<table>
<thead>
<tr>
<th>S.No.</th>
<th>Board of Studies</th>
<th>Subject Code</th>
<th>Subject</th>
<th>Period per week</th>
<th>Scheme of Examination</th>
<th>Total Marks</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>L T P</td>
<td>ESE CT TA ESE TA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Instrumentation</td>
<td>234611 (34)</td>
<td>Process Control</td>
<td>4 1 -</td>
<td>100 20 20 -</td>
<td>140</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Electronics &amp; Telcomm Engg</td>
<td>234612 (28)</td>
<td>Communication Engg</td>
<td>4 1 -</td>
<td>100 20 20 -</td>
<td>140</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>Instrumentation</td>
<td>234613 (34)</td>
<td>Advance Instrumentation</td>
<td>4 1 -</td>
<td>100 20 20 -</td>
<td>140</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Instrumentation</td>
<td>234614 (34)</td>
<td>Biomedical Instrumentation</td>
<td>4 1 -</td>
<td>100 20 20 -</td>
<td>140</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Mechanical Engg.</td>
<td>200615 (37)</td>
<td>Entrepreneurship Development</td>
<td>4 1 -</td>
<td>100 20 10 -</td>
<td>130</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>Instrumentation</td>
<td>234621 (34)</td>
<td>Major Project</td>
<td>- - 3</td>
<td>- - -</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>Instrumentation</td>
<td>234622 (34)</td>
<td>Process Control Lab</td>
<td>- - 2</td>
<td>- - -</td>
<td>50</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>Electronics &amp; Telcomm Engg</td>
<td>234623 (28)</td>
<td>Communication Engg Lab</td>
<td>- - 2</td>
<td>- - -</td>
<td>50</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Instrumentation</td>
<td>234624 (34)</td>
<td>Advance Instrumentation Lab</td>
<td>- - 2</td>
<td>- - -</td>
<td>50</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Instrumentation</td>
<td>234625 (34)</td>
<td>Biomedical Instrumentation Lab</td>
<td>- - 2</td>
<td>- - -</td>
<td>50</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20 5 11</td>
<td>500 100 90 250 60 1000</td>
<td>31</td>
<td></td>
</tr>
</tbody>
</table>
CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

(A) SEMESTER : VI
(B) SUBJECT TITLE : PROCESS CONTROL
(C) CODE : 234611 (34)
(D) BRANCH / DISCIPLINE : INSTRUMENTATION ENGINEERING

(E) RATIONALE

The syllabus of this course has been designed to make the student know about the process control component the relation between final 7 primary component functioning of various components. Coverage is given to various types of control values & their applications knowledge of specification of various process conform components will help the student in procurement of components.

(F) TEACHING & EXAMINATION SCHEME

<table>
<thead>
<tr>
<th>Sub. Code</th>
<th>Subject</th>
<th>Period per week</th>
<th>Scheme of Examination</th>
<th>Total Marks</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>234611</td>
<td>Process Control</td>
<td>4 1 -</td>
<td>L T P ESE CT TA ESE TA</td>
<td>140</td>
<td>5</td>
</tr>
<tr>
<td>(34)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>234622</td>
<td>Process Control lab</td>
<td>- - 2</td>
<td></td>
<td>60</td>
<td>1</td>
</tr>
<tr>
<td>(34)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(G) DISTRIBUTION OF MARKS AND HOURS:

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Topic</th>
<th>Hour</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Process Control Component</td>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td>2.</td>
<td>Prematic Component</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>3.</td>
<td>Hydraulic Component</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>4.</td>
<td>Electro Pneumatic Relays</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>5.</td>
<td>Controllers and Control Valves</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>6.</td>
<td>Actuators</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>7.</td>
<td>Programmable Logic Controllers</td>
<td>17</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>80</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
(H) CONTENTS

1 PROCESS CONTROL COMPONENT:
   Principle of operation & construction details of limit suntches, Potentiometers, synchros, Auto transformer, sewomotors, (DC & AC), stepper motor

2 PREMATIC COMPONENT
   Like happer nozzle system, bellows & relays lockup relays.

3 HYDRAULIC COMPONENT
   Principal and Operation of hydraulic amplifier.

4 ELECTRO PNEUMATIC RELAYS
   Application of electro pneumatic relays

5 CONTROLLERS AND CONTROL VALVES
   Hydraulic and pneumatic controllers, Electrical and Electronic controllers & Control Valves

6 ACTUATORS
   Pneumatic actuators and its types
   Electro pneumatic actuators
   Electro hydraulic actuator
   Electric motor actuation
   Two position motor actuator

7 PROGRAMMABLE LOGIC CONTROLLERS
   Concepts of PLC
   Need and its utilities in process control
   Basic organizational block diagram
   Its working
   Programming and application in process control

(I) SUGGESTED INSTRUCTIONAL STRATEGIES
   • It should included good methods like lecture, question answer, assignment and lab work. Drill and practice for home ands classroom assignments would prove more useful to develop the analytical skills.
SUGGESTED LEARNING RESOURCES:

(a) REFERENCE BOOKS

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Title</th>
<th>Author, Publisher, Edition &amp; Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Automatic Process Control</td>
<td>Donald Ekman, Willey Eastern Publication</td>
</tr>
<tr>
<td>2.</td>
<td>Process Control</td>
<td>Peter Harriott, TMH Publication</td>
</tr>
<tr>
<td></td>
<td>Industries Vol. I, II</td>
<td></td>
</tr>
</tbody>
</table>

(b) OTHERS:

- VCDs
- Learning Packages
- Lab Manuals
- Charts.

SUBJECT TITLE: PROCESS CONTROL LAB

Practical Code: 234622 (34)

Hours: 32

LIST OF PRACTICALS

2. Study the control loop of tank level control
3. Study the control loop of a boiler for temperature control
4. Study the control loop of a system for a flow control
5. Study the control loop of a system of a pressure
6. Study the feed forward cascade and ratio control in a multi loop control system.
The communication became advanced with the use of computers and data processing and continues to develop into a major industry providing the interconnection and transmission services between distant sites.

The course aim is to provide knowledge about advancement in concept, equipment and process of communication at various frequencies and media of communication. The Subject deals with new ways of data transmission i.e. through optical fibre, satellite and other media. In addition it covers advanced data communication methodologies like, satellite communication, Wireless Communication, Wired Communication and Power Line Communication. The course will be useful to update the knowledge of students about new advancement in the field of communication.

<table>
<thead>
<tr>
<th>Sub. Code</th>
<th>Subject</th>
<th>Period per week</th>
<th>Scheme of Examination</th>
<th>Total Marks</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>L   T   P</td>
<td>Theory</td>
<td>Practical</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>ESE CT TA</td>
<td>ESE TA</td>
<td>L+[(T+P)/2]</td>
<td></td>
</tr>
<tr>
<td>234612</td>
<td>Communication Engineering</td>
<td>4   1   -</td>
<td>100 20 20</td>
<td>-</td>
<td>140</td>
</tr>
<tr>
<td>(28)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>234623</td>
<td>Communication Engineering Lab</td>
<td>-   -   2</td>
<td>-</td>
<td>50 10</td>
<td>60</td>
</tr>
<tr>
<td>(28)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DISTRIBUTION MARKS & HOURS:

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Chapter Name</th>
<th>Hours</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>REVIEW OF SIGNAL REPRESENTATION</td>
<td>06</td>
<td>08</td>
</tr>
<tr>
<td>2</td>
<td>COMMUNICATION SYSTEMS AN OVERVIEW</td>
<td>12</td>
<td>22</td>
</tr>
<tr>
<td>3</td>
<td>AMPLITUDE MODULATION</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>4</td>
<td>ANGULAR MODULATION</td>
<td>16</td>
<td>24</td>
</tr>
<tr>
<td>5</td>
<td>PULSE MODULATION</td>
<td>17</td>
<td>20</td>
</tr>
<tr>
<td>6</td>
<td>MISCELLANEOUS TOPICS</td>
<td>12</td>
<td>05</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>80</td>
<td>100</td>
</tr>
</tbody>
</table>
COURSE CONTENTS

1) REVIEW OF SIGNAL REPRESENTATION
   - Time Domain And Frequency Domain Analysis Of Signals
   - Energy And Power Density Spectrum Of Signals
   - Sampling Theorem
   - Noise

2) COMMUNICATION SYSTEMS AN OVERVIEW
   - Objectives
   - Communication And Society
   - Methods Of Communication
   - Meaning Of Communication
   - Sending And Receiving The Message

3) AMPLITUDE MODULATION
   - Introduction
   - Am Signal Generation
     - Collector Modulation
     - Base Modulation
     - Emitter Modulation
   - Am Wave Form
   - Standard Am Transmitters( High Level And Low Level Transmission)
   - Am Receivers
     - Diode Detector
     - Transistor Detector
     - Radio Receivers( TRF, Super Heterodyne )
   - Disadvantages of AM
   - SSB Generation
   - Balanced Modulator
   - Diode Ring Modulator
   - SSB Receivers
   - VSB
   - Advantages and Disadvantages of SSB & VSB

4) ANGULAR MODULATION
   - FM Signal
   - FM Signal Generation
   - Reactance Modulator
o VARACTOR Diode Method
   o AFC
   o PM Signal
   o Advantages and Disadvantages of FM & PM

5) PULSE MODULATION
   o PAM
   o PWM
   o PPM
   o PCM
   o FSK, ASK
   o Merits and Demerits of above

6) MISCELLANEOUS TOPICS
   o Introduction and Concept of Power line carrier communication (PLCC)
   o Introduction and Concept of Fibre Optic Communication (FOC)
   o Introduction and Concept of Satellite Communication (SATCOM)

RECOMMENDED BOOKS

1. Analog Communication -- by Schaum Series
2. Radio Engineering – by G K Mithal
3. Communication System -- by George Kennedy
4. Communication System -- by Singh And Sapre
LIST OF PRACTICALS:

1. Determination of Sensitivity of Receivers
2. Determination of Selectivity of Receivers
3. Determination of Fidelity of Receivers
4. Determination of IF of Receivers
5. Determination of Image Ratio of Receivers
6. Perform amplitude modulation of a signal, plot the waveform and calculate modulation index
7. Study of Modulation And Demodulation on CRO
8. Perform the adaptive delta modulation techniques and plot the waveforms
9. Perform the modulation & demodulation in ASK, draw its waveforms
10. Perform the modulation & demodulation in FSK, draw its waveforms
11. Perform the modulation & demodulation in PSK, draw its waveforms
12. Observe DSB/SSB AM transmitter waveforms and plot the graph
13. Observe DSB/SSB AM receiver waveforms and plot the graph
14. Study of Pulse Modulation On CRO
The name itself describes a lot about the subject. The subject includes the detailed information about different quantity measurements like level, pressure, humidity, temperature, radiation of temperature etc. Again the subject involves the detailed study of low pressure and low level measurement and conductivity of liquids which will be helpful in understanding many complex processes of the industries.

### Teaching & Examination Scheme

<table>
<thead>
<tr>
<th>Subject</th>
<th>Period per week</th>
<th>Scheme of Examination</th>
<th>Total Marks</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
<td>Theory</td>
</tr>
<tr>
<td></td>
<td>ESE</td>
<td>CT</td>
<td>TA</td>
<td>ESE</td>
</tr>
<tr>
<td>234613 (34)</td>
<td>4</td>
<td>1</td>
<td>-</td>
<td>100</td>
</tr>
<tr>
<td>234624 (34)</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>-</td>
</tr>
</tbody>
</table>

L: Lecture hour, T: Tutorial hours, P: Practical hours, ESE: End of Semester Exam, CT: Class Test, TA: Teacher’s Assessment.

### Distribution of Marks and Hours:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Chapter No.</th>
<th>Chapter Name</th>
<th>Hours</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>LEVEL MEASUREMENT</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>HUMIDITY MEASUREMENT</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>MICELLANEOUS MEASUREMENT</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>ANALYTIC INSTRUMENT</td>
<td>17</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>GAS CHROMATOGRAPHY</td>
<td>06</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>LOW PRESSURE MEASUREMENT</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>DATA LOGUS</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TOTAL</td>
<td>80</td>
<td>100</td>
</tr>
</tbody>
</table>
H) DETAILED COURSE CONTENTS:

Chapter-1 LEVEL MEASUREMENT
- Application of level measurement
- Level measuring method
- Direct level measurement, indirect level measurement
- Solid level measurement
- Density measurement
- Radioactive devisitomater.

Chapter-2 HUMIDITY MEASUREMENT
- Introduction
- Measurement of humidity using psychometer
- Measurement of humidity using hydrometer
- Measurement of moisture content of solid.

Chapter-3 MISCELLANEOUS MEASUREMENT
- Radiation temperature measurement (pyrometer)
- Basic concept of hot body radiation
- Radiation pyrometer optical pyrometer, advantage of pyrometer
- Conductivity of liquid (water)

Chapter-4 ANALYTICAL INSTRUMENT
- Analysis using thermal properties; thermal conductivity analysis
- H2Co2 analysis
- Analysis using electrical properties
- PH analyzer, construction of hot wire, oxygen analyzer
- Analysis using radiant energy property
- X-ray technique of analysis by diffraction method
- gm counter & its measuring circuit, fluorescent spectrography
- Absorption spectrography
- Scheme of X-ray absorption spectrography

Chapter-5 GAS CHROMATOGRAPHY
- Principle of chromatography related instrumentation like injector, oven, column & detector.
Chapter-6  LOW PRESSURE MEASUREMENT

- Diaphragm pressure gauge, capsule pressure gauge, bellow pressure gauge, differential pressure measurement.

Chapter-7  DATA LOGOUS

- Objective of data logging, basic element of data logging, block diagram function of each block basic of DAS & SCADA

(H) SUGGESTED INSTRUCTIONAL STRATEGIES:

(J) SUGGESTED LEARNING RESOURCES:

(a) Reference Books :

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Title</th>
<th>Author, Publisher, Edition &amp; Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(b) Others:
- Video Programs.
- Learning Packages.
the subject will help the students to expose themselves to a very wide opening area of specialization, which is going to increase day by day. Biomedical engineering is a field which is very fast growing due to the needs and urge of security and more security of the human race for themselves against various physiological disorders. The necessity of detection of these disorders at earliest possible periods has given birth to many wonderful techniques like ECG, tomography, MRI etc. and to study these techniques is definitely going to be a delightful experience to the pupils.

(F) TEACHING & EXAMINATION SCHEME

<table>
<thead>
<tr>
<th>Sub. Code</th>
<th>Subject</th>
<th>Period per week</th>
<th>Scheme of Examination</th>
<th>Total Marks</th>
<th>Credit L+(T+P)/2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>L   T   P</td>
<td>ESE   CT   TA   ESE   TA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>234614</td>
<td>Bio-Medical Instrumentation</td>
<td>4   1    -</td>
<td>100   20   20   -    -</td>
<td>140</td>
<td>5</td>
</tr>
<tr>
<td>(34)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>234625</td>
<td>Bio-Medical Instrumentation</td>
<td>-    -    2</td>
<td>-      -    -     -    -</td>
<td>60</td>
<td>1</td>
</tr>
<tr>
<td>(34)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DISTRIBUTION MARKS AND HOURS:

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Chapter Name</th>
<th>Hours</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FUNDAMENTALS OF MEDICAL INSTRUMENTATION</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>BIOMEDICAL ELECTRODES</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>DIAGNOSTIC INSTRUMENTS</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>BLOOD CELL COUNTERS</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>5</td>
<td>RECORDING SYSTEMS</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>6</td>
<td>BIOMEDICAL TELEMETRY</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>80</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
1) **FUNDAMENTALS OF MEDICAL INSTRUMENTATION:**

Physiological system of the body the cardiovascular system, the respiratory system, the nervous system, sources of biomedical signals.

2) **BIOMEDICAL ELECTRODES:**

Study of bioelectrical potential & bio electric theory, recording electrodes silver chloride electrodes, electrodes for ECG electrodes for EEG, electrodes for EMG, & micro electrodes

3) **DIAGNOSTIC INSTRUMENTS:**

Block diagram and explanatory study of:
- Electrocardiography (ECG)
- Electroencephalography (EEG)
- Electromyography (EMG)
- Ultrasonic imaging systems
- Pacemaker defibrillators
- CAT SCAN, MRI, SONOGRAPHY

4) **BLOOD CELL COUNTERS:**

Chemical sensors, bio sensors, smart sensors, methods of blood cell counting, blood pressure measurement, blood flow measurement

5) **RECORDING SYSTEMS:**

Basic recording systems, sources of noise in low level measurement signal processing technique, direct writing recorders, ink jet recorders potentiometric recorders, digital recorders, instrumentation tape recorders.

6) **BIOMEDICAL TELEMETRY:**

Wireless telemetry, single channel telemetry system, multi channel telemetry, multi channel wireless telemetry, multi patient telemetry system, implantable telemetry system

**SUGGESTED INSTRUCTIONAL STRATEGIES**

- It should include good methods like lecture, question answer, assignment and lab work. Drill and practice for home & classroom assignments would prove more useful to develop the analytical skills.
SUGGESTED LEARNING RESOURCES.

(a) REFERENCE BOOKS

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Title</th>
<th>Author, Publisher, Edition &amp; Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bio medical instruments</td>
<td>Chrompbell</td>
</tr>
<tr>
<td>2</td>
<td>Handbook of medical instruments</td>
<td>R S Khandpur</td>
</tr>
<tr>
<td>3</td>
<td>Biomedical instruments</td>
<td>M.E. Van Valkenburg</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(b) OTHERS:

VCDs.
Learning Packages.
Lab Manuals.
Charts.

Subject: Biomedical Instrumentation Lab

Practical Code: 234625 (34)
Hours: 32

LIST OF EXPERIMENTS:

1. Study of ECG
2. Measurement of blood pressure
3. Study of various electrodes used in bio medical engineering
4. Measurement and observation of BP and recording data on PC
5. Visit to medical labs and ICU of different hospitals
CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

A) SEMESTER : VI  
B) COURSE TITLE : ENTREPRENEURSHIP DEVELOPMENT  
C) CODE : 200615 (37)  
D) BRANCH/DISCIPLINE : Mechanical Engg.  
E) RATIONALE : It has been experienced in most parts of the world that entrepreneurship development is a means of rapid economic development vis-à-vis creation of gainful employment of masses. The myth that entrepreneurs are born and not made no longer holds good. Experiences of last few decades in India show that it is possible to develop entrepreneurs through planned efforts. These designed efforts are more essentially required in polytechnics where increasing unemployment has necessitated promoting self-employment/entrepreneurship as career option thereby creating more job providers than job seekers. This course focuses on inputs required for students to undertake entrepreneurial activities as career option.

F) TEACHING AND EXMINATION SCHEME:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Periods/Week (In Hours)</th>
<th>Scheme of Examination</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200615 (37)</td>
<td>4</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

G) DISTRIBUTION OF MARKS AND HOURS:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Chapter No.</th>
<th>Chapter Name</th>
<th>Hours</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
<td>Entrepreneurship Development</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
<td>Forms of business organization</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
<td>Institutional support for SSI</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>4.</td>
<td>4.</td>
<td>Planning a small scale industry</td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>5.</td>
<td>5.</td>
<td>Management of small business firms</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>6.</td>
<td>6.</td>
<td>Project selection, formulation and appraisal</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>7.</td>
<td>7.</td>
<td>Problems of small industries</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>8.</td>
<td>8.</td>
<td>Entrepreneurial motivation training</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>80</td>
<td>100</td>
</tr>
</tbody>
</table>
H) DETAILED COURSE CONTENTS:

Chapter – 1 : Entrepreneurial Development
- Definition of entrepreneurship,
- Characteristics of entrepreneurs,
- Factors influencing entrepreneurship,
- Need for promotion of entrepreneurship and small business
- Entrepreneurial Environment
- Environmental analysis.
- Government policies for setting up new small enterprises
- Opportunities in service industries.

Chapter – 2 : Forms Of Business Organization
- Forms of ownership
- Sole Proprietorship
- Partnership
- Cooperative society
- Joint – stock company
- Private Limited Companies
- Public Limited Companies

Chapter – 3 : Institutional support to SSI
- Institutional set up
- Industries centers,
- Industrial estates
- Institutional support at National level
- Institutional support at State level
- Commercial banks and financial institutions

Chapter – 4 : Planning a SSI
- What is planning?
- Types of planning
- Importance of planning
- Steps in planning
- Steps in planning a SSI
- Technical dimensions for setting up an enterprise

Chapter – 5 : Management of Small Business Firm
- Functional areas of small business firm
- Fundamentals of Management
- Managerial effectiveness
- Essential data for effective control of small business
- Resource management
- Office management
- Employees Welfare & safety
- Factory rules and Labour Laws related to SSIs
- Sales Tax and Income Tax laws related to SSIs
Chapter – 6 : Project selection, Formulation & Appraisal

- Project selection & formulation
- Scope of project report
- Content & Format of Project report
- Need of Project Appraisal
- Steps of Project Appraisal

Chapter – 7 : Problems of Small industries

- Power shortages
- Project planning
- Finance
- Raw material
- Production constraints
- Marketing
- Personal constraints
- Regulations

Chapter – 8 : Entrepreneurial Motivation Training

- Achievement Motivation
- Creative thinking
- Risk taking abilities

I) SUGGESTED INSTRUCTIONAL STRATEGIES:

- Lecture Method.
- Industrial visits.
- Simulation
- Role play
- Interaction with successful entrepreneurs
- Demonstration.
- Games

J) SUGGESTED LEARNING RESOURCES:

(a) Reference Books :

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Title</th>
<th>Author, Publisher, Edition &amp; Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.</td>
<td>Entrepreneurship Development in small scale proceedings of National Seminar, DCSSI, New Delhi</td>
<td>Patel V.G.</td>
</tr>
</tbody>
</table>
| 5. | The Business Planning Guide | David H. Bangs  
Upstart Publishing  
Company, In Chicago |
| 6. | Entrepreneurship development in India | Dr. C.B. Gupta  
Dr. N.P. Srinivasan  
Sultan Chand & Sons |

### LIST OF TEAM WORK

Team Work will consist of collecting following information by the students:

1. Collect State industrial policy
2. Report of interaction with successful entrepreneurs/industrial visits
3. Prepare list of opportunities for business, service and industrial ventures
4. Whom to approach for What?
5. Facilities and incentives available from various support agencies

-----
CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

(A) SEMESTER : VI
(B) SUBJECT : MAJOR PROJECT
(C) CODE : 234621 (34)
(D) BRANCH / DISCIPLINE : INSTRUMENTATION ENGINEERING
(E) RATIONALE:

The optimum operation of any industrial organization demands its staff to share the administrative and technical responsibilities efficiently and effectively. The great technological and sociological advances that have occurred in all segments of our society have forced the developments of new management concepts, techniques and tools to cope up with complexity, the systematic and organized approach in every discipline is indispensable in a society which is producing more technically qualified persons, newer materials and complex products and more information than ever before.

Apart from this keeping in view of the importance and necessity, the basic concepts of work study, Maintenance and safety have been included. Due thought has been given to keep in line with the national emphasis on environment and pollution control.

(F) TEACHING & EXAMINATION SCHEME

<table>
<thead>
<tr>
<th>Sub. Code</th>
<th>Subject</th>
<th>Period per week</th>
<th>Scheme of Examination</th>
<th>Total Marks</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
<td>Theory</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ESE</td>
<td>CT</td>
<td>TA</td>
<td>ESE</td>
</tr>
<tr>
<td>234621</td>
<td>Major Project</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>(34)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

STRATEGIES TO BE ADAPTED FOR SELECTING WORKING ON PROJECT-WORK

1. Identification of project by market survey and industrial survey. (Part of Entrepreneurship)
2. Selection / Design of a Project for desired output.
3. Possibly modification of the selected Circuit / Given Circuit.
5. Procurement of components & Accessories.
7. Safety & Precaution Measurements.
8. Disposals of Waste & Hazard Materials (Part of Environment)
10. Market-Survey for Product-Sales (Part of Entrepreneurship)
11. Economic viability of Product (Part of Entrepreneurship)
12. Costing of the project/product
   a. Capital costs
   b. Material & production cost (Part of entrepreneurship)
13. Identify and approach various agencies for financial and technical assistance (Part of entrepreneurship)

14. Documentation of project report
   a. Drafting
   b. Sketching
   c. Layout
   d. Presentation