

**STUDY  
and  
EVALUATION SCHEME**

**MASTER OF ENGINEERING  
IN  
ELECTRICAL ENGINEERING  
(INSTRUMENTATION & CONTROL)**

**MODULAR PROGRAMME**

**(2024 – 2027)**



***ELECTRICAL ENGINEERING DEPARTMENT***  
**NATIONAL INSTITUTE OF TECHNICAL TEACHERS TRAINING &  
RESEARCH**

**(Deemed to be University under Distinct Category)**

**CHANDIGARH**

**June 2024**

# STUDY & EVALUATION SCHEME

SESSION 2024-27

**M.E. ELECTRICAL ENGINEERING (INSTRUMENTATION & CONTROL)**

**PROGRAM CODE:NC24S0621M**

**MODULAR PROGRAMME (Total Hours = 1800)**

SUBJECT CODE.	SUBJECT	SCHEDULE OF TEACHING (per 7-days week)			CREDITS	MARKS		
		L	P	TOTAL		Internal Assessment	End Semester Examination	TOTAL
SPELL - I								
As per subject chosen	Program Core – I	12	-	12	4	50	50	100
As per subject chosen	Program Elective – I	9	-	9	3	50	50	100
As per subject chosen	Program Elective – II	9	-	9	3	50	50	100
#OCA		-	-	12	-	-	-	-
TOTAL				42	10	150	150	300
# Out of Class Activities (OCA): Preparing Assignments, Seminar preparation, PPT preparation, Literature Survey, Exploring Internet etc.								
SPELL - II								
As per subject chosen	Program Core – II	12	-	12	4	50	50	100
As per subject chosen	Program Elective – III	9	-	9	3	50	50	100
062171	Research Seminar – I	-	6	6	1	50	-	50
#OCA		-	-	15	-	-	-	-
TOTAL				42	8	150	100	250
SPELL - III								
As per subject chosen	Program Core – III	12	-	12	4	50	50	100
As per subject chosen	Program Elective – IV	9	-	9	3	50	50	100
	Lab – I	-	18	18	3	50	-	50
#OCA		-	-	3	-	-	-	-
TOTAL				42	10	150	100	250
SPELL - IV								
As per subject chosen	Program Core – IV	12	-	12	4	50	50	100
As per subject chosen	Program Core – V	12	-	12	4	50	50	100
062172	Research Seminar – II	-	6	6	1	50	-	50
#OCA		-	-	12	-	-	-	-
TOTAL				42	9	150	100	250

SUBJECT CODE	SUBJECT	SCHEDULE OF TEACHING (per 7-days week)			CREDITS	MARKS		
		L	P	TOTAL		Internal Assessment	End Semester Examination	TOTAL
SPELL - V								
As per subject chosen	OEC/SEC/AEC - I	9	-	9	3	50	50	100
As per subject chosen	OEC/SEC/AEC - II	9	-	9	3	50	50	100
062162	Lab – II	-	18	18	3	50	-	50
#OCA		-	-	6	-	-	-	-
TOTAL				42	9	150	100	250
SPELL - VI								
052071	Research Methodology	12	-	12	3	50	50	100
062163	Preliminary Thesis	-	45	45	10	-	-	-
#OCA		-	-	6	-	-	-	-
TOTAL				60	13	50	50	100
SPELL - VII								
062164	Thesis	-	60	60	20	100*	100	200**
#OCA		-	-	30	-	-	-	-
TOTAL				90	20	100	100	200
	* Internal assessment is based on the following criterion:							
	Gra de	Condition						
	A+	Publication from Thesis in SCI / SCIE indexed journal						
	A	Publication from Thesis in Scopus / ESCI indexed journal						
	B+	Publication from Thesis in UGC Care journal <b>OR</b> Scopus indexed conference proceedings						
	B	Publication from Thesis in International Conference						
	C+	Publication from Thesis in National Conference						
	** Final Grade will be average of the grades of internal assessment and university viva-voce examination							

## **PROGRAM TOTAL CREDITS = 80**

- NOTES:**
1. Requirement for the award of **ME Electrical Engineering (Instrumentation & Control) degree** is 80 credits with minimum CGPA of 6.0
  2. **Post-Graduate Diploma in Electrical Engineering (Instrumentation & Control)** will be awarded to those who exit after successful completion of Spell V (MINIMUM 40 CREDITS)
  3. The students will study a minimum of 2 and a maximum of 5 SWAYAM/NPTEL courses during the program subject to the selected SWAYAM-NPTEL course meeting the credit requirement of the program. For SWAYAM-NPTEL courses the students will take the NPTEL exam and submit the certificate for credit transfer.

## **COURSE BASKETS**

### **SPELL-I**

**One PROGRAM CORE COURSE (PCC) from the following list to be studied in the first spell**

<b>SUBJECT CODE</b>	<b>SUBJECT NAME</b>	<b>CREDITS</b>
062101	Digital Signal Processing	4
062102	Energy Management	4
062103	IoT Enabled Industrial Automation	4
062104	Smart Grid: Basics to Advanced Technologies	4
062105	Opto-Electronic Instrumentation	4

**Two PROGRAM ELECTIVE COURSES (PEC) from the following list to be studied in the first spell**

<b>SUBJECT CODE</b>	<b>SUBJECT NAME</b>	<b>CREDITS</b>
062121	Process Dynamics and Control	3
062122	Advanced Control Theory	3
062123	PLC and Micro controller	3
062124	State Space Approach to Control System Analysis and Design	3
062125	Instrumentation for Environmental Engineering	3
062126	Virtual Instrumentation	3
062127	Bio-Medical Instrumentation and Sensors	3
062128	Introduction to Electric Vehicles and Hybrid Electric Vehicles	3
062129	Power Electronics	3
062130	Power Quality	3
062131	Power System Analysis	3
062132	Energy Regulation and Pricing	3
062133	Measurement Sciences and Techniques	3
062134	Soft Computing Techniques	3
062135	Sensors and Actuators	3
	Any other relevant course available on SWAYAM/NPTEL	3

### **SPELL-II**

**One PROGRAM CORE COURSE (PCC) from the following list to be studied in the second spell**

<b>SUBJECT CODE</b>	<b>SUBJECT NAME</b>	<b>CREDITS</b>
062101	Digital Signal Processing	4
062102	Energy Management	4
062103	IoT Enabled Industrial Automation	4
062104	Smart Grid: Basics to Advanced Technologies	4
062105	Opto-Electronic Instrumentation	4

**One PROGRAM ELECTIVE COURSE (PEC) from the following list to be studied in the second spell**

<b>SUBJECT CODE</b>	<b>SUBJECT NAME</b>	<b>CREDITS</b>
062121	Process Dynamics and Control	3
062122	Advanced Control Theory	3
062123	PLC and Micro controller	3
062124	State Space Approach to Control System Analysis and Design	3
062125	Instrumentation for Environmental Engineering	3
062126	Virtual Instrumentation	3
062127	Bio-Medical Instrumentation and Sensors	3
062128	Introduction to Electric Vehicles and Hybrid Electric Vehicles	3
062129	Power Electronics	3
062130	Power Quality	3
062131	Power System Analysis	3
062132	Energy Regulation and Pricing	3
062133	Measurement Sciences and Techniques	3
062134	Soft Computing Techniques	3
062135	Sensors and Actuators	3
	Any other relevant course available on SWAYAM/NPTEL	3

### **SPELL-III**

**One PROGRAM CORE COURSE (PCC) from the following list to be studied in the third spell**

SUBJECT CODE	SUBJECT NAME	CREDITS
062101	Digital Signal Processing	4
062102	Energy Management	4
062103	IoT Enabled Industrial Automation	4
062104	Smart Grid: Basics to Advanced Technologies	4
062105	Opto-Electronic Instrumentation	4

**One PROGRAM ELECTIVE COURSE (PEC) from the following list to be studied in the third spell**

SUBJECT CODE	SUBJECT NAME	CREDITS
062121	Process Dynamics and Control	3
062122	Advanced Control Theory	3
062123	PLC and Micro controller	3
062124	State Space Approach to Control System Analysis and Design	3
062125	Instrumentation for Environmental Engineering	3
062126	Virtual Instrumentation	3
062127	Bio-Medical Instrumentation and Sensors	3
062128	Introduction to Electric Vehicles and Hybrid Electric Vehicles	3
062129	Power Electronics	3
062130	Power Quality	3
062131	Power System Analysis	3
062132	Energy Regulation and Pricing	3
062133	Measurement Sciences and Techniques	3
062134	Soft Computing Techniques	3
062135	Sensors and Actuators	3
	Any other relevant course available on SWAYAM/NPTEL	3

#### **SPELL – IV**

**Two PROGRAM CORE COURSES (PCC) from the following list to be studied in the fourth spell**

SUBJECT CODE	SUBJECT NAME	CREDITS
062101	Digital Signal Processing	4
062102	Energy Management	4
062103	IoT Enabled Industrial Automation	4
062104	Smart Grid: Basics to Advanced Technologies	4
062105	Opto-Electronic Instrumentation	4

### **SPELL – V**

**A total of Two Courses from the following lists of OEC, SEC & AEC to be studied in the fifth spell.**

#### **OPEN ELECTIVE COURSES (OEC)\***

SUBJECT CODE	SUBJECT	CREDITS
102141	A Primer to Mathematical Optimization	3
102142	Optimization Theory and Algorithms	3
102143	Problem Solving Through Programming in C	3
102144	Programming in Modern C++	3
102145	Introduction to Machine Learning	3
102146	Cloud Computing	3
102147	Introduction to Industry 4.0 and Industrial Internet of Things	3

#### **SKILL ENHANCEMENT COURSES (SEC)\***

SUBJECT CODE	SUBJECT	CREDITS
102165	Entrepreneurship	3
102166	Understanding Incubation and Entrepreneurship	3
102167	Patent Law for Engineers and Scientists	3
102168	Advanced Contracts, Tendering and Public Procurement	3
102169	Science Communication: Research Productivity and Data Analytics using Open-Source Software	3

#### **ABILITY ENHANCEMENT COURSES (AEC)\***

SUBJECT CODE	SUBJECT	CREDITS
102181	Environmental Science	3
102182	Soft Skills	3

**\* Any other relevant course in addition to the above listed OEC, SEC and AEC courses may be added from time to time**