

Chhattisgarh Swami Vivekanand Technical University, Bhilai, CG

SCHEME OF TEACHING AND EXAMINATION

M. Tech. Electronics & Telecommunication Engineering (Instrumentation & Control)**III Semester**

S. No.	Board of Studies	CODE	SUBJECT	Periods per week			Scheme of Exam Theory/Practical			GRAND TOTAL	Credit L+(T+P)/2
				L	T	P	ESE	TA	CT		
1	Electronics & Telecomm.	552311(28)	Adaptive Control Systems	3	1	-	100	20	20	140	4
2	Electronics & Telecomm.	Refer Below Elective -III		3	1	-	100	20	20	140	4
3	Electronics & Telecomm.	552321(28)	Preliminary Work on Dissertation	-	-	28	100	100	-	200	14
4	Electronics & Telecomm.	552322(28)	Seminar on Industrial Training & Dissertation	-	-	3	-	20	-	20	2
TOTAL				6	2	31	300	160	40	500	24

L – Lecture, T – Tutorial, P – Practical, ESE- End Semester Exam , CT- Class Test TA – Teacher’s Assessment

Table - III			
Elective – III			
S.No.	Board of Studies	Code	Subject
1	Electronics & Telecomm.	552331(28)	Analytical Instrumentation
2	Electronics & Telecomm.	552332 (28)	Real Time Systems
3	Electronics & Telecomm.	552333(28)	Programmable Logic Controllers

Note (1) – 1/4th of total strength of students subject to minimum of twenty students is required to offer an elective in the college in a Particular academic session.

Note (2) – Choice of elective course once made for an examination cannot be changed in future examinations.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI (C.G.)

Semester: **M.Tech. III Sem.**

Subject : Adaptive Control System

Total Theory Periods: 40

Total Marks in End Semester Exam. : **100**

Minimum number of class test to be conducted: **02**

Branch: **Electronic Engg.**

Code: 552311 (28)

Total Tutorial Periods: **12**

UNIT-I

Introduction: Basic concepts and classification, Real-Time Parameter Estimation, Identification techniques; impulse response identification, parameter estimation, learning model approach

UNIT-II

Adaptive control design: Nodal reference adaptive control, input signal adaptive control. Practical application, adaptive autopilot, Auto-Tuning, Gain Scheduling, Self-tuning regulators

UNIT-III

Adaptive Regulators and Systems: Deterministic Self-Tuning Regulators, Stochastic Adaptive Control, Stochastic and Predictive Self-Tuning Regulators, Model-Reference Adaptive Systems, Properties of Adaptive Systems

UNIT-IV

Robust and Self-Oscillating Systems: Practical Issues and Implementation, Commercial Products and Applications, Perspectives on Adaptive Control

UNIT-V

Computer Aided Adaptive Control: Adaptive controller adjustment – Indirect adaptive control, Direct Adaptive control, Adaptive control schemes – Model Reference Adaptive Controllers (MRAC), Self Tuning Adaptive Controllers (STAC), Adaptive control techniques.

Names of Text Books:

1. **Adaptive Control, Chatterjee & Permar**, Oxford University Press
2. **Adaptive Control, Karl J. Aström, Björn Wittenmark**; Pearson Ed.
3. **Computer Aided Process Control, S.K Singh**, Prentice Hall of India

Name of Reference Books:

1. **Adaptive Control, Chang C. Hang, Weng K. Ho, Tong Heng Lee**; Instrument Society of America
2. **Adaptive Control Systems(Illustrated), Rogelio Lozano, Gang Feng, Rogelio Lozano**; Newnes

Further Reading:

1. **Cerebellum and Adaptive Control (Illustrated)**, John S. Barlow; Cambridge Univ Pr
2. **Adaptive Dual Control: Theory And Applications**, Heinz Unbehauen, Nikolai Michailovich Filatov; Springer Verlag
3. **Neural and Adaptive Systems: Fundamentals Through Simulations (Illustrated)**, Jose C. Principe, Neil R. Euliano, W.Curt Lefebvre; John Wiley & Sons Inc

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI (C.G.)

Semester: M.Tech. III Sem.

Subject : Analytical Instrumentation

Total Theory Periods: 40

Total Marks in End Semester Exam. : 100

Minimum number of class test to be conducted: 02

Branch: Electronic Engg.

Code: 552331 (28)

Total Tutorial Periods: 12

UNIT-I

Absorption spectrometry: (UV, Visible, IR), mass spectrometry, Möss Bauer spectroscopy, Principles, design aspects and application

UNIT-II

NMR spectroscopy: principles, generation, equipment, Principles, design aspects and applications, limitations

UNIT-III

ESR Spectroscopy: principles, design aspects, generation, equipment, applications, limitations

UNIT-IV

NDP spectroscopy: principles, design aspects, generation, equipment, applications, limitations

UNIT-V

X-Rays and Other Techniques: X-rays absorption, fluorescence and diffractometric techniques, electron microscope and microprobe, EXAFS, ESCA, and Auger techniques. Chromatography and colorimetry. Instrumentation of thermo physical and transport properties of matter, DTA, DSC.

Names of Text Books:

1. **Instrumental Methods of Analysis (VI edition).** *Willard H.W., Merritt L.L., Dean J.A., Settle F.A.,*
2. **Handbook of Analytical Instruments,** *R.S. Khandpur,* Tata Mcgraw Hill

Name of Reference Books:

1. **Instrumentation, Measurement and Analysis,** *B.C. Nakra, K.K. Chaudhry,* Tata Mcgraw Hill
2. **Instrument Engineers Handbook –** *B.G. Liptak.*

Further Reading:

1. The Art of Electronics, Paul Horowitz & Winifield Hill

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI (C.G.)

Semester: M.Tech. III Sem.

Subject : Real Time Systems

Total Theory Periods: 40

Total Marks in End Semester Exam. : 100

Minimum number of class test to be conducted: 02

Branch: Electronic Engg.

Total Tutorial Periods: 12

Code: 552332 (28)

UNIT-I

Real Time Systems - Basics and Applications: Typical Real-Time Applications, Hard Versus Soft Real-Time Systems, A Reference Model of Real-Time Systems

UNIT-II

Real-time Scheduling: Commonly Used Approaches to Real-Time Scheduling, Clock Driven Scheduling, Priority-Driven Scheduling of Periodic Tasks

UNIT-III

Scheduling and Resources: Scheduling Aperiodic and Sporadic Jobs in Priority-Driven Systems, Resources and Resource Access Control

UNIT-IV

Multiprocessor Scheduling: Resources Access Control, and Synchronization, Scheduling Flexible Computations and Tasks with Temporal Distance Constraints

UNIT-V

Communication and OS: Real-Time Communication, Operating Systems

Names of Text Books:

1. **Real Time Systems, Saeed B. Niku**, Prentice Hall
2. **Real Time Systems, C.M. Krishna, K.G. Shin**, Mcgraw Hill

Name of Reference Books:

1. **Real-Time Systems, Jane W. S. Liu**
2. **Real-Time Systems : Scheduling, Analysis, and Verification, Albert M. K. Cheng**

Further Reading:

1. **Real-Time Concepts for Embedded Systems, Qing Li, Caroline Yao**; CMP Books

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI (C.G.)

Semester: **M.Tech. III Sem.**
Subject : **Programmable Logic Controllers**
Total Theory Periods: 40
Total Marks in End Semester Exam. : **100**
Minimum number of class test to be conducted: **02**

Branch: **Electronic Engg.**
Total Tutorial Periods: **12**
Code: 552333 (28)

UNIT-I

PLC Basics: An Overall look at programmable Logic Controllers, General PLC Programming Procedure, Devices to which PLC Input and Output Modules are connected.

UNIT-II

Basic PLC Programming: Programming On/Off Inputs to Produce On-Off Outputs, Relation of Digital Gate Logic to Contact/Coil Logic, Creating Ladder Diagrams from Process Control Descriptions.
Basic PLC Functions, Register Basics, PLC Time Functions, PLC Counter Functions.
Intermediate Functions, PLC Arithmetic Functions, PLC Number Comparison Functions, Numbering Systems and PLC Number Conversion Functions.

UNIT-III

Data Handling Functions: The PLC SKIP and MASTER CONTROL RELAY Functions, Jump Functions, PLC Data Move Systems, Other PLC Data Handling Functions.
PLC Functions -Working with Bits, PLC Digital Bit Functions and Applications, PLC Sequencer Functions, Controlling a Robot with a PLC, PLC Matrix Functions.

UNIT-IV

Advanced PLC Functions: Analog PLC Operation, PID Control of Continuous Process, Networking PLCs.

UNIT-V

PLC Deployment: Alternative Programming Language, PLC Auxiliary Commands and Functions, PLC installation, Troubleshooting and Maintenance, Selecting a PLC, Operation Simulation and Monitoring, Commonly Used Circuit Symbols.

Names of Text Books:

1. **Programmable Logic Controllers, John W. Webb, Ronald A. Reis**, Prentice Hall - 5th Ed
2. **Computer Based Industrial Control, Krishna Kant**, Prentice Hall

Name of Reference Books:

1. **Programmable Logic Controllers: Principles & Applications, Webb & Reis**, Prentice Hall of India.
2. **Programmable Logic Control: Principles & Applications**, NIIT, Prentice Hall of India.

Further Reading:

1. **Advanced Practical Process Control, Brian Roffel**