Chhattisgarh Swami Vivekanand Technical University, Bhilai, CG

SCHEME OF TEACHING AND EXAMINATION

M. Tech. Electronics & Telecommunication Engineering (Instrumentation & Control)

III Semester

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

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

### Table - III

#### Elective – III

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Board of Studies</th>
<th>Code</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Electronics &amp; Telecomm.</td>
<td>552331(28)</td>
<td>Analytical Instrumentation</td>
</tr>
<tr>
<td>2</td>
<td>Electronics &amp; Telecomm.</td>
<td>552332 (28)</td>
<td>Real Time Systems</td>
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<tr>
<td>3</td>
<td>Electronics &amp; Telecomm.</td>
<td>552333(28)</td>
<td>Programmable Logic Controllers</td>
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</tbody>
</table>

**Note (1)** – 1/4*th* 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.)

Subject : Adaptive Control System Code: 552311 (28)
Total Theory Periods: 40 Total Tutorial Periods: 12
Total Marks in End Semester Exam. : 100
Minimum number of class test to be conducted: 02

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

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

UNIT-V

Names of Text Books:
1. Adaptive Control, Chatterjee & Permar; Oxford University Press

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
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.,

Name of Reference Books:
1. Instrumentation, Measurement and Analysis, B.C. Nakra, K.K. Chaudhry; Tata Mcgraw Hill

Further Reading:
1. The Art of Electronics, Paul Horowitz & Winifield Hill
UNIT-I

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

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

Further Reading:
1. Advanced Practical Process Control, Brian Roffel