum seven exchanges).

Resume writing: cover letter—the components of a resume like sender's address, recipient's address, career objective to be explained.

Group Discussion: Topics of common interest, avoiding controversial ones, are to be given for discussion. A group may consist of six members.

Students should be exposed to 44 phonemes (sounds) in English language and their symbols.

There shall be no question on this end examination.

COMMUNICATION SKILLS EXERCISES:-

1. Departmental Vocabulary alphabetically (using it in sentence, antakshari).Using the words orally in sentences
2. Introducing oneself and others
3. Vote of thanks / Welcome address
4. Description (pictures from English weekly/daily)
5. Auditory/oral comprehension
6. Oral presentation
7. Face to face dialogue
8. Telephonic dialogue
9. Resume writing
10. Group Discussion

Communication Skills:

Ten Marks for each exercise leading to a maximum of hundred marks in total.

The total marks to be reduced to an average of ten marks.

Texts of the performed activities to be recorded in the Record Note book. Synopsis of the news item of the day/date is mandatory at the beginning of every record exercise.

Life Skills:

i) Preparing for and dealing with change.
j) Motivation, goal-setting and self-esteem.
k) Teamwork skills.
l) Time management
m) Emotional intelligence skills
n) Career planning.
o) Assertive Skills.
p) Interview skills.

Life skills are to be intensely inculcated through lectures, quotes, anecdotes and case studies. An excellent awareness of the eight essential life skills is to be created through continuous internal assessment. Five assignments in these topics are to be recorded in the record note book.

- A minimum of five assignments on five different topics.
- Each assignment to be assessed for twenty marks.
- The total marks to be reduced to an average of ten marks.
- All the topics to be covered in the lab.

TIME MANAGEMENT IN THE END EXAM.

For written part 30 min

- Written part of the examination should be the first / beginning of the examination, monadic oral exam to start during the written exam.
  Written Part exercises:
- auditory / oral comprehension.
- Resume writing.
- Giving news caption for the passage.
- During the written examination time of 30 minutes, monodic communication examination may also take place simultaneously.

MONODIC COMMUNICATION (ONE MAN COMMUNICATION)

Oral part – 75 min.

Both internal and external examiners (simultaneously) are to examine the students.

Five minutes for each student. 15 students for external & 15 students for internal and within 75 minutes both internal and external examiners complete the monadic communication exam.

DYADIC COMMUNICATION (ONE PAIR COMMUNICATION)

- 5 min for each pair.
- 15 pairs in total. 8 pairs for external and 7 pairs for internal examiner. (8x5=40 min) within **40 min** both internal and external examiners completes the dyadic communication exam.
- The students examined by the external for monadic exam are to be examined by the internal for dyadic and vice versa.

PROFESSIONAL COMMUNICATION

- 30 min for group discussion.
- 6 members in each group.
- 5 min for discussion for each group.
- Both internal and external examiners to supervise / examine simultaneously one group each.
- Within fifteen minutes all the six groups to be examined.

LABORATORY REQUIREMENT

1. An echo-free room for housing a minimum of sixty students.
2. Necessary furniture and comfortable chairs
3. Public Address System.
4. A minimum of two Computers with internet access, with Audio for Listening Skill and related software packages.
5. A minimum of Two different English dailies.
6. A minimum of one standard Tamil daily.
7. Headphone units – 30 Nos. with one control unit with a facility to play and record in Computer.
8. A minimum of Three Mikes with and without cords.
9. Colour Television (minimum size – 29").
10. DVD/VCD Player with Home Theatre speakers.
11. Clip Chart, white board ,smart board.
12. Projector.
13. video camera.
14. Printer,Xerox,scanner machines **desirable.**
15. English Weeklies/monthlies/journals like ELTOI **desirable.**
16. Frozen thoughts –monthly journal for Lifeskills by Mr.Rangarajan / www.frozenthoughts.com

Mark Pattern

End Examination –	**75 Marks**
Monodic Communication –	35 Marks
Dyadic Communication –	15 Marks
Profession Communication –	20 Marks
Professional Appearance –	5 Marks

Internal Assessment	**25 Marks**
Communication skills Record Notebook	10 Marks
Life skills assignments	10 Marks
Attendance	5 Marks

COMMUNICATION AND LIFE SKILLS PRACTICAL

Allocation & Statement of Marks

Duration:3Hrs.

Name of the Candidate Reg. No.

A. Monodic communication : 35 Marks

Introduction (5 mks)	Use in sentence (5 mks)	Vote of thanks / welcome address (5 mks)	Auditory/Oral comprehension (10 mks)	Description/ Oral presentation (5 mks)	News caption (5 mks)	Total (35 mks)

B. Dyadic communication: 15 Marks

Antakshari (5 mks)	Dialogue (10 mks)	Total (15 mks)

C. Professional communication: 20 Marks

Group Discussion (10 mks)	Resume (10 mks)	Total (20 mks)

D. Internal Assessment: 25 Marks

Record Notebook Commn.skills (10 mks)	Assignments Life Skills (10 mks)	Attendance (5 mks)	Total (25 mks)

E. Professional Appearance: /5 Marks

Total : **/100 Marks**

Internal examiner **External examiner**

FACE TO FACE DIALOGUE TOPICS

1. Between Friends (On any acceptable topic).
2. Between a conductor and a passenger.
3. Between a doctor and a patient.
4. Between a Shopkeeper and a Buyer.
5. Between a Teacher and a Student.
6. Between a tourist and a guide.
7. In a Bank.

8 At a railway enquiry counter.

9. Lodging a complaint.

Note: A resourceful teacher may add a few more topics of common interest.

TELEPHONIC DIALOGUE TOPICS

1. Placing an order.
2. Making Enquiries.
3. Fixing appointments
4. Making a hotel reservation.
5. Dealing with a wrong number.
6. Travel arrangements.
7. Handling complaints.

MECHANICAL DEPARTMENTAL VOCABULARY FOR ANTAKASHARI AND USING IN SENTENCES

EXAMPLE:

A:

1. Anvil – made of cast Iron used in foundry shop.
2. Axle – A metal rod that connects two wheels.
3. Alloy – alloy is a mixture of two or more metals.
4. Addendum – distance between top of gear teeth and pitch circle.
5. Annealing – It is a heat treatment process for softening the metals.

B:

1. Bearing – it is which supports the shaft.
2. Bolt – it is a type of fastener. Combined with screw.
3. Brake – it is used to halt an auto mobile vehicle.
4. Beed – steel wiring used in tyres to withstand stress.
5. Baffles – it is used to reduce noise, filter dust particles in auto mobile.

C:

1. Cam – it is a lobe like structure, which actuates the valve.
2. Crown – the slope like structure in the piston.
3. Calipers' – they are measuring instruments.
4. Clutch – it is used to disengage and engage the fly wheel and main shaft.
5. Chamber – it is the distance between vertical line and tyre center line.

D:

1. Damper – it is a type of shock absorber, reduces the vibration.
2. Differential – it controls the speed of rotating wheel in the rear axis.
3. Diaphram – it is used to separate two layers.
4. Detonation – it is the continuous knocking with serious effect on cylinder head.

E:

1. Evaporator – it absorbs heat to vapourise liquid into air
2. Engine-the place where fuel is burnt and heat energy is converted. mechanical energy
3. Electrolyte-it is a liquid substance which is used to transfer current or any metal particle.
4. Emission-the release of burnt gas from automobile.
5. Elongation-the increase of dimension due to application of load.

F:

1. Filter-which is used to remove dust particles.
2. Friction-the resistance on wear occur due to rubbing of two metals.
3. Fly wheel-the wheel like structure used to balance the uneven weight in engine.
4. Fuel – it is a substance that burns with oxygen in the air.
5. Factor of safety - it is the safety limit after which the material will break down.

G:

1. Governor – it is used to control the flow of fuel according to load.
2. Gear – it is used to transmit power from one place to another.
3. Generator – it is used to generate power.
4. Gasket – it prevents the leakage and to provide sealing effect.
5. Goggle – the protective device used to guard the eyes.

H:

1. Hub – it is the center part of wheel.
2. Hammer – it is used to beat sheet metals.
3. Hydraulics – it deals with fluid for various function.
4. Hatching – it is used to highlight the parts in drawings.
5. Head stock – it is the main function unit of lathe.

I:

1. Ignition – it is the function by which fuel is burnt.
2. Injection – it is the process of spraying fuel into engine block.
3. Impeller – it is which converts kinetic energy into pressure energy.
4. Inventory – it is the place where raw materials are stored.
5. Idling – it is the condition at which the automobile engine at stationary state.

J:

1. Jig – it guides the tool and hold the job.
2. Jaw – it is teeth like structure used to hold work pieces.
3. Jog mode – Jog mode is used to give manual feed for each axis continuously.
4. Junk – it is known as waste material in industry.
5. Journal – It is a type of bearing.

K:

1. Keyway – it is a specific path made in shaft to joint parts.
2. Knocking – the sound produced due to Burning of uncompleted burnt fuel.
3. Kelvin – it is the degree of hotness.
4. Knurling – it is the process of lathe done to work piece to improve the gripness.
5. Knuckle joint – It is a type of joint used to connect two work pieces.

L:

1. Lubrication – process of reducing heat by applying cooling substances.
2. Layering – it is used to draw parts of a machine separately and combine together.
3. Lever – it is a supported arm used to engage gears.
4. Lathe – it is the father of machines used in turning operations.
5. Lead screw - it is the screw through which the carriage travels.

M:

1. Manometer – it is used to measure the pressure of fluids.
2. Milling – process of removing metal from work piece by rotating cutting tool.
3. Manifold – it is a passage made for flow of fuel in automobile.
4. Moulding – it is the process of passing hot liquid metal into mould made through sand.
5. Module – it is a metric standard used to identify or specify pitch.

N:

1. Nozzle – it is used to reduce the pressure and increases the velocity.
2. Nut – it is a type of fastener used to couple with screw.
3. Nomenclature – Dimensional property of specific part on component is notified by nomenclature.
4. Neck – Distance between drills body and shank.
5. Naphtha – kind of inflammable oil.

O:

1. Orthography – it is the three dimensional view of an object.
2. Ovality – Elliptical shape of piston.
3. Over haul – it is the complete checking and servicing of a machine or vehicle.
4. Optimum temperature – suitable temperature condition for certain process on working.
5. Offset – it is by which the axis of certain job is defined.

P:

1. Pinion – a small gear is called pinion.
2. Pulley – A cylindrical object used to connect belt for transmitting power.

3. Pump – it is which transfers fluid from one place to another.
4. Piston – it is which transfer power from combustion chamber to connecting rod.
5. Port – it is the opening in two stroke engine for movement of fuel and exhaust.

Q:

1. Quilt – it is used to give automatic feed in machines.
2. Quality control – it is an inspection processl.

R:

1. Reaming – it is the operation used to finish inner surface of a hole.
2. Reservoir – it is used to store fuel or any liquid.
3. Rack – it is a spur gear with infinite radius.
4. Retainer – it is used to bring back to the original position.
5. Radiator – it is the part used in automobile for cooling water.

S:

1. Shackle – it is a rod connected to leaf spring.
2. Spring – it is a circular rod which compresses on load and retracts when released.
3. Strainer – it is used to remove micro particles.
4. Shock absorber - it is used to reduce vibration and give cushioning effect.
5. Suspension- it is used to absorb shocks and give cushioning effect.

T:

1. Tail stock – it is used in lathe to support the job.
2. Tool – it is a metal.removal device.
3. Torque – it is the twisting load given on a work piece.
4. Trimming – it s the process of removing excess metal .
5. Turning – it is a metal cutting process used to reduce diameter.

U:

1. Universal joint-it is used to connect propeller shaft and differential unit.
2. Universal divider head- it is used to index various components.

V:

1. Valve – valve is the part used in automobile for flow of fuel and exhaust to cylinder head.
2. Vent hole – it is the hole made in casting for ventilation purpose.
3. Vulcanizing – it is the process of adding carbon to rubber.
4. Vibration – it is caused due to the movement in an uneven surface.
5. Velocity-rate of change of displacement.

W:

1. Wheel-it is a circular object which rotates and moves the vehicle.
2. Wiper-it is used in wind shield to remove water droplets.
3. Work piece-it is the material in which various processes are done to make a component.
4. Wage-it is the amount paid to a worker for his work.
5. Washer-washer is a component used in fasteners to reduce gap.

Y:

1. Yawing-the turning of wind mill towards direction of air is called yawing.
2. Yoke-it is which holds the other end of spindle in milling machine.
3. Yield stress-It is the stress above which it will attain the breaking stress.
4. Young's modulus-it is the ratio between stress and strain.

Pl.note: Suppose departmental words are not available in some English letters like

' x ' ' y ' ' z ' the students may be permitted to use common words. This is only an example. Another student of Mechanical Engineering can have different sets of words under each letter of the English alphabet.Like that there may be variety of sets. The most important point is that One is not supposed to murmur but speak the words intelligibly in an audible manner. Swallowing the words will deprive a student of winning a selection in an interview. In the same way, students of other Departments can have different sets of words of their departments under each letter of the English alphabet.

TELEPHONE LANGUAGE AND PHRASES IN ENGLISH

Answering the phone

" Good morning/afternoon/evening, Madras Enterprises, Premila speaking."

" Who's calling, please?"

Introducing yourself

" This is Raghavan speaking."

" Hello, this is Raghavan from Speak International."

Asking for someone

" Could I speak to Mr. Raman, please?"

" I'd like to speak to Mr Raman, please."

" Could you put me through to Mr Raman, please?"

" Could I speak to someone who …"

Explaining

" I'm afraid Mr. Raman isn't in at the moment".

" I'm sorry, he's in a meeting at the moment."

" I'm afraid he's on another line at the moment."

" Putting someone on hold"

" Just a moment, please."

" Could you hold the line, please?"

" Hold the line, please."

Problems

" I'm sorry, I don't understand. Could you repeat that, please?"

" I'm sorry, I can't hear you very well. Could you speak up a little, please?"

" I'm afraid you've got the wrong number."

" I've tried to get through several times but it's always engaged."

" Could you spell that, please?"

Putting someone through

" One moment, please. I'll see if Mr Raman is available."

" I'll put you through."

" I'll connect you."

" I'm connecting you now".

Taking a message

" Can I take a message?"

" Would you like to leave a message?"

" Can I give him/her a message?"

" I'll tell Mr. Raman that you called"

" I'll ask him/her to call you as soon as possible."

" Could you please leave your number? I shall ask him to get back to you."

Pl.note: The above ones are samples only. A resourceful teacher may add more.

DAY-TO-DAY EXPRESSIONS (For dialogues)

COMMON PARLANCE

How are you?
Fine. Thank you.
How are you?
Me too.
How do you do?
How do you do?
It's good to see you again.
Glad to meet you.
Thank you.
Thanks very much.
Welcome.

Hello! How is everything?
Just fine. Thanks. What's new?
Nothing much.

I'm pleased to meet you.
The pleasure is mine.
I've heard Paul speak about you often.
Only good things! I hope.

Look who's here!
Are you surprised to see me?
Sure. I thought you were in Chennai.
I was, but I got back yesterday.

Sorry, May I help you?
So kind of you.
That's so nice of you.
Nice talking to you.

Nice meeting you.
It's getting late, and I've to go now.
Certainly. Come back soon.
In that case, I'll be seeing you.
Fine.
Thank you.
Welcome
So long. See you later.
Take care. Bye.
Good-bye.

Could you tell me the time, please?
Certainly. It is 5.35 p.m.
My watch says 5.40 p.m.
Then your watch is five minutes fast.

Excuse me. Can you tell me the way to …?
May I come in?
How is the weather today?
It is pleasant. / sunny / rainy / warm /windy.

I am sorry, Can you repeat what you have said.
I am sorry, I can't hear you properly.
It is not audible. Can you please repeat it?
Beg your pardon; I don't get your words clearly.
How do you feel now?
Are you ok?
I am fine. And how about you?
I am fine. Thank you.

GROUP DISCUSSION

Let me begin with introducing this concept,
Well, this is to convey that
At the outset, I am here to convey
At this juncture, I would like to
May I intervene?
May I add?
Kindly permit me to say
If you could allow me to say
Let me add a few words
Let me first answer your question
Can you please allow me to convey
Excuse me; I would like to add further

On behalf of my colleagues,
On their behalf
Firstly/ secondly/ thirdly.
Finally/ conclusively/ at the end / Summing up

Eventually/ in the event of
In spite of / otherwise/ although/ though

Please Note:

- The above ones are samples only.
- A resourceful teacher may add more.
- A potential student may exhibit variety.

V SEMESTER

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code: 1047
Subject code : **24751**
Semester : V Semester
Subject title : **INDUSTRIAL INSTRUMENTATION AND AUTOMATION**

TEACHING AND SCHEME OF EXAMINATION:

No of Weeks/ Semester : 16 weeks

Subject Title	Instruction		Examination			
	Hrs. Week	Hrs Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
INDUSTRIAL INSTRUMENTATION AND AUTOMATION	5	80	25	75	100	3Hrs

Topics and Time Allocation

UNIT	TOPICS	TIME (hrs)
I	STRAIN, FORCE MEASUREMENTS	14
II	TORQUE & POWER MEASUREMENT	14
III	TEMPATURE AND FLOW MEASUREMENTS	12
IV	BASIC CONCEPTS OF PLC	14
V	PROGRAMMING AND APPLICATIONS	14
	REVISION/ TEST	12
	TOTAL	80

RATIONALE :
Various types of digital instruments and PC based data acquisition system is required
The knowledge about Strain,Force ,Pressure measurement is a prerequiste

OBJECTIVES:

- Understand the Various types of Digital Instruments.
- Understand the PC Based Data Aquisition System.
- Understand the Various types of signal Conditioning Technique.
- Understand the Various types Strain Measurements
- Understand Various types of Force Measurements.
- Understand the Various pressure Measuring devices.
- Understand the Various Flow Measuring Devices.
- Understand the Various Viscosity Measuring Devices.
- Understand the Various humidity Measuring Devices.

24751 - INDUSTRIAL INSTRUMENTATION AND AUTOMATION

DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I	**STRAIN, FORCE MEASUREMENTS** Strain transducers-Strain measuring techniques- resistance strain gauge- Strain gauge materials – metal resistance strain gauges – bonded and unbonded type – wire type strain gauges – metal foil gauges – semiconductor strain gauge. FORCE MEASUREMENTS : Force – work – torque – scales & balances – equal arm beam balance – pendulum scale – proving ring – hydraulic load cell – pneumatic load cell – strain gauge load cell.	**14 Hrs**
II	**TORQUE& PRESSURE MEASUREMENT** Torsion meter – mechanical, optical & electrical types – strain gauge torsion meter – dynamometer – mechanical, hydraulic & electric motor generator dynamometers. PRESSURE MEASUREMENT Terminology – atmospheric – absolute - gauge-static- total pressures-Manometers-Utube manometer-Single column manometers- ring balance-bourden gauge-bellowgauge-low pressure gauge-pirani vacuum gauge	**14 Hrs**
III	**TEMPERATURE AND FLOW MEASUREMENTS** **TEMPERATURE MEASUREMENT** Temperature scales-temperature measuring instruments-liquid in glass thermometer- Bi-metallic thermometers-filled system- thermocouples-resistance thermometers-thermistors-total radiation Pyrometer **FLOW MEASUREMENTS** Venturi flow meter-pilot tube current meter- turbine meter-rotor meter	**12 Hrs**

IV	**BASIC CONCEPTS OF PLC** Introduction to Programmable Logic controller – Hardwired circuits versus PLC control – Advanatages of PLC control – Relays – Parts pf PLC – Processor – Memory – Input and output modules – Digital and Analog I/O's – Communication with PLC – Logic functions (OR, AND, NAND & EX –OR)- Remote I/O – The operater interface – Message display – operater input and display –Printed reports – Traffic Displays – Time and Date – Computer boards – Talking to other PLC and computers	**14 Hrs**
V	**PROGRAMMING AND APPLICATIONS OF PLC** Ladder Programming Bit instruction – timer- counter –program control instruction – data handling instruction – math instruction – simple ladder diagrams for star- delta starter – Ladder diagrams for DOL starter – Cylinder sequence Application – Cylinder sequence using counter – Ladder diagram using Latch circuit – Ladder diagram using Timer – Ladder diagram using counter – sequence of the operation and ladder diagram for multicylinder application – sequence of the operation and ladder diagram for clean room air lock.	**12 Hrs**

TEXT BOOK

1. D.Patranabis, "Principles of industrial instrumentation", tatamcgraw hill, ii edition
2. Electrical & Electronics – measurements & Instrumentation – Sawheney, Dhanpatrai& sons
3. Modern Electronic Instrumentation & Measurements Techniques – Albert D. Helfrick and William David Cooper – PHI
4. R.K.Jain, "Mechanical and Industrial Measurements", Khanna Publishers, 11th Edition
5. Instrumentation – Devices & Systems – C.S.Rangan, G.R.Sarma, VSV.Mani, G.K.Mithal, TMH

24751-INDUSTRIAL INSTRUMENTATION AND AUTOMATION

MODEL QUESTION PAPER - I

Time : 3 Hrs Max. Marks: 75

PART – A (15 x 1 = 15 Marks)

Answer any Fifteen Questions. Each question carries 1 mark.

1. What is the difference between bonded and unbonded type strain gauge?
2. List any two strain measuring techniques.
3. Define torque.
4. What is the purpose of Pneumatic load cell & strain gauge load cell?
5. What is Torsion meter?
6. What is absolute gauge?
7. What is the purpose of Borden gauge?
8. Mention few low pressure gauges.
9. What is see back effect?
10. What is the purpose of Thermistor?
11. What is the purpose of Rotometer?
12. Where venture flow meter is used?
13. What is PLC?
14. Name the parts of PLC.
15. What is output model?
16. Define Ladder diagram.
17. What is on delay timer?
18. What is the use of program control instruction?
19. What is the use of Data handling instruction?
20. What is DOL starter?

PART – B (5 x 12 = 60 Marks)

Answer all questions choosing either A or B from each question.
Each question carries 12 Marks

21. A) (i) Explain Resistance strain gauge with neat diagram. [6]

(ii) Explain hydraulic load cell force measurement with neat diagram. [6]

(OR)

B) (i) Explain semiconductor strain gauge with neat diagram. [6]

(ii) Explain proving Ring force measurement with neat diagram . [6]

22. A) (i) Explain electrical type torsion meter with neat diagram [6]

(ii) Explain absolute pressure measurement using U tube monometer . [6]

(OR)

B) (i) Explain strain gauge torsion meter with neat diagram . [8]

(ii)Explain pirani vacuum gauge with neat diagram. [6]

23. A) Explain total radiation pyrometer with neat diagram and mention its applications. [12]

(OR)

B) (i) Explain turbine type flow measurement with neat diagram [12]

24. A) (i) Draw the block diagram of PLC & explain the each block. [8]

(ii) Compare hardwired circuits versus with PLC control. [4]

(OR)

B)(i)ExplainAnalogmodules used in PLC. [6]

(ii) Briefly explain the operated interface and message display. [6]

25. A) (i) Draw the PLC ladder diagram of Star delta starter and explain its function . [8]

(ii) Write short notes on timer. [4]

(OR)

B) Draw ladder diagram for cylinder sequence application for

A+B+C+A-B-C-with10Counts. [12]

24751-INDUSTRIAL INSTRUMENTATION AND AUTOMATION

MODEL QUESTION PAPER - II

Time : 3 Hrs Max. Marks: 75

PART – A (15 x 1 = 15 Marks)

Answer any Fifteen Questions. Each question carries 1 mark.

1. What is the principle of Resistance strain gauge?
2. What is the difference between wire type strain gauge & metal foil strain gauge?
3. Mention the application of pneumatic load cell.
4. What is scales & balance?
5. Mention different types of torsion meter.
6. What is meant by Mechanical dynamometer?
7. What is static pressure?
8. What is the purpose of bellow gauge?
9. Mention the temperature measuring instruments.
10. Define thermo couple.
11. What is the purpose of Thermistor?
12. Mention the flow measurement instrument.
13. What is Relay?
14. State the parts of Processor unit.
15. What is input model?
16. State some output switching device used in PLC.
17. State some input switching device used in PLC.
18. What is counter?
19. Mention the types of bit instruction.
20. What is star delta starter?

PART – B (5 x 12 = 60 Marks)

Answer all questions choosing either A or B from each question.
Each question carries 12 Marks

21. A) (i) Explain the Metal resistance strain gauge with neat diagram. [6]

(ii) Explain hydraulic load cell with neat diagram. [6]

(OR)

B) (i) Explain semi conductor strain gauge with neat diagram. [6]

(ii) Explain proving ring balance with neat diagram . [6]

22. A) (i) Explain Electrical type torsion meter with neat diagram. [6]

(ii) Explain Mechanical dynamometer with neat diagram. [6]

(OR)

B) (i) Explain single column mano meter with neat diagram. [6]

(ii)Explain low pressure gauge with neat diagram. [6]

23. A) (i) Briefly explain liquid in glass thermo meter with neat diagram. [6]

(ii) Briefly explain resistance thermo meter with neat diagram. [6]

(OR)

B) (i) Explain Venturi flow meter with neat diagram. [6]

(ii)Explain turbine meter with neat diagram. [6]

24. A) (i) Briefly explain Graphic Displays with neat diagram . [6]

(ii) Briefly explain Talking to other PLC and computers with neat diagram. [6]

(OR)

B (i) Draw ladder logic for AND,OR,NAND & EX-OR [8]

(ii)Mention the advantages of PLC. [4]

25. A) (i) Explain bit instruction used in PLC . [8]

(ii) Explain the operation of DOL starter. [4]

(OR)

B) (i) Explain the sequence of operation &draw ladder diagram

For clean Room air lock . [12]

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code: 1047
Subject code : **24052**
Semester : V Semester
Subject title : **MICROCONTROLLER**

TEACHING AND SCHEME OF EXAMINATION:

No of Weeks/ Semester : 16 weeks

Subject Title	Instruction		Examination			
	Hrs. Week	Hrs Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
MICROCONTROLLER	5	80	25	75	100	3Hrs

Topics and Time Allocation

UNIT	TOPICS	TIME (hrs)
I	**Architecture & Instruction set of 8051**	14
II	**Programming Examples:**	14
III	**I/O and Timer**	12
IV	**Interrupt and Serial Communication**	14
V	**Interfacing Techniques**	14
	REVISION/ TEST	12
	TOTAL	80

OBJECTIVES:

- On completion of the following units of syllabus contents, the students must be able to
- Explain Architecture of 8051 Microcontroller.
- Explain the functions of various registers.
- Understand interrupt structure of 8051.
- Understand serial data communication concepts.
- Understand the programming techniques.
- Explain various addressing modes.
- Write simple programs using 8051.
- Understand the block diagram and control word formats for peripheral devices.
- Understand how to interface with RS232C.
- Understand how to interface with 8255.
- Understand various application of 8051 Microcontroller

24052 - MICROCONTROLLER

DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I	**Architecture & Instruction set of 8051:** Comparison of Microprocessor and Microcontroller - Block diagram of Microcontroller –Functions of each block. Pin details of 8051 – ALU –ROM – RAM – Memory Organization of 8051 - Special function registers – Program Counter – PSW register –Stack - I/O Ports – Timer – Interrupt – Serial Port – Oscillator and Clock - Clock Cycle – State - Machine Cycle – Instruction cycle – Reset – Power on Reset – Overview of 8051 family Instruction set of 8051 – Classification of 8051 Instructions - Data transfer instructions – Arithmetic Instructions – Logical instructions –Branching instructions – Bit Manipulation Instructions.	**14 Hrs**
II	**Programming Examples:** Assembling and running an 8051 program –Structure of Assembly Language –Assembler directives - Different addressing modes of 8051 – Programmes – Multibyte Addition – 8 Bit Multiplication and Division – Biggest Number / Smallest Number – Ascending order / Descending order – BCD to HEX Conversion – HEX to BCD Conversion – BCD to ASCII Conversion – ASCII to Binary Conversion – Odd Parity Generator – Even Parity Generator - Time delay routines.	**14 Hrs**
III	**I/O and Timer:** Bit addresses for I/O and RAM – I/O programming – I/O bit manipulation programming – Programming 8051 Timers – Timer 0 and Timer 1 registers – Different modes of Timer – Mode 0 Programming – Mode 1 Programming - Mode 2 Programming - Mode 3 Programming - Counter programming – Different modes of Counter – Mode 0 Programming – Mode 1 Programming - Mode 2 Programming - Mode 3 Programming (simple programs).	**12 Hrs**
IV	**Interrupt and Serial Communication:** Basics of Serial programming – RS 232 Standards - 8051 connection to RS 232 – 8051 Serial Communication Programming – Programming 8051 to transmit data serially - Programming 8051 to Receive data serially – 8051 Interrupt s – Programming Timer Interrupts – Programming external hardware interrupts – Programming the serial communication interrupt – Interrupt priority in 8051 (simple programs).	**14 Hrs**
V	**Interfacing Techniques:** IC 8255 – Block Diagram – Modes of 8255 - Interfacing external memory to 8051– 8051 interfacing with the 8255 – ASM Programming – Relays – Sensor interfacing – ADC interfacing – DAC interfacing - Keyboard interfacing – Seven segment LED Display Interfacing - Stepper Motor interfacing – DC motor interfacing using PWM.	**14 Hrs**

TEXT BOOKS:

1. Microcontrollers, Principles and Applications – Ajit pal – PHI Ltd., - 2011.

REFERENCE BOOKS:

1. 8051 Microcontroller and Embedded Systems using Assembly and C by Mazidi, Mazidi and D.MacKinlay, 2006 Pearson Education Low Price Edition.
2. Microprocessor and Microcontroller by R.Theagarajan, Sci Tech Publication, Chennai
3. 8051 Microcontroller by Kenneth J.Ayala.

24052 - MICROCONTROLLER
Model question paper – I

Time: 3 Hrs. **Max. Marks: 75**

Part – A **15x1=15**

Note : Answer any 15 Questions. – All Questions carry equal marks

1. What is Microcontroller?
2. Mention the number of bytes in internal RAM and internal ROM of 8051?
3. State any two differences between microprocessor and microcontroller.
4. When 8051 is reset, all interrupts are disabled. How to enable these interrupts?
5. What are the instructions used to access external RAM.
6. List the Addressing modes in 8051?
7. What is meant by assembler directives?
8. List any four assembler directives.
9. Calculate the reload value of timer 1 for achieving a baud rate of 4800 in 8051 for a crystal frequency of 11.0592 MHz.
10. Mention the timers of 8051.
11. Mention the operating modes of 8051 timers
12. Mention the control registers related to timer/counters of 8051
13. How will you double the baud rate in 8051?
14. List the interrupts available in 8051?
15. What is meant by interrupt priority in 8051?
16. What is the function of SMOD bit in PCON register?
17. Write the BSR control words to set PC0 and to reset PC4 in 8255.
18. What is the instruction used to transfer a data byte between microcontroller and 8255.
19. Define a stepper motor.
20. Give the normal 4 step sequence.

Part – B **5x12 = 60**

Answer all questions choosing either A or B from each question.
Each question carries 12 marks.

21 A) Draw and explain the block Diagram of 8051 microcontroller

(Or)

B) i) List the special function registers with their addresses and explain anyone of them
ii) Draw and explain the Structure of Internal RAM of 8051

22 A) Write an assembly language program to arrange the given set of 'n' numbers in ascending order

(Or)

B) Explain the various addressing modes in 8051 with examples.

23 A) Explain in details about the programming of 8051 timer

(Or)

B) Write a program to generate square wave of 50 Hz frequency on pin P1.2 using timer 0 interrupt. Assume crystal = 11.0592 MHz

24 A) Explain about the programming of 8051 serial port

(Or)

B) Explain the functions of each bit of Serial Control Register (SCON) and Power Control Register (PCON) in detail.

25 A) Explain about 8051 interfacing with 8255

(Or)

B) Explain about stepper motor interfacing with 8051.

24052 - MICROCONTROLLER
Model question paper – II

Time: 3 Hrs. **Max. Marks: 75**

Part – A **15x1=15**

Note: Answer any 15 Questions. – All Questions carry equal marks

1. Give the PSW setting for masking register bank 2 as default register bank in 8051 Microcontroller?
2. Define the clock cycle of 8051.
3. Define the machine cycle of 8051.
4. Define the instruction cycle of 8051.
5. How can you perform multiplication using 8051 Microcontroller?
6. What is the operation carried out when 8051 executes the instruction MOVC A, @A + DPTR?
7. Write a delay routine for 1 millisecond using timer 0 of 8051 for 12 MHz crystal frequency.
8. List the addressing modes of 8051.
9. What is the function of C/T bit of TMOD register?
10. Find the timer's clock frequency for the crystal frequency of 11.0592 MHz
11. What is the function of C/T bit of TMOD register?
12. State the function of timer flag TF in TCON register.
13. List the serial modes. ?
14. What is the function of REN bit in SCON register?
15. What is the function of SMOD bit in PCON register?
16. State the two methods of serial data communication.
17. Define a transducer.
18. Define step angle.
19. What is interfacing?
20. Define DAC.

Part – B **5x12 = 60**

Answer all questions choosing either A or B from each question.
Each question carries 12 marks.

21 A) Explain with neat sketch memory organisation of 8051

(Or)

B) Draw the pin diagram of 8051 and explain the function of each pin.

22 A) Write an assembly language program (ALP) for multi-byte addition

(Or)

B) Write an ALP for finding maximum number in an array.

23 A) Explain the TMOD register and TCON register

(Or)

B) Explain the steps to program the timer in mode 1 and mode 2.

24 A) Write the steps involved in programming 8051 to transfer and receive data serially.

(Or)

B) Explain the interrupt priority in 8051.

25 A) Explain ADC interfacing with 8051.

(Or)

B) Explain seven segment LED display interfacing with 8051**.**

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code: 1047
Subject code : **24753**
Semester : V Semester
Subject title : **HYDRAULICS AND PNEUMATIC SYSTEMS**

TEACHING AND SCHEME OF EXAMINATION:

No of Weeks/ Semester : 16 weeks

Subject Title	Instruction		Examination			
	Hrs. Week	Hrs Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
HYDRAULICS AND PNEUMATIC SYSTEMS	5	80	25	75	100	3Hrs

Topics and Time Allocation

UNIT	TOPICS	TIME (hrs)
I	FLUID POWER AND PUMPS	14
II	LINEAR ACTUATORS, ROTARY ACTUATORS	14
III	DIRECTIONAL CONTROLVALVE, PRESSURE CONTROL VALVE, FLOW CONTROL VALVE	12
IV	HYDRAULIC COMPONENTS, INSTUMENTATION AND MEASUREMENT, CONDUITS AND FITTINGS, HYDRAULIC CIRCUITS	14
V	PNEUMATICS SYSTEM, ELECTRONIC CONTROL FOR FLUID POWER	12
	REVISION/ TEST	12
	TOTAL	80

RATIONALE :

Hydraulics and pneumatics systems are finding enormous applications in industries.

The knowledge about the various pneumatic components is essential for understanding the pneumatic systems.

OBJECTIVES:

* Explain the various types of piston pumps.

* Explain the Various types of gear pumps.

* Explain the Various linear actuators.

*Explain the Various rotary actuators.

* Explain the various directional control valves.

* Explain the Various Pressure Control valves.

* Explain the Various Hydraulic Components.

* Explain the Various Directional control valves.

* Explain the Various pneumatic system.

24753 - HYDRAULICS AND PNUEMATIC SYSTEMS
DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I	**Fluid Power, Pumps.** Fluid Power –Definition –Pascal's Law- Basic Properties Of Hydraulic Fluids- Mass , Weight, Density, Specific Weight, Specific Gravity, Viscosity, Bulk Modulus. Hydralic Pumps-Classification -Pump Types- **Piston Pumps** –Axial Piston Pump- Radial Piston Pumps- Graphical Symbols – Working Principles only. **Gear Pumps**-External Gear Pump- Internal Gear Pumps. Graphical Symbols – Working Principles only. V**ane Pump**-Unbalanced Vane Pump – Balanced Vane Pump- Graphical Symbols – Working Principles only.	**14 Hrs**
II	**Linear actuators, Rotary actuators.** **Linear Actuators**- Hydraulic Cylinders - Cylinder Types-Single Acting cylinder -Gravity Return cylinder–Spring Return cylinder -Telescopic Cylinder – Hydralic Ram –Tandem Cylinder , Symbols and working principles only- **Rotary actuators**-motor types –gear motor-balanced vane motor-pison motor –two vane rotor actuator-rack AND pinion rotary actuator-motor torque –speed –power –efficiency –symbols –applications –specifications.	**14Hrs**
III	**Directional control valve, pressure control valve, Flow control valve** **Directional Control Valves**:-Check Valve-Shuttle Valves-Two Way Directional Control Valves -Three Way Directional Control Valves -Four Way Directional Control Valves – Directional Control Valves Actuation types-Symbols- Working Principles- **Pressure Control Valve:** Pilot Operated, Pressure Relief Valve –Pressure Reducing Valve –Sequence Valve – Symbols- Working Principles- **Flow Control Valve** –Type –Needle Valve –Pressure Compensated Flow Control Valve-Cushioned Cylinders –Flow Dividers –Balanced Spool Flow Divider- Rotary Flow Divider .	**12 Hrs**

IV	**Hydraulic components, Instrumentation and Measurement, Conduits and Fittings, Hydraulic circuits:** **Hydraulic Components** –Accumulators – types –Diaphragm - Spring Loaded -Weight Loaded -Pressure Intensifiers – Hydraulic Reservoirs-Heat Exchanger types- Air cooled –Water cooled - Filters . **Instrumentation and Measurement**: Pressure Gauges-Flow meters-Temperature Gauges- **Conduits and Fittings**-Pipe - Tubing –Hose - Seals and Bearings - Hydralic Fluids. **Hydralic Circuits:-**Counter Balance Circuit –Sequence Circuit- Speed Control Circuit-Meter in Circuit –Meter Out Circuit-Intermittent Feed Control-Speed Control ForContinous Processing – **Booster and Intensifier Circuits**-Force Multiplication – PressureIntensification.	**14 Hrs**
V	**Pneumatics system, Electronic control for Fluid power** **Pneumatics** - Basic principles of pneumatics-difference between hydraulics and pneumatics-compressor types-two stage piston compressor –rotary vane compressor-rotary screw compressor –vacuum pumps- double acting pneumatic cylinder–gear motor-pressure regulator –filters-lubricators-FRL unit-water removal – air preparation and distribution – **Electronic control of fluid power** -solenoid valves-servo valvespumpcontrols.	**12 Hrs**

Text Books:

1. Industrial Hydraulics –Third Edition John J.PippengerTyler,G.Hicks. Mc.Graw-Hill Book Companys.
2. Introduction To Fluid Power--James L. Johnson.-Delmar Thomson Learning Inc.

References :

1. Fluid Power Technology-Robert P. Kokernale-Library Of Congress Cataloging- Publication Data.
2. Basic Fluid Power - Dudleyt, A Pease and John J Pippenger - Prentice Hall 1987.
3. Fluid Power With Applications - Antony Espossito, Prentice Hall 1980.
4. Hydraulics And Pneumatics - (HB) Adrewparr –Jaico Publishing House.
5. Pneumatic And Hydraulic Systems - Bolton W. Butterworth-Heinemann-1987

24753 HYDRAULICS AND PNUEMATIC SYSTEMS
MODEL QUESTION PAPER

Time : 3 Hours Max. Marks : 75

Part A (Answer any 15 questions) 15 X 1=15

1. Define Fluid Power
2. State Pascal's law
3. Draw the graphical symbol for radial piston pump
4. What is the use of hydraulic Pumps
5. State different type of hydraulic cylinder.
6. Draw the symbol of hydraulic motor.
7. Draw the symbol for hydraulic ram tandem cylinder.
8. What is the use of pressure relief valve.
9. State any two difference between three way directional control valve and four way directional valve
10. What is the purpose of flow dividers?
11. Draw the symbol for sequence valve.
12. Define pressure intensification ratio
13. State different type of accumulators.
14. What is vacuum pump?
15. What is the function of meter out circuit?
16. What is the function of diffuser.
17. State any two differences between hydraulic pneumatic compressors.
18. What devices make up an FRL unit.
19. What is the function of pressure regulator?
20. What is the Purpose of air preparation.

Part B 5 X 12=60

Answer all questions choosing either A or B from each question.
Each question carries 12 marks.

21 a) Explain with neat sketch the working principle of axial piston pump.

or

b)Explain with neat sketch the working principle of vane pump.

22. a)Explain the working principle of telescopic cylinder

or

b) What is the purpose of actuator? Explain rack and pinion rotary actuator. What are the functions of actuator?

23. a) Explain the working principal of three way directional control valve.

or

b) Explain needle valve and its application.

24. a) Explain bourdon tube pressure gauge.

or

b) Explain spring loaded accumulators

25. a)Explain the working of rotary screw compressor

or

b) Explain servo valves and its applications.

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code : 1047
Subject Code : 24754
Semester : V
Subject Title : CAD/CAM

TEACHING AND SCHEME OF EXAMINATIONS:

No. of Weeks per Semester : 16 Weeks

Subject Title	Instructions		Examination			
	Hours/ Week	Hours/ Semester	Marks			Duration
CAD/CAM	5	80	Internal Assessment	Board Examination	Total	3 Hrs
			25	75	100	

Topics and Allocation of Hours:

Unit No	Topics	Hours
I	INTRODUCTION CIM AND COMPUTER AIDED DESIGN & ANALYSIS	15
II	COMPUTER AIDED MANUFACTURING AND RAPID PROTOTYPING	15
III	CNC MACHINE AND COMPONENTS	15
IV	PART PROGRAMMING	15
V	FMS, INTEGRATED MATERIAL HANDLING	15
	REVISION AND TEST	5
	Total	80

RATIONALE:

As per the latest requirements in the Industries this enables to learn the assistance of computer in the field of design and manufacturing areas. It's able to learn the latest manufacturing concepts of in the shop floors and manufacturing methods like RPT. They are able to know about the working of principles of CNC machines and programming techniques are included. The application of material handling equipment is learnt based on the automation in the industries.

OBJECTIVES:

- Understand the concept and requirement of the integration of the design and manufacturing.
- Acquire knowledge about the computer assistance in the design process and analysis.
- Understand the concepts of manufacturing with computer assistance in the shop floor.
- Learn the principle and working of the CNC machines.
- Understand the principle of latest manufacturing machines like EDM and RPT.
- Learn the method of CNC programming with international codes.
- Acquire the knowledge in the material handling equipment

CAD/CAM
DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I	**INTRODUCTION CIM AND COMPUTER AIDED DESIGN & ANALYSIS** **CIM:** Introduction of CIM – concept of CIM - evolution of CIM – CIM wheel – Benefits – integrated CAD/CAM. **CAD:** Computer Aided Design **–** Introduction – CAD definition – Shigley's design process – CAD activities – benefits of CAD. Types of CAD system –Host and terminal based CAD system - PC based CAD system – workstation based CAD system – graphics workstation – CAD software packages. 2D&3D transformations – translation, scaling, rotation and concatenation. Geometric modeling: Techniques: Wire frame modeling – surface modeling – solid modeling: Boundary representation – Constructive Solid Geometry – Comparison. Graphics standard – Definition –Need - GKS – IGES – PHIGS – DXF. Concept of Design for Excellence (DFX) – Guide lines of Design for Manufacture and assembly (DFMA). **Finite Element Analysis:** Introduction – Development - Basic steps – Advantage.	**15 Hrs**
II	**COMPUTER AIDED MANUFACTURING AND RAPID PROTOTYPING** **CAM:** Definition – functions of CAM – benefits of CAM – Group technology – Part families - Parts classification and coding - coding structure – Optiz system, MICLASS system and CODE System - process planning – CAPP – Types of **CAPP :** Variant type, Generative type – advantages of CAPP - production planning and control – computer integrated production management system – Master Production Schedule (MPS) – Capacity planning – Materials Requirement Planning (MRP) –Manufacturing Resources Planning (MRP-II)– Shop floor control system - Just in time manufacturing philosophy- Introduction to enterprises resources planning. Rapid proto typing: concept and applications – materials – types - Stereo lithography – laser sintering – Deposition Modeling - 3D printing.	**15 Hrs**
III	**CNC MACHINE AND COMPONENTS** **CNC Machines:** Numerical control – definition – components of NC systems – development of NC – DNC – Adaptive control systems – working principle of a CNC system – Features of CNC machines - advantage of CNC machines – difference between NC and CNC – Construction and working principle of turning centre – Construction and working principle of machining centers – machine axes conventions turning centre and machining centre – design considerations of NC machine tools. CNC EDM machine – Working principle of die sinking and wire EDM machines - Coordinate Measuring Machines: construction and working principles. **Components of CNC machine.** **Drives:** spindle drive – dc motor – Feed drives – dc servo motor and stepper motor – hydraulic systems – Slide ways – requirement – types – friction slide ways and anti friction slide ways - linear motion bearings – recirculation ball screw – ATC – tool magazine – feedback devices – linear and rotary transducers – Encoders - in process probing.	**15 Hrs**

IV	**PART PROGRAMMING** **PART PROGRAMMING:** NC part programming – methods - manual programming – conversational programming – APT programming - Format: sequential and word address formats - sequence number – coordinate system – types of motion control: point-to-point, paraxial and contouring – Datum points: machine zero, work zero, tool zero NC dimensioning – reference points – tool material – tool inserts - tool offsets and compensation - NC dimensioning – preparatory functions and G codes, miscellaneous functions and M codes – interpolation: linear interpolation and circular interpolation - CNC program procedure. Part Program – macro – sub-program – canned cycles: stock – mirror images – thread cutting – Sample programs for lathe : Linear and circular interpolation - Stock removal turning – Peck drilling – Thread cutting and Sample programs for milling: Linear and circular interpolation – mirroring – sub program – drilling cycle – pocketing	**15 Hrs**
V	**FMS, INTEGRATED MATERIAL HANDLING** Types of manufacturing - introduction to FMS – FMS components – FMS layouts – Types of FMS: flexible manufacturing cell – flexible turning cell – flexible transfer line – flexible machining systems – benefits of FMS - introduction to intelligent manufacturing system – virtual machining. Computer Integrated material handling – AGV: working principle – types - benefits – Automatic Storage and Retrieval Systems (ASRS).	**15 Hrs**

Text Books :

1) CAD/CAM/CIM , R.Radhakrishnan, S.Subramanian, New Age International Pvt. Ltd.
2) CAD/CAM , Mikell P.Groover, Emory Zimmers, Jr.Prentice Hall of India Pvt., Ltd.
3) NC Programming, S.K.Sinha, Galgotia Publications Pvt. Ltd.

Reference Books :

1) CAD/CAM Principles and Applications, Dr.P.N.Rao, Tata Mc Graw Hill Publishing Company Ltd.
2) CAD/CAM, Ibrahim Zeid, Mastering Tata McGraw-Hill Publishing Company Ltd., New Delhi.
3) Automation, Production Systems, and Computer-Integrated Manufacturing, Mikell P. Groover, Pearson Education Asia.
4) Computer control of manufacturing systems,Yoram Koren, McGraw Hill Book.

24754 CAD/CAM

MODEL QUESTION PAPER-1

Time: 3 Hrs **Max Marks : 75**

PART A

Answer any fifteen questions. All Questions carry ONE mark. 15 x 1 = 15

1 Define is CAD.
2 List the benefits of CIM.
3 What is translation?
4 Mention the advantages of FEA.
5 Define CAM.
6 What is process planning?
7 What is concurrent engineering?
8 Mention the applications of RPT
9 Define NC.
10 Differentiate between NC and CNC.
11 What is encoder?
12 Mention the types of slide ways.
13 Mention the different formats of part program.
14 What is a reference point?
15 Mention the different shapes of tool inserts.
16 What is NC dimensioning?
17 List the benefits of FMS.
18 What is AGV?
19 List type of material handling equipment
20 Define virtual machining

PART B: Answer all questions Marks 5 x 12=60

Answer all questions choosing either A or B from each question.

Each question carries 12 marks.

	21A	(i)Mention the basic steps of FEA.	4
		(ii)Explain the activities of CAD in design process.	8
		(OR)	
	B(i)	Compare the wire frame modeling with surface modeling.	2
		(ii)Explain the constructive solid geometry modeling technique.	10
22	A	(i)Write briefly about Enterprise Resource Planning.	4
		(ii)What is GT? Explain the optiz system of coding.	8
		(OR)	
	B	(i)Write briefly about the Shop Floor Control.	4
		(ii)Explain the computer integrated production management system.	8
23	A	(i)Explain the working of ATC.	4
		(ii)Explain the working principle of turning centre.	8
		(OR)	
	B	(i)What is the feed back device?	2
		(ii)Explain the working of linear and rotary transducers.	10
24	A	(i)Write briefly about conversational programming.	4
		(ii)Explain about the APT programming language.	8
		(OR)	
	B	(i)Write the procedure to create CNC manual part program.	4
		(ii)Write a part program to create a mirroring image in a CNC milling machine using a sub program.	8

25	A	(i)Explain FMS Components	8
		(ii)Explain FMS Layouts.	4
		(OR)	
	B	(i)Write briefly on intelligent manufacturing system.	4
		(ii)Explain AGV.	8

CAD/CAM

MODEL QUESTION PAPER-2

Time: 3 Hrs **Max Marks : 75**

PART A – Answer any fifteen questions. All Questions carry Equal marks. 15 x 1 = 15

1 List the benefits of CAD.
2 What is graphic workstation?
3 What is concatenation?
4 What is the need of graphic standard?
5 List the benefits of CAM.
6 What is capacity planning?
7 List the advantages of CAPP.
8 What is sequential engineering?
9 What are the advantages of CNC machine?
10 What are the purposes of CMM?
11 What are the requirements of slide ways?
12 What is the purpose of ATC?
13 What is NC part programming?
14 What is tool offsets?
15 What is linear interpolation?
16 What is sub program?
17 What is FMS?
18 List the types of FMS layout
19 Define intelligent manufacturing system
20 What is ASRS?

PART B: Answer all questions Marks 5 x 12=60

21	A	(i)Write briefly about the cost involved in design process.	4
		(ii)Explain the Shigley's design process.	8
		(OR)	
	B	(i)What is graphic standard?	2
		(ii)Explain the IGES graphic standard.	10
22	A	(i)Write briefly about Material Requirement Planning.	4
		(ii)What is CAPP? Explain the generative method of CAPP.	8
		(OR)	
	B	(i)Write briefly about the product development cycle.	4
		(ii)What is RPT? Explain the working of stereo lithography.	8
23	A	(i)Write briefly about adaptive control system.	4
		(ii)Explain the working principle of CNC system.	8
		(OR)	
	B	(i)Write briefly about the linear motion bearing.	2
		(ii)Explain the working principle of CMM.	10
24	A	(i)Write briefly about tool inserts.	4
		(ii)Write a part program to make M20 X 1.5 thread in CNC lathe.	8
		(OR)	
	B	(i)Explain the types of motion control in CNC machine.	4
		(ii)Write a part program for stock removal in turning.	8
25	A	(i)Explain the FMS components.	8
		(ii)Explain the FMS layout with sketches.	4
		(OR)	
	B	(i)Explain ASRS	4
		(ii)Explain AGV	8

L-SCHEME
(Implemented from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code: 1047
Subject code: **24055**
Semester : V Semester
Subject title : MICROCONTROLLER PRACTICAL

TEACHING AND SCHEME OF EXAMINATION:

Number of Weeks/ Semester : 16 weeks

Subject	Instruction		Examination			
	Hrs. Week	Hrs Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
Microcontroller practical	5	80	25	75	100	3Hrs

ALLOCATION OF MARKS

Scheme of Examinations
The Evaluation has to be done as given below

Allocation of marks for Board Practical Examination

I) Programme	- 30 Marks
II) Debugging and Execution	- 30 Marks
III) Result	- 10 Marks
IV) Viva – Voce	- 5 marks

Total	**- 75 Marks**

EQUIPMENTS REQUIRED

S.No	Name of the Equipments	Required Nos
1.	8051 Microcontroller Kit	18 Nos
2.	Digital I/O Interface Board	02 Nos
3.	Matrix keyboard Interface Board	02 Nos
4.	Seven segment LED display Interface Board	02 Nos
5.	Traffic light Interface Board	02 Nos
6.	8 bit ADC Interface Board	02 Nos
7.	8 bit DAC Interface Board	02 Nos
8.	STEPPER MOTOR CONTROL Interface Board	02 Nos
9.	DC motor control Interface Board	02 Nos
10.	Sending data through serial port between controller kits	02 Nos

24056 - MICROCONTROLLER PRACTICAL

Note1: ALL THE EXPEIMENTS SHOULD BE CONDUCTED
2: Different data are to be given for each batch

Part - A

1. Write an Assembly Language Programme for Multi-byte Addition and execute the same in the 8051 Kit.
2. Write an Assembly Language Programme for Multiplication and Division of two numbers and execute the same in the 8051 Kit.
3. Write an Assembly Language Programme for Arranging the given data in Ascending order and execute the same in the 8051 Kit.
4. Write an Assembly Language Programme for BCD to Hex conversion and execute the same in the 8051 Kit.
5. Write an Assembly Language Programme for Hex to BCD conversion and execute the same in the 8051 Kit.
6. Write an Assembly Language Programme for ASCII to Binary and execute the same in the 8051 Kit.
7. Write an Assembly Language Programme for Parity bit generation and execute the same in the 8051 Kit.
8. Write an Assembly Language Programme for using timer / Counter and execute the same in the 8051 Kit.

Part - B

INTERFACING WITH APPLICATION BOARDS

1. Write an Assembly Language Programme for interfacing Digital I/O board and test it.
2. Write an Assembly Language Programme for interfacing Matrix keyboard and test it.
3. Write an Assembly Language Programme for interfacing seven segment LED displays and test it.
4. Write an Assembly Language Programme for interfacing Traffic light control and test it.
5. Write an Assembly Language Programme for interfacing 8 bit ADC and test it.
6. Write an Assembly Language Programme for interfacing 8 bit DAC and test it.
7. Write an Assembly Language Programme for interfacing STEPPER MOTOR and test it.
8. Write an Assembly Language Programme for interfacing DC motor and test it.
9. Write an Assembly Language Programme for Sending data through serial port between controller kits and test it.

SCHEME OF VALUATION	
Programme	30 Marks
Debugging and Execution	30 Marks
Result	10 Marks
Viva voce	5 marks
Total	75 marks

L-SCHEME

(Implements from the Academic year 2011-2012 onwards)

Course Name: DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code: 1047
Subject code: **24756**
Semester : V Semester
Subject title : **HYDRAULIC, PNEUMATIC AND PLC PRACTICAL**

Subject Title	Instruction		Examination			
	Hrs. Week	Hrs Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
HYDRAULIC, PNEUMATIC AND PLC PRACTICAL	5	80	25	75	100	3Hrs

PNEUMATICS LAB

A. Study of Pneumatic system its elements- pressure control valves, Directional control valves (DCV)

1. a. Direct operation of a single Acting cylinder.
   b. Direct operation of Double Acting cylinder.
2. Operations of Single Acting Cylinder controlled from two different positions using shuttle valve.
3. Operation of a Double Acting cylinder with Quick exhaust valve.
4. Speed control of Double Acting cylinder using metering in and metering out circuit.
5. Automatic operation of Double Acting cylinder in multi cycles -Using limit switches and memory valves.
6. Automatic operation of Two Double Acting cylinder in multi cycles -Using limit switches and memory valves in the following sequence
   a. A+B+A-B-
   b. A-B+A+B-
   c. A+B+B-A-
   d. A&B+A-B-
7. Operation of a Double Acting cylinder using solenoid operated Directional control valve.

HYDRAULICS LAB

B. Study of hydraulic system and its elements.

1. a. Direct operation of Double Acting cylinder.

   b. Direct operation of Hydraulic Motor.

2. a. Speed control of Double Acting cylinder - Using metering-in and metering-out control.

   b. Speed control Hydraulic Motor - Using metering-in and metering-out control.

3 Automatic operation of Double Acting cylinder in multi cycles -Using pressure sequencing valve

4. Operation of a Double Acting cylinder using solenoid operated Directional control valve.

5. Automatic operation of Two Double Acting cylinder in multi cycles -Using solenoid valves and proximities in the following sequence

   a. A+B+A-B-

   b. A-B+A+B-

   c. A+B+B-A-

   d. A&B+A-B-

PLC LAB

C. Study of PLC system and its elements

1. a. Direct operation of a Pneumatic cylinder using solenoid valve and latch circuit.

   b. Direct operation of a hydraulic cylinder using solenoid valve and latch circuit.

   c. Direct operation of a hydraulic motor using solenoid valve and latch circuit.

2. a. Operation of a pneumatic/hydraulic cylinder using AND logic control.
   b. Operation of a pneumatic/hydraulic cylinder using OR logic control.

3. a. On-delay timer control of pneumatic/hydraulic cylinder
   b. Off-delay timer control of pneumatic/hydraulic cylinder.

4. a. Automatic operation of Two Double Acting pneumatic cylinder in multi cycles Using proximities in the following sequence

   I. A+B+A-B-

   II. A-B+A+B-

   III. A+B+B-A-

   IV. A&B+A-B-

   b. Automatic operation of Two Double Acting pneumatic cylinder in multi cycles Using proximities in the following sequence

   I. A+B+A-B-

   II. A-B+A+B-

   III. A+B+B-A-

   IV. A&B+A-B-

EQUIPMENTS REQUIRED

Pneumatic

Basic trainer kit -2
Electro pneumatic trainer kit -1
PLC trainer kit -1

Hydraulic

Basic trainer kit -1

Electro hydraulic trainer kit -1

Pneumatic Trainer kit -1

Scheme of Valuation

Circuit Diagram	30 MARKS
Identifying the components	30 MARKS
Execution of Operation	10 MARKS
Viva voce	5 MARKS
TOTAL	75 MARKS

L-SCHEME

(Implements from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code: 1047
Subject code : **24757**
Semester : V Semester
Subject title : **CNC PRACTICAL**

Subject Title	Instruction		Examination			
	Hrs. Week	Hrs Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
CNC PRACTICAL	5	80	25	75	100	3Hrs

Introduction

1. Study of CNC Lathe, Milling
2. Study of international standards G-codes, M codes
3. Program writing – Turning simulator – Milling simulator, IS practice – commands – menus

Exercise Practice

CNC Lathe

1. Simulate and Produce a part for step turning.
2. Simulate and Produce a part for taper turning
3. Simulate and Produce a part for circular interpolation
4. Simulate and Produce a part for multiple turning operation
5. Simulate and Produce a part for thread cutting and grooving
6. Simulate and Produce a part for internal drills and boring

CNC Milling

1. Simulate and Produce a part for grooving
2. Simulate and Produce a part for drilling
3. Simulate and Produce a part for mirroring with subroutine
4. Simulate and Produce a part for rectangular and circular pocketing

EQUIPMENTS REQUIRED

CNC TURN - 2 Nos

CNC MILLER - 2 Nos

Scheme of Valuation

CNC PROGRAMME	30 MARKS
SIMULATION	10 MARKS
MACHINE SETTING AND OPERATION	30 MARKS
VIVA VOCE	5 MARKS
TOTAL	75 MARKS

VI SEMESTER

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code : 1020
Subject Code : 22061
Semester : VI
Subject Title : Industrial Engineering and Management

TEACHING AND SCHEME OF EXAMINATIONS:

No. of Weeks per Semester : 16 Weeks

Subject Title	Instructions		Examination			
	Hours/ Week	Hours/ Semester	Marks			Duration
Industrial Engineering and Management	5	80	Internal Assessment	Board Examination	Total	3 Hrs
			25	75	100	

Topics and Allocation of Hours:

Unit No	Topics	Hours
I	PLANT ENGINEERING AND PLANT SAFETY	15
II	WORK STUDY, METHOD STUDY AND WORK MEASUREMENT	15
III	PRODUCTION PLANNING AND QUALITY CONTROL	15
IV	PRINCIPLES OF MANAGEMENT AND PERSONNEL MANAGEMENT	15
V	FINANCIAL MANAGEMENT AND MATERIALS MANAGEMENT	15
	REVISION AND TEST	5
	Total	80

RATIONALE:

In the Indian Economy, Industries and enterprises always find prominent place. After globalization, the government of India has announced liberalization policy of starting an enterprise which resulted in the mushroom growth of industries. The present day students should be trained not only in manufacturing processes but also in managing activities of industries. Training must be imparted to students not only to shape them as technicians but also as good managers.

The knowledge about plant, safety, work study techniques, personnel management and financial management will definitely mould the students as managers to suit the industries. Due to the presence of such personalities the industries will leap for better prosperity and development.

OBJECTIVES:

- Explain the different types of layout and compare them.
- Appreciate the safety aspects and its impacts on an organization.
- Compare different productivity improvement technique.
- Explain different work measurement techniques.
- Estimate standard time for a job.
- Explain production planning and control and its functions.
- Study the role of PPC as a tool for cost control.
- Prepare process control charts.
- Explain the principles of management and function of management.
- Compare different organizational structure.
- Explain the selection and training of staff.
- Analyse inventory control system and the tools used in stock control.
- Explain the procurement and consumption cycle.

INDUSTRIAL ENGINEERING AND MANAGEMENT

DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I	**PLANT ENGINEERING AND PLANT SAFETY** **Plant Engineering :** Plant – Selection of site of industry – Plant layout – Principles of a good layout – types – process, product and fixed position – techniques to improve layout – Principles of material handling equipment – Plant maintenance – importance – Break down maintenance, preventive maintenance and scheduled maintenance. **Plant Safety:** Importance –accident-causes and cost of an accident-accident proneness-prevention of accidents-Industrial disputes-settlement of Industrial disputes-Collective bargaining, conciliation, Mediation, arbitration-Indian Factories Act 1948 and its provisions related to health, welfare and safety.	**15 Hrs**
II	**WORK STUDY, METHOD STUDY AND WORK MEASUREMENT** **Work Study:** Productivity – Standard of living – method of improving productivity – Objectives – Importance of good working conditions. Method Study: Definition – Objectives – Selection of a job for method study – Basic procedure for conduct of method study – Tools used – Operation process chart, Flow process chart, two handed process chart, Man machine chart, String diagram and flow diagram. **Work Measurement:** Definition – Basic procedure in making a time study – Employees rating factor – Application of time allowances – Rest, Personal, Process, Special and Policy allowances – Calculation of standard time – Problems – Basic concept of production study – Techniques of work measurement-Ratio delay study, Synthesis from standard data, analytical estimating and Pre determined Motion Time System (PMTS).	**15 Hrs**
III	**PRODUCTION PLANNING AND QUALITY CONTROL** **Production Planning and Control:** Introduction – Major functions of production planning and control – Pre planning – Methods of forecasting – Routing and scheduling – Dispatching and controlling – Concept of Critical Path Method (CPM)-Description only. Production – types-Mass production, batch production and job order production- Characteristics – Economic Batch Quantity (EBQ) – Principles of product and process planning – make or buy decision – problems. **Quality Control:** Definition – Objectives – Types of inspection – First piece, Floor and centralized inspection – Advantages and disadvantages. Quality control – Statistical quality control – Types of measurements – Method of variables – Method of attributes – Uses of X, R, p and c charts – Operating Characteristics curve (O.C curve) – Sampling inspection – single and double sampling plan – Concept of ISO 9001:2008 Quality Management System Registration / Certification procedure – Benefits of ISO to the organization.	**15 Hrs**

IV	**PRINCIPLES OF MANAGEMENT AND PERSONNEL MANAGEMENT** **Principles of Management:** Definition of management – Administration - Organization – F.W. Taylor's and Henry Fayol's Principles of Management – Functions of Manager – Types of Organization – Line, Staff, Taylor's Pure functional types – Line and staff and committee type – Directing – Leadership - Styles of Leadership – Qualities of a good leader – Motivation – Positive and negative motivation –Modern management techniques- Just In Time – Total Quality Management (TQM) – Quality circle – Zero defect concept – 5S Concept- Management Information Systems. **Personnel Management:** Responsibility of human resource management – Selection procedure – Training of workers – Apprentice training – On the job training and vestibule school training – Job evaluation and merit rating – objectives and importance – wages and salary administration – Components of wages – Wage fixation – Type of wage payment – Halsey's 50% plan, Rowan's plan and Emerson's efficiency plan – Problems.	**15 Hrs**
V	**FINANCIAL MANAGEMENT AND MATERIAL MANAGEMENT** **Financial Management:** Fixed and working capital – Resources of capital – shares preference and equity shares – debentures – Type of debentures – Public deposits, Factory costing – direct cost – indirect cost – Factory overhead – Selling price of a product – Profit – Problems. Depreciation – Causes – Methods - Straight line, sinking fund and percentage on diminishing value method – Problems. **Material management:** Objectives of good stock control system – ABC analysis of inventory – Procurement and consumption cycle – Minimum Stock, Lead Time, Reorder Level-Economic order quantity problems – supply chain management – Introduction – Purchasing procedure – Store keeping – Bin card.	**15 Hrs**

Text Books :

1) Industrial Engineering and Management, O.P. Khanna, Revised Edition Publications (P) Ltd – 2004, 67/4 Madras House, Daryaganj, New Delhi – 110002.
2) Engineering Economics and Management, T.R. Banga & S.C. Sharma, McGraw Hill Editiion. 2 – 2001, New Delhi.

Reference Books :

1) Management, A global perspective, Heinz Weihrich, Harold Koontz, 10th Edition, McGraw Hill International Edition 1994.
2) Essentials of Management, 4th Edition, Joseph L.Massie, Prentice-Hall of India, New Delhi 2004.

22061 INDUSTRIAL ENGINEERING AND MANAGEMENT

Model Question Paper – II

Time: 3 Hrs. **Max. Marks : 75**

PART– A
Marks 15 x 1= 15

Note : Answer any 15 Questions. All Questions carry equal marks.

1. What is a plant?
2. Define line layout.
3. What is meant by maintenance?
4. State any two provisions of safety.
5. Define method study.
6. State any two objectives of method study.
7. What is operation process chart?
8. What is PMTS?
9. What is PPC?
10. Define scheduling.
11. Explain first piece inspection.
12. What do you mean by producer's risk?
13. Define Administration.
14. Harmony and not discord – explain.
15. What is an organization chart?
16. Define motivation.
17. State the types of capital required.
18. List the sources of capital.
19. What is meant by prime cost?
20. Define depreciation.

PART – B

Marks 5 x 12 = 60

Answer all Questions **5x12=60**

21. a. What are the different types of plant layout? Explain any two with neat sketches. (12)

(OR)

b. State the important Provisions of Factories Act 1948 governing safety & health of workers. (12)

22. a. With a neat sketch. Explain man type flow process chart. (12)

(OR)

b. Write short notes on the following

(i) Ratio delay study (6)

(ii) Analytical estimation (6)

23. a.. What is forecasting? Explain the different techniques of forecasting. (12)

(OR)

b. Write short notes on

(i) Double sampling plan (6)

(ii) OC curve for a simple plan (6)

24. a. A Worker completes a job in 6 hrs. The allowed standard time for the job is 8 hrs. His wage Rate is Rs.5 per hour. Calculate the total earnings of the worker under the following Systems of payment

(i) Halsey's 50% plan (6)

(ii) Rowan's plan (6)

(OR)

b. State the principles of management as enumerated by Henry Fayol. Explain any eight of them (12)

25. a. Explain by means of a block diagram how the selling price of a product is determined. (12)

b. Explain how total cost of inventory can be efficiently controlled by "ABC Analysis" technique. (12)

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code: 1047
Subject code : **24762**
Semester : VI Semester
Subject title : **PROCESS CONTROL**

TEACHING AND SCHEME OF EXAMINATION:

No of Weeks/ Semester : 16 weeks

Subject Title	Instruction		Examination			
	Hrs. Week	Hrs Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
PROCESS CONTROL	6	96	25	75	100	3Hrs

TOPICS AND TIME ALLOCATION

UNIT	TOPICS	TIME (hrs)
I	SIMPLE PROCESS CONTROL SYSTEMS AND TERMINOLOGY	17
II	CONTROLLER PRINCIPLES	17
III	TUNING OF CONTROLLERS	16
IV	FINAL CONTROL ELEMENTS	17
V	COMPLEX CONTROL SYSTEMS	17
	REVISION/ TEST	12
	TOTAL	96

RATIONALE :

In Chemical Industries controllers are used in controlling temperature,pressure,level and other process variables.To get employment in Chemical Industries this subject will be helpful.

OBJECTIVES:

*Describe the difference between contolled variable ,manipulated variable& Load variable

* List the advantages of automatic process control system

* Explain the concepts of self regulation and transportation Lag.

* Concepts Reverse & direct action.

* Compare P,I,D, PI,PD,PID controller action.

* Concept of P\I and I\P converter.

*List the characteristics of control valve.

* Concept of cavitation & Flashing .

* Describe feed forward control system.

* List the advantages of FLC

24762 - PROCESS CONTROL

DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I	**SIMPLE PROCESS CONTROL SYSTEMS AND TERMINOLOGY** Definition – Process – Functional block diagram of an Automatic process control system – Set point – Measured variable – Comparator – Error – Controller – Final control element. Controlled variable – Manipulated variable – disturbances –Advantages of Automatic control system – Simple Liquid level control system – Flow control system – Temperature control system with transportation Lag – Self Regulation – Capacitance and Capacity –BIS symbols - PID Diagram	17
II	**CONTROLLER PRINCIPLES** Controller – Block diagram, Types, General properties – Reverse and Direct action, Controller modes – Discontinuous – On – Off Control with differential gap, without differential gap – Neutral zone– Continuous – Proportional controller – Proportional band (PB) – Effect of PB on a controller output – Offset –Integral control – PI – PD – PID – Definition, salient features, applications and limitations of the above controllers – Selection of control action – Electronic controllers – Error detector – Two position controller – P,I,D,PI,PD, PID controllers – pneumatic controllers – Flapper – Nozzle mechanism, Pneumatic relay.	17
III	**TUNING OF CONTROLLERS** Concept of tuning – Criteria for controller tuning – Quarter decay ratio, IAE, ISE, ITAE – Methods of tuning – Open loop response method – Process reaction curve – Closed loop response method – Ultimate cycle method, Damped oscillation method.	16
IV	**FINAL CONTROL ELEMENTS** Signal converters – P to I Converter, I to P Converter – Actuators – Electrical,Pneumatic, Hydraulic and Electro pneumatic – Valve Positioners – Control valve –Characteristics Quick opening, Linear, Equal percentage – Control valve sizing – Cv rating – Selection of a control valve – Effects of Cavitation and Flashing on control valve performance.	17

V	**COMPLEX CONTROL SYSTEMS** Cascade control systems, ratio control systems, feed forward control system, comparison of feedback control system and feed forward control system –(one specific application for each of the above systems) Introduction DCS Fuzzy Logic Control System –Block diagram and basic concepts concept of Artificial Neural Network- Introduction to Nano Technology	17

REFERENCE BOOKS

1. Donald P Eckman, Process control,Wiely Eastern limited,1991
2. Peter Hariot, Process control,TataMcgraw Hill.
3. B. SankaraGomathi, Process control (Principles and applications), J J Publications, 1981.
4. George Stephanopoulos, Chemical process control.
5. Michael P Lukas, Distributed control system (Their evaluation and design), Van Nostrand Reinhold Company Inc, 1986.
6. James A Freeman / David M Skapura, Neural networks, Pearson Education,Eighth reprint, 2003.
7. C.D.Johnson, Process control instrumentation Technology, Prentice Hall ofIndiaPvt, Ltd,
8. C.L. Smith , Digital computer process control.Douglas M. Considine, Process / Industrial Instruments Handbook, fourthedition,McGraw Hill, Inc.

PROCESS CONTROL

MODEL QUESTION PAPER - I

Note : Answer any 15 Questions. All Questions carry equal marks.

PART – A

1. Define Controller.
2. What is meant by Self-Regulation?
3. Define Capacitance.
4. Define transportation lag.
5. What are the types of controller?
6. Define Integral time.
7. What are the conditions used to determine the characteristics of closed loop system?
8. What is the use of Needle Valve in Pneumatic controller?
9. Define Tuning.
10. Expand ISE.
11. Define process reaction curve.
12. What is meant by Inflection Point?
13. What is a signal converter?
14. What are the two types of valve characteristics?
15. Define Minimum flow.
16. Define cv rating.
17. Give any two applications for ratio control system.
18. Mention the characteristics of NN.
19. Define Activation Value.
20. What are the interconnect technologies used for distributed control?

PART – B

Answer all questions choosing either A or B from each question.
Each question carries 12 marks.

21(a) Explain the Basic Elements of a Control System with suitable Functional Block Diagram.(12)

(OR)

(b) i) With neat diagram, explain the operation of Simple Liquid Level Control System.(8)

(ii) Mention the advantages of Automatic control system.(4)

22(a) Compare the control actions and Mention the conditions to select the control actions.(12)

(OR)

(b)Explain the operation of proportional controller with neat diagram.

.

23 (a) Explain the operation of Ziegler-Nicholas Method of controller tuning.(12)

(OR)

(b) Explain the operation of Damped Oscillation Method of controller tuning.(12)

24 (a) Explain the operation of Pneumatic and Solenoid Valve.(12)

(OR)

(b) Explain the operation of Motor Actuator.(12)

25 (a) What is meant by Cascade Control Action? Explain with suitable example.(12)

.(or)

(b)With neat diagram, explain Feed forward control system.(12)

PROCESS CONTROL

MODEL QUESTION PAPER - II

Note : Answer any 15 Questions. All Questions carry equal marks.

PART – A

1. Define Process.
2. Define Disturbance.
3. Define dead time.
4. Define capacity.
5. What is meant by Neutral Zone?
6. Define error .
7. Define offset.
8. Define Reset Rate.
9. What are the criteria for controller tuning?
10. Define Quarter Decay ratio.
11. Expand ITAE.
12. Give the mathematical equation for PID Mode in Damped Oscillation Method.
13. Define CV rating.
14. What is an actuator?
15. Mention two advantages of Piston actuator.
16. Define Turndown.
17. Give any two features of DCS.
18. Draw the block diagram for Cascade Control System.
19. Mention the characteristics of NN terminology.
20. Mention any two advantages of fuzzy logic.

PART – B

Answer all questions choosing either A or B from each question.
Each question carries 12 marks.

21.(a) Explain with a neat diagram a temperature control system with transposition lag.(12)

(or)

(b) With a neat diagram, explain a simple liquid level control system.(12).

22 .(a) Explain the flapper-nozzle system in pneumatic controller.(12)

(or).

(b) Explain the PID controller.Derive the equation. (12)

23. (a) Explain the Ultimate cycle method of controller tuning.(12)

(or)

(b) Explain the open loop response method of controller tuning.(12)

.

24.(a) Explain the operation of electric motor actuated control valve.(12)

(or)

(b) i) Explain the operation of spring actuator with valve positioner.(6)

(ii) Mention the factors to select the control valves & explain the effects of cavitation.(6)

25 (a) Explain the distributed control system with a neat diagram.(12)

(or)

(b) Explain the functional block diagram of fuzzy logic controller.(12)

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code: 1047
Subject code : **24763**
Semester : VI Semester
Subject title : **ROBOTICS AND AUTO ELECTRONICS**

TEACHING AND SCHEME OF EXAMINATION:

No of Weeks/ Semester : 16 weeks

Subject Title	Instruction		Examination			
	Hrs. Week	Hrs Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
ROBOTICS AND AUTOELECTRONICS	5	80	25	75	100	3Hrs

Topics and Time Allocation

UNIT	TOPICS	TIME (hrs)
I	BASIC CONFIGURATION OF ROBOTICS AND ITS WORKING	14
II	ROBOT CONTROLLER, SERVO SYSTEMS	14
III	ROBOT MOTION ANALYSIS AND VISION SYSTEM	14
IV	ROBOT PROGRAMMING	14
V	ROBOT APPLICATION IN MANUFACTURING AND AUTO ELECTRONICS	12
	REVISION/ TEST	12
	TOTAL	80

RATIONALE

Robot are used in many industries.The knowledge of robots will be considered as prerequisite in these industries . Now automation in vehicles is increasing , the knowledge becomes essential.

OBJECTIVES:

- To understand the basic configuration of Robotics.
- To understand the various types of Robotics.
- To understand the Robot Contoller.
- To understand Various servomotor.
- To understand the robot Kinematics.
- To understand the vision system.
- To understand the various Robot programming.
- To understand the application of robots in various industries.
- To understand the uses of various sensors and warning systems.

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24763 - ROBOTICS AND AUTO ELECTRONICS
DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I	**Basic Configuration of Robotics and its Working** Introduction – definition – basic configuration of robotics and its working – robot components – manipulator, end effectors, drive system, controller, sensors – mechanical arm – degrees of freedom – links and joints – construction of links, types of joint – classification of robots – Cartesian, cylindrical, spherical, horizontal articulated (SCARA), vertical articulated – structural characteristics of robots – work envelope and work volume - robot work volumes and comparison – wrist rotations – mechanical transmission, pulleys, belts, gears, harmonic drive – conversion between linear and rotary motion and its devices.	**14Hrs**
II	**Robot Controller, Servo Systems** Robot controller – level of controller – open loop and closed loop controller – servo systems –— robot path control – point to point – continuous path control – sensor based path control – controller programming – actuators – dc servo motors – stepper motors – hydraulic and pneumatic drives - feedback devices – potentiometers – optical encoders – dc tachometers.	**14 Hrs**
III	**Robot Motion Analysis and Vision System** Robot motion analysis – robot kinematics – robot dynamics - end effectors – grippers and tools - gripper design – mechanical gripper – vacuum gripper – magnetic grippers – sensors – transducers – tactile sensors – proximity sensors and range sensors – force and moment sensors and its applications and problems -photoelectric sensors – vision system – image processing and analysis – roboticapplications – robot operation aids – teach pendent – MDI and computer control.	**12 Hrs**
IV	**Robot Programming** Robot programming – lead through methods and textual robot languages – motion specification - motion interpolation - basic robot languages – generating of robot programming languages – On-Line & Off-Line programming - robot language structure – basic commands – artificial intelligence and robotics.	**14 Hrs**

V	**Robot Application in Manufacturing and Auto Electronics** Robot application in manufacturing – material handling –assembly finishing – adopting robots to work station - requisite and non – requisite robot characteristics –stages in selecting robot for individual application – precaution for robot –future of robotics. Sensors for fuel level in tank- Engine cooling water temperature sensor – engine oil pressure sensor – Speed sensor – Air pressure sensor – Engine oil temperature sensor – Oil pressure warning system – Engine over heat warning system – Air pressure warning system – Speed warning system – Door Lock Indicators.	**14 Hrs**

Reference Books:

1. Industrial Robotics – Technology – Programming and Applications - Mikell P. Groover, Mite chellweiss, Roger Negal and Nicholes G. Odress.
2. Robotics – An Introduction – Doughales – R. Halconnjr.
3. JUDGE. AW – Modern Electric Equipments for Automobile – Chapman & Hall London 1975
4. Walter E Billet & Leslie. F GOINGS – Automotive Electric Systems

24763 – Robotics and Auto Electronics

MODEL QUESTION PAPER - I

Time : 3 Hrs Max. Marks: 75

PART – A (15 x 1 = 15 Marks)

Answer any Fifteen Questions. Each question carries 1 mark.

1. Define the term 'Robot'.
2. State the Degree of freedom associated with Rist.
3. What is meant by work Envelope?
4. Define End effector.
5. What is meant by open loop control system?
6. What is on line Programming?
7. Give any two basic commands used in Robot.
8. What is meant by accuracy of Robot?
9. Define transducer.
10. What is SCARA?
11. Define motion interpolation.
12. State any two techniques in image Processing and analysis.
13. What is meant by Reverse Kinematics?
14. What is Lead through Programming?
15. Give any two Robot Programming Languages.
16. What is teach Pendant?
17. State one advantage of future Robots.
18. State the Purpose of Automated guided Vehicle.
19. Name one sensor for Air pressure warning system.
20. Give any two applications of sensor in Automobile.

PART – B (5 x 12 = 60 Marks)

Answer all questions choosing either A or B from each question. Each question carries 12 Marks

21. A) (i) Explain the basic configuration of robot with a neat sketch. [6]

(ii) Describe the Robot components. [6]

(OR)

B) (i) Explain the structural Characteristics of a Robots. [6]

(ii)Explain the types of links with a neat sketch. [6]

22. A) (i) Explain the types of drive system used in Robots. [6]

(ii) Describe the types of Electromagnetic Grippers. [6]

(OR)

B) (i) Illustrate the various types of stepper motors with its neat sketches. [6]

(ii)Explain the factors to be considered for selection and Design of Grippers. [6]

23. A) (i) Explain the machine vision applications in Robots. [6]

(ii) Explain the operation of ultrasonic sensor with a neat sketch. [6]

(OR)

B) (i) Describe the types of optical encoders with a neat sketches. [6]

(ii)Explain the various techniques in image processing and analysis. [6]

24. A) (i) Explain forward transformation of manipulator with two degrees of freedom. [6]

(ii) Explain the generations of Robot programming languages. [6]

(OR)

B) (i) Explain Reverse kinematics of manipulator with two degrees of freedom. [6]

(ii)Explain motion commends and sensor commands with an example. [6]

25. A) (i) Explain forward Requisite and Non Requisite robot characteristics . [6]

(ii) Explain the Robot applications in the field of machine tool loading and unloading operation. [6]

(OR)

B) (i) Explain various social consternation for implementing the Robots. [6]

(ii Explain the speed warning system in Automobile. [6]

24763 – Robotics and Auto Electronics

MODEL QUESTION PAPER - II

Time : 3 Hrs Max. Marks: 75

PART – A (15 x 1 = 15 Marks)

Answer any Fifteen Questions. Each question carries 1 mark.

1. Define degrees of freedom?
2. What is manipulator?
3. What is open loop controller?
4. What is an actuator?
5. Classify the sensor.
6. What is tactile sensor?
7. List any two commands used for robot Programming.
8. What is Gripper?
9. Define image processing.
10. What you mean by feedback?
11. Define on line programming.
12. Differentiation between speed sensor and temperature sensor.
13. Define pay load.
14. List the robot wrist characteristics.
15. List one device for linear to rotary motion conversion.
16. What is meant by interpolation?
17. List one advantage of on line programming.
18. State one advantage of future Robot.
19. Name one sensor for Air pressure warning system.
20. Give any two applications of sensor in Automobile.

PART – B (5 x 12 = 60 Marks)

Answer all questions choosing either A or B from each question. Each question carries 12 Marks

21. A) (i) Explain the open loop controller and closed loop controller. [6]

(ii) Draw the neat diagram of SCARA and list the advantages. [6]

(OR)

B) (i) Illustrate the Cartesian and spherical configurations of Robot. [8]

(ii) Describe the various Robot wrist rotations . [4]

22. A) (i) Explain the different feedback device used in Robots. [8]

(ii) Explain the working of potentiometer in Robot. [4]

(OR)

B) (i) Explain the working of DC Servo motor. [8]

(ii)Explain the working of stepper motor. [4]

23. A) (i) Explain the working of vacuum gripper. [8]

(ii) Write brief notes on Photo electric sensor. [4]

(OR)

B) (i) Explain the function of vision system [8]

(ii)Explain the feature of magnetic gripper. [4]

24. A) (i) Explain in detail about the lead through programming methods. [8]

(ii) Explain the Purpose of weight and signal commands. [4]

(OR)

B) (i) Discus about the characteristics of future Robot task. [8]

(ii)Explain the working of Engine oil temperature sensor. [4]

25. A) (i) Explain a speed warning system in automobiles . [8]

(ii) Draw the oil pressure sensor used in Automobile [4]

(OR)

B) (i) With neat diagram explain the working of fuel level sensor used in automobile. (8)

(ii Mention the request Robot Characteristics. [4]

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code: 1047
Subject code : **24764**
Semester : VI Semester
Subject title : **PROCESS CONTROL PRACTICAL**

Subject Title	Instructions		Examination			
	Hours/ Week	Hours/ Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
PROCESS CONTROL PRACTICAL	5	80	25	75	100	3 Hrs

1. Transient response of thermocouple
2. Effect of Capacity
3. On- off control of temperature process
4. On – off control of pressure process
5. On off control of level process
6. Differential output of a thermocouple
7. Measurement of temperature using RTD
8. Measurement of temperature using thermistor
9. Characteristics of control valve
10. Measurement of Pressure
11. Response of PID controller
12. Measurement of displacement using LVDT

EQUIPMENTS REQUIRED

1. ON – OFF LEVEL PROCESS
2. ON – OFF PRESSURE PROCESS
3. ON – OFF TEMPERATURE PROCESS
4. LVDT TRAINER MODULE
5. RTD TRAINER MODULE
6. PID CONTROLLER
7. THEMISTOR TRAINER MODULE
8. CONTROL VALVE TRAINER KIT
9. THERMOCOUPLE – 3 Nos

Block/Circuit diagram – 20 marks

Connections – 20 marks

Reading & Graph – 20 marks

Result – 10 marks

Viva voce – 5 marks

Total – 75 marks

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code: 1047
Subject code : **24765**
Semester : VI Semester
Subject title : **ROBOTICS AND AUTO ELECTRONICS PRACTICAL**

Subject Title	Instructions		Examination			
	Hours/ Week	Hours/ Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
ROBOTICS AND AUTO ELECTRONICS PRACTICAL	5	80	25	75	100	3 Hrs

1. Robot system connection and component recognition
2. Robot operation, moving the various axes continuous and intermittent motion.
3. Writing programs off-line
    a. Homing operation
    b. Recording positions
4. Writing programs for pick and place at least five programs
5. Writing programs using loops.
6. Programs using XYZ Coordinates.
7. Teaching positions via XYZ co-ordinates
8. Measurement of Robot characteristics
    a. Measurement of Robot work envelope
    b. Measurement of Robot of motion
    c. Measurement of Repeatability
9. Study of Vision system in Robot
10. Practicals connected with various Transducers
11. Practicals connected with Photo sensor
12. Practicals connected with proximity switch
13. Study of computer controlled wheel alignment
14. Study of computer controlled engine performance

EQUIPMENTS REQUIRED

SIX AXES ROBOT SYSTEM

ROBOT SIMULATION SOFTWARE (TEN USER)

PHOTOSENSOR TRAINER KIT

PROXIMITY SWITCH TRAINER KIT

ANY TWO TRANSDUCER TRAINER KIT(PHOTOSENSOR ,PROXIMITY SWITCH TRAINER KIT)

Scheme of Valuation

ALGORITHM/CIRCUIT DIAGRAM	15 MARKS
FLOW CHART/CIRCUIT CONNECTION	15 MARKS
PROGRAM/PROCEDURE	30 MARKS
OBSERVATION/OUTPUT	10 MARKS
VIVA VOCE	5 MARKS
TOTAL	75 MARKS

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : DIPLOMA IN ELECTRONICS(ROBOTICS)ENGINEERING/MECHATRONICS
Course Code: 1047
Subject code : **24766**
Semester : VI Semester
Subject title : **CAD PRACTICAL**

Subject Title	Instructions		Examination			
	Hours/ Week	Hours/ Semester	Marks			Duration
CAD PRACTICAL	5	80	Internal Assessment	Board Examination	Total	3 Hrs
			25	75	100	

Sl.no	Topics
1	Introduction
2	Sectional views, Limits, fits and tolerances
3	Keys and surface finish
4	Screw threads and threaded fasteners
5	Draw Group commands, Osnap options, Drafting setting and Function keys
6	Commands Practice
7	Edit and Modify Group commands, Pedit, Text edit
8	Commands Practice
9	View groups, Inquiry, Block commands
10	Commands Practice
11	Hatching, Layer, color and line types
12	Commands Practice
13	Technical drawing with AutoCAD, Creating Isometric Drawing Ex. Practice

14 Detailed drawing, sectional views Practice

15 Isometric Drawing Ex. Practice

16 File commands, Plotting, External reference

17 Drawing Ex. Practice (Machine & Assembly drawings in 2D only)

i) Sleeve and cotter joint

ii) Spigot and socket joint

iii) Knukle joint

iv) Protected type flange coupling

v) Universal coupling

vi) Swivel Bearing

vii) Simple Eccentric

18 3D Fundamentals

19 Predefined 3D objects ,Creating surfaces , 3D solid primitives, Working with UCS-3D coordinate system

20. Solid Rendering

21. 3D solid modeling practice

i) Geneva Mechanism

ii) Cast iron block

iii) Bushed bearing

iv) Bearing block

v) Screw jack

EQUIPMENTS REQUIRED

COMPUTER - 15 Nos

Scheme of Valuation

ASSEMBLY DRAWING	30 MARKS
3D/SOLID MODEL	30 MARKS
ISOMETRIC DRAWING	10 MARKS
VIVA VOCE	5 MARKS
TOTAL	75 MARKS

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name: DIPLOMA IN ELECTRONICS (ROBOTICS) ENGINEERING/MECHATRONICS
Course Code : 1047
Subject Code: 24767
Semester : VI
Subject Title: **PROJECT WORK**

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TEACHING AND SCHEME OF EXAMINATIONS:

No. of Weeks per Semester : 16 Weeks

Subject	Instruction		Examination		
	Hours/ Week	Hours/ Semester	Assessment Marks		
			Internal	Board Exam	Total
PROJECT WORK	4	64	25	75	100

Minimum Marks for Pass is 50 out of which minimum 35 marks should be obtained out of 75 marks in the board Examination alone.

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
- Get exposure on industrial environment and its work ethics.
- Understand what entrepreneurship is and how to become an entrepreneur.
- 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.
- Understand the facts and importance of environmental management.

Understand and gain knowledge about disaster management

INTERNAL ASSESSMENT:

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

Detail of assessment	Period of assessment	Max. Marks
First Review	6th week	10
Second Review	14th week	10
Attendance	Entire semester	5
Total		**25**

EVALUATION FOR BOARD EXAMINATION:

Details of Mark allocation	Max Marks
Marks for Report Preparation, Demo, Viva-voce	45
Marks for answers of 15 questions which is to be set by the external examiner from the given question bank consisting of questions in the following three topics Entrepreneurship, Disaster Management and Environmental Management. Out of fifteen questions five questions to appear from each of the above topics i.e. 5 questions x 3 topics = 15 questions 15 questions x 2marks = 30 Marks	30
Total	**75**

DETAILED SYLLABUS

ENTREPRENEURSHIP, ENVIRONMENTAL & DISASTER MANAGEMENT

1. ENTREPRENEURSHIP

1.1 Introduction – Entrepreneur - characteristics of Entrepreneur - contributions of an Entrepreneur - functions of entrepreneur - Barriers to entrepreneurship - Roll of government in Entrepreneurial development.

1.2 Small scale industries (SSI) - SSI role in country's economic growth – importance of SSI - starting of an SSI - Government organization and Non-governmental organizations supporting SSI - DIC,NSIC,SIDO,KVIC, Development banks and their objectives - role of commercial banks in assisting SSI - Women entrepreneurs and opportunities – Subsidy and concessions to Small Scale Industries.

2. ENVIRONMENTAL MANAGEMENT

2.1 Introduction – Environmental Ethics – Assessment of Socio Economic Impact – Environmental Audit – Mitigation of adverse impact on Environment – Importance of Pollution Control – Types of Industries and Industrial Pollution.

2.2 Solid waste management – Characteristics of Industrial wastes – Methods of Collection, transfer and disposal of solid wastes – Converting waste to energy – Hazardous waste management Treatment technologies.

2.3 Waste water management – Characteristics of Industrial effluents – Treatment and disposal methods – Pollution of water sources and effects on human health.

2.4 Air pollution management – Sources and effects – Dispersion of air pollutants – Air pollution control methods – Air quality management.

2.5 Noise pollution management – Effects of noise on people – Noise control methods.

3. DISASTER MANAGEMENT

3.1 Introduction – Disasters due to natural calamities such as Earthquake, Rain, Flood, Hurricane, Cyclones etc – Man made Disasters – Crisis due to fires, accidents, strikes etc – Loss of property and life..

3.2 Disaster Mitigation measures – Causes for major disasters – Risk Identification – Hazard Zones – Selection of sites for Industries and residential buildings – Minimum distances from Sea – Orientation of Buildings – Stability of Structures – Fire escapes in buildings - Cyclone shelters – Warning systems.

3.3 Disaster Management – Preparedness, Response, Recovery – Arrangements to be made in the industries / factories and buildings – Mobilization of Emergency Services - Search and Rescue operations – First Aids – Transportation of affected people – Hospital facilities – Fire fighting arrangements – Communication systems – Restoration of Power supply – Getting assistance of neighbors / Other organizations in Recovery and Rebuilding works – Financial commitments – Compensations to be paid – Insurances – Rehabilitation.

LIST OF QUESTIONS

1. ENTREPRENEURSHIP

1. Define the term Entrepreneur.
2. What is Entrepreneurship? Explain.
3. List the various stages of decisions an entrepreneur has to make before reaching the goal of his project.
4. What is innovation?
5. State briefly the role of an entrepreneur in the economic growth of a country.
6. List the characteristics of an Entrepreneur.
7. What are the critical elements of an Entrepreneur?
8. State the major functions of an Entrepreneur.
9. What are barriers to Entrepreneurship?
10. Define Small Scale Industry.
11. What are the qualities of Entrepreneur?
12. What are the benefits of Entrepreneur?
13. What are the various SSI that can flourish in your district?
14. Identify the infrastructural needs for an industry.
15. What are the various agencies involved in the establishment and development of various SSI?
16. Name some of the agencies funding SSI.
17. Explain the roles played by Government in Entrepreneural development.
18. What are the various concessions and incentives available for a SSI.

19. Name some consumer products with wide demand that can be manufactured by a SSI?
20. What is feasibility study?
21. What is the importance of SSI?
22. What is DIC? State its functions.
23. What is NSIC? State its functions.
24. What is SIDO? State its functions.
25. Name the Development Banks in India working towards Entrepreneurial development.
26. State the role of commercial bank in assisting SSI sector.
27. What are the different phases of Entrepreneurial Development programme?
28. What is an Industrial Estate?
29. What are the facilities available in an Industrial Estate?
30. Identify the various training agencies associated with SSI.
31. List the governmental agencies from whom you shall get financial assistance for a SSI.
32. What is KVIC? State its objectives.
33. Name some state finance corporations.
34. What are the steps involved in preparing a feasibility report?
35. What are the factors to be considered regarding raw materials for a SSI?
36. What are the features of a SSI?
37. What are the advantages of becoming an Entrepreneur?
38. Name the Organizations offering assistance for the development of Women entrepreneurs.
39. State the business opportunities for Women entrepreneurs.
40. State the different subsidies given to SSI's.

2. ENVIRONMENTRAL MANAGEMENT

1. What is the responsibility of an Engineer-in-charge of an Industry with respect to Public Health?
2. Define Environmental Ethic.
3. How Industries play their role in polluting the environment?
4. What is the necessity of pollution control? What are all the different organizations you know, which deal with pollution control?
5. List out the different types of pollutions caused by a Chemical / Textile / Leather / Automobile / Cement factory.
6. What is meant by Hazardous waste?
7. Define Industrial waste management.

8. Differentiate between garbage, rubbish, refuse and trash based on their composition and source.
9. Explain briefly how the quantity of solid waste generated in an industry could be reduced.
10. What are the objectives of treatments of solid wastes before disposal?
11. What are the different methods of disposal of solid wastes?
12. Explain how the principle of recycling could be applied in the process of waste minimization.
13. Define the term 'Environmental Waste Audit'.
14. List and discuss the factors pertinent to the selection of landfill site.
15. Explain the purpose of daily cover in a sanitary landfill and state the minimum desirable depth of daily cover.
16. Describe any two methods of converting waste into energy.
17. What actions, a local body such as a municipality could take when the agency appointed for collecting and disposing the solid wastes fails to do the work continuously for number of days?
18. Write a note on Characteristics of hazardous waste.
19. What is the difference between municipal and industrial effluent ?
20. List few of the undesirable parameters / pollutants anticipated in the effluents from oil refinery industry / thermal power plants / textile industries / woolen mills / dye industries / electroplating industries / cement plants / leather industries (any two may be asked)
21. Explain briefly the process of Equalization and Neutralization of waste water of varying characteristics discharged from an Industry.
22. Explain briefly the Physical treatments "Sedimentation" and "Floatation" processes in the waste water treatment.
23. Explain briefly when and how chemical / biological treatments are given to the waste water.
24. List the four common advanced waste water treatment processes and the pollutants they remove.
25. Describe refractory organics and the method used to remove them from the effluent.
26. Explain biological nitrification and de-nitrification.
27. Describe the basic approaches to land treatment of Industrial Effluent.
28. Describe the locations for the ultimate disposal of sludge and the treatment steps needed prior to ultimate disposal.
29. List any five Industries, which act as the major sources for Hazardous Air Pollutants.
30. List out the names of any three hazardous air pollutants and their effects on human health.
31. Explain the influence of moisture, temperature and sunlight on the severity of air pollution effects on materials.
32. Differentiate between acute and chronic health effects from Air pollution.
33. Define the term Acid rain and explain how it occurs.
34. Discuss briefly the causes for global warming and its consequences

35. Suggest suitable Air pollution control devices for a few pollutants and sources.
36. Explain how evaporative emissions and exhaust emissions are commonly controlled.
37. What are the harmful elements present in the automobile smokes? How their presence could be controlled?
38. What is the Advantage of Ozone layer in the atmosphere? State few reasons for its destruction.
39. Explain the mechanism by which hearing damage occurs.
40. List any five effects of noise other than hearing damage.
41. Explain why impulsive noise is more dangerous than steady state noise.
42. Explain briefly the Source – Path – Receiver concept of Noise control.
43. Where silencers or mufflers are used ? Explain how they reduce the noise.
44. Describe two techniques to protect the receiver from hearing loss when design / redress for noise control fail.
45. What are the problems faced by the people residing along the side of a railway track and near to an Airport? What provisions could be made in their houses to reduce the problem?

3. DISASTER MANAGEMENT

1. What is meant by Disaster Management? What are the different stages of Disaster management?
2. Differentiate Natural Disasters and Man made Disasters with examples.
3. Describe the necessity of Risk identification and Assessment Surveys while planning a project.
4. What is Disasters recovery and what does it mean to an Industry?
5. What are the factors to be considered while planning the rebuilding works after a major disaster due to flood / cyclone / earthquake? (Any one may be asked)
6. List out the public emergency services available in the state, which could be approached for help during a natural disaster.
7. Specify the role played by an Engineer in the process of Disaster management.
8. What is the cause for Earthquakes? How they are measured? Which parts of India are more vulnerable for frequent earthquakes?
9. What was the cause for the Tsunami 2004 which inflicted heavy loss to life and property along the coast of Tamilnadu ? Specify its epicenter and magnitude.
10. Specify the Earthquake Hazard Zones in which the following towns of Tamilnadu lie: (a) Chennai (b) Nagapattinam (c) Coimbatore (d) Madurai (e) Salem.
11. Which parts of India are experiencing frequent natural calamities such as (a) heavy rain fall (b) huge losses due to floods (c) severe cyclones

12. Define basic wind speed. What will be the peak wind speed in (a) Very high damage risk zone – A, (b) High damage risk zone, (c) Low damage risk zone.
13. Specify the minimum distance from the Sea shore and minimum height above the mean sea level, desirable for the location of buildings.
14. Explain how the topography of the site plays a role in the disasters caused by floods and cyclones.
15. Explain how the shape and orientation of buildings could reduce the damages due to cyclones.
16. What is a cyclone shelter ? When and where it is provided ? What are its requirements ?
17. What Precautionary measures have to be taken by the authorities before opening a dam for discharging the excess water into a canal/river ?
18. What are the causes for fire accidents ? Specify the remedial measures to be taken in buildings to avoid fire accidents.
19. What is a fire escape in multistoried buildings ? What are its requirements ?
20. How the imamates of a multistory building are to be evacuted in the event of a fire/Chemical spill/Toxic Air Situation/ Terrorist attack, (any one may be asked).
21. Describe different fire fighting arrangements to be provided in an Industry.
22. Explain the necessity of disaster warning systems in Industries.
23. Explain how rescue operations have to be carried out in the case of collapse of buildings due to earthquake / blast / Cyclone / flood.
24. What are the necessary steps to be taken to avoid dangerous epidemics after a flood disaster?
25. What relief works that have to be carried out to save the lives of workers when the factory area is suddenly affected by a dangerous gas leak / sudden flooding ?
26. What are the difficulties faced by an Industry when there is a sudden power failure? How such a situation could be managed?
27. What are the difficulties faced by the Management when there is a group clash between the workers? How such a situation could be managed?
28. What will be the problems faced by the management of an Industry when a worker dies because of the failure of a mechanical device due to poor maintenance? How to manage such a situation ?
29. What precautionary measures have to be taken to avoid accidents to labourers in the Industry in a workshop / during handling of dangerous Chemicals / during construction of buildings / during the building maintenance works.
30. Explain the necessity of medical care facilities in an Industry / Project site.
31. Explain the necessity of proper training to the employees of Industries dealing with hazardous products, to act during disasters.
32. What type of disaster is expected in coal mines, cotton mills, Oil refineries, ship yards and gas plants?

33. What is meant by Emergency Plan Rehearsal? What are the advantages of such Rehearsals?
34. What action you will take when your employees could not reach the factory site because of continuous strike by Public Transport workers?
35. What immediate actions you will initiate when the quarters of your factory workers are suddenly flooded due to the breach in a nearly lake / dam, during heavy rain?
36. What steps you will take to avoid a break down when the workers union of your Industry have given a strike notice?
37. List out few possible crisis in an organization caused by its workers? What could be the part of the middle level officials in managing such crisis?
38. What types of warning systems are available to alert the people in the case of predicted disasters, such as floods, cyclone etc.
39. Explain the necessity of Team work in the crisis management in an Industry / Local body.
40. What factors are to be considered while fixing compensation to the workers in the case of severe accidents causing disability / death to them?
41. Explain the legal / financial problems the management has to face if safely measures taken by them are found to be in adequate.
42. Describe the importance of insurance to men and machinery of an Industry dealing with dangerous jobs.
43. What precautions have to be taken while storing explosives in a match/ fire crackers factory?
44. What are the arrangements required for emergency rescue works in the case of Atomic Power Plants?
45. Why residential quarters are not constructed nearer to Atomic Power Plants?

SANDWICH DIPLOMA COURSE-INDUSTRIAL TRAINING

24791 Industrial Training I (Report writing & Viva Voce)

24792 Industrial Training II (Report writing & Viva Voce)

1. Introduction

The main objective of the sandwich Diploma course is to mould a well rounded technician acclimated with industrial environment while being a student in the institution.

The Sandwich Diploma Course study is pursued by students, in 7 Semesters of 3 ½ years duration, the subjects of 3years-Full Time Diploma Course being regrouped for academic convenience.

While in the 4th semester students under Industrial Training for 6 months(December through May). They also do course work in the institution for one day in a week, While in the 7th semester they undergo another spell of 6 months (June through November) Industrial training.

The Apprenticeship (Amendment) Act 1973 is followed in regulating the Industrial training procedure for Sandwich Course.

I SEM	II SEM	III SEM	IV SEM	V SEM	VI SEM	VII SEM

Institutional Study

Industrial Training

2. Attendance Certification

Every month students have to get their attendance certified by industrial supervisor in the prescribed form supplied to them. Students have also to put their signature on the form and submit it to the institution supervisor. Regularity in attendance and submission of report will be duly considered while awarding the Internal Assessment mark.

3. Training Reports

The students have to prepare two types of reports:

- Weekly report in the form of diary to be submitted to the concerned staff in-charge of the institution. This will be reviewed while awarding Internal Assessment marks.
- Comprehensive report at the end of each spell which will be used for Board Examination.

3.1 Industrial Training Diary

Students are required to maintain the record of day-to-day work done. Such record is called Industrial training Diary. Students have to write this report regularly. All days for the week should be

accounted for clearly giving attendance particulars (Presence, absence, Leave, Holidays etc). The concern Industrial supervisor is to check periodically these progress reports.

3.2 Comprehensive Training Report

In addition to the diary, students are required to submit a comprehensive report on training with details of the organisation where the training was undergone after attestation by the supervisors. The comprehensive report should be incorporating study of plant/product/process/construction along with intensive in-depth study on any one of the topics such as processes, methods, tooling, construction and equipment, highlighting aspects of quality, productivity and system. The comprehensive report should be completed in the last week of Industrial training. Any data, drawings etc should be incorporated with the consent of the Organisation.

a. Scheme of Evaluation

1.1 Internal Assessment Marks

First Review (during 3rd month)	: 10 marks
Second Review (during 5th month)	: 10 marks
Attendance *	: 05 marks (Awarded same as in Theory)
Total	: 25 marks

1.2 Board Examination

Presentation about Industrial Training	: 20 marks
Comprehensive Training Report	: 30 marks
Viva-voce	: 25 marks
Total	: 75 marks

*** For awarding marks to attendance, the Industrial Training attendance has to be considered.**

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