CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

DIPLOMA IN INSTRUMENTATION ENGINEERING

SEMESTER - VI

S.No.	Board of Studies	Subject Code	Subject	Period per week			Scheme of Examination				Total Marks		Credit L+(T+P)/ 2]
							Theory			Practical			
				L	T	P	ESE	CT	TA	ESE	TA		
1	Instrumentation	234611 (34)	Process Control	4	1	-	100	20	20	-	-	140	5
2	Electronics & Telcomm Engg	234612 (28)	Communication Engg	4	1	-	100	20	20	-	-	140	5
3	Instrumentation	234613 (34)	Advance Instrumentation	4	1	-	100	20	20	-	-	140	5
4	Instrumentation	234614 (34)	Biomedical Instrumentation	4	1	-	100	20	20	-	-	140	5
5	Mechanical Engg.	200615 (37)	Entrepreneurship Development	4	1	-	100	20	10	-	-	130	5
6	Instrumentation	234621 (34)	Major Project	-	-	3	-	-	-	50	20	70	2
7	Instrumentation	234622 (34)	Process Control Lab	-	-	2	-	-	-	50	10	60	1
8	Electronics & Telcomm Engg	234623 (28)	Communication Engg Lab	-	-	2	-	-	-	50	10	60	1
9	Instrumentation	234624 (34)	Advance Instrumentation Lab	-	-	2	-	-		50	10	60	1
10	Instrumentation	234625 (34)	Biomedical Instrumentation Lab	-	-	2	-	-	-	50	10	60	1
Total				20	5	11	500	100	90	250	60	1000	31

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

Sub. Code	Subject	Period per week			Scheme of Examination					Total Marks	Credit L+(T+P)/2
					Theory			Practical			
		L	T	P	ESE	CT	TA	ESE	TA		
234611 (34)	Process Control	4	1	-	100	20	20	-	-	140	5
234622 (34)	Process Control lab	-	-	2	-	-	-	50	10	60	1

(G) DISTRIBUTION OF MARKS AND HOURS:

S. No.	Topic	Hour	Marks
1.	Process Control Component	9	15
2.	Prematic Component	10	15
3.	Hydraulic Component	10	10
4.	Electro Pneumatic Relays	10	10
5.	Controllers and Control Valves	12	15
6.	Actuators	12	15
7.	Programmable Logic Controllers	17	20
	Total	**80**	**100**

(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.

(J) SUGGESTED LEARNING RESOURCES:

(a) REFERENCE BOOKS

Sl. No.	Title	Author, Publisher, Edition & Year
1.	Automatic Process Control	Donald Ekman, Willey Eastern Publication
2.	Process Control	Peter Harriott, TMH Publication
3.	Applied Instrumentation in Process Industries Vol. I, II	W.G. Andrews & Williams

(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.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

(A) SEMESTER : VI
(B) SUBJECT TITLE : COMMUNICATION ENGINEERING
(C) CODE : 234612 (28)
(D) BRANCH / DISCIPLINE : ELECTRONICS & TELCOMM ENGG
(E) RATIONALE

The communication became advanced with the use of computers and data processing and continues to develop in to a major industry providing the interconnection and transmission services between distant site.

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 news way 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.

(F) TEACHING & EXAMINATION SCHEME

Sub. Code	Subject	Period per week			Scheme of Examination					Total Marks	Credit L+[(T+P)/2]
					Theory			Practical			
		L	T	P	ESE	CT	TA	ESE	TA		
234612 (28)	Communication Engineering.	4	1	-	100	20	20	-	-	140	5
234623 (28)	Communication Engineering. Lab	-	-	2	-	-	-	50	10	60	1

DISTRIBUTION MARKS & HOURS:

S . No.	Chapter Name	Hours	Marks
1	REVIEW OF SIGNAL REPRESENTATION	06	08
2	COMMUNICATION SYSTEMS AN OVERVIEW	12	22
3	AMPLITUDE MODULATION	17	21
4	ANGULAR MODULATION	16	24
5	PULSE MODULATION	17	20
6	MISCELLANEOUS TOPICS	12	05
	Total	80	100

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

- VARACTOR Diode Method
- AFC
- PM Signal
- Advantages and Disadvantages of FM & PM

5) PULSE MODULATION

- PAM
- PWM
- PPM
- PCM
- FSK, ASK
- Merits and Demerits of above

6) MISCELLANEOUS TOPICS

- Introduction and Concept of Power line carrier communication (PLCC)
- Introduction and Concept of Fibre Optic Communication (FOC)
- 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

Subject: Communication Engg Lab

Practical Code: 234623 (28)
Hours: 32

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

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

(A) SEMESTER : VI
(B) SUBJECT TITLE : ADVANCED INSTRUMENTATION
(C) CODE : 234613 (34)
(D) BRANCH / DISCIPLINE : INSTRUMENTATION ENGINEERING
(E) RATIONALE :

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.

(F) TEACHING & EXAMINATION SCHEME

Subject	Period per week			Scheme of Examination					Total Marks	Credit L+(T+P)/2
				Theory			Practical			
	L	T	P	ESE	CT	TA	ESE	TA		
234613 (34)	4	1	-	100	20	20	-	-	140	5
234624 (34)	-	-	2	-	-	-	50	10	60	1

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

G) DISTRIBUTION OF MARKS AND HOURS:

Sl. No.	Chapter No.	Chapter Name	Hours	Marks
1	1	LEVEL MEASUREMENT	10	10
2	2	HUMIDITY MEASUREMENT	10	15
3	3	MICELLANEOUS MEASUREMENT	12	15
4	4	ANALYTIC INSTRUMENT	17	20
5	5	GAS CHROMATOGRAPHY	06	10
6	6	LOW PRESSURE MEASUREMENT	15	15
7	7	DATA LOGUS	10	15
		TOTAL	**80**	**100**

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
- Radio active 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 loging, basic element of data loging, block diagram function of each block basic of DAS & SCADA

(H) SUGGESTED INSTRUCTIONAL STRATEGIES:

(J) SUGGESTED LEARNING RESOURCES:

(a) Reference Books :

Sl. No.	Title	Author, Publisher, Edition & Year
1		
2		
3		
4		

(b) Others:

- Video Programs.
- Learning Packages.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

(A) SEMESTER : VI
(B) SUBJECT TITLE : BIOMEDICAL INSTRUMENTATION
(C) CODE : 234614 (34)
(D) BRANCH / DISCIPLINE : INSTRUMENTATION ENGINEERING
(E) RATIONALE :

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

Sub. Code	Subject	Period per week			Scheme of Examination					Total Marks	Credit L+(T+P)/2
					Theory			Practical			
		L	T	P	ESE	CT	TA	ESE	TA		
234614 (34)	Bio-Medical Instrumentation	4	1	-	100	20	20	-	-	140	5
234625 (34)	Bio-Medical Instrumentation	-	-	2	-	-	-	50	10	60	1

DISTRIBUTION MARKS AND HOURS:

S. No.	Chapter Name	Hours	Marks
1	FUNDAMENTALS OF MEDICAL INSTRUMENTATION	20	20
2	BIOMEDICAL ELECTRODES	16	20
3	DIAGNOSTIC INSTRUMENTS	12	15
4	BLOOD CELL COUNTERS	10	15
5	RECORDING SYSTEMS	12	15
6	BIOMEDICAL TELEMETRY	10	15
	Total	80	100

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

Sl. No.	Title	Author, Publisher, Edition & Year
1	Bio medical instruments	Chrompbell
2	Handbook of medical instruments	R S Khandpur
3	Biomedical instruments	M.E. Van Valkenburg
4		
5		

(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:

Course Code	Periods/Week (In Hours)			Scheme of Examination						Credit L+(T+P) 2
	L	T	P	Theory			Practical		Total Marks	
				ESE	CT	TA	ESE	TA		
200615 (37)	4	1	-	100	20	10	-	-	130	5

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:

Sl. No.	Chapter No.	Chapter Name	Hours	Marks
1.	1.	Entrepreneurship Development	10	12
2.	2.	Forms of business organization	8	10
3.	3.	Institutional support for SSI	8	10
4.	4.	Planning a small scale industry	10	18
5.	5.	Management of small business firms	8	12
6.	6.	Project selection, formulation and appraisal	12	10
7.	7.	Problems of small industries	12	12
8.	8.	Entrepreneurial motivation training	12	10
		Total	**80**	**100**

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 :

Sl. No.	Title	Author, Publisher, Edition & Year
1.	Starting your own Business, A step-by-step Blue print for the First-time Entrepreneur	Stephen C. Harper, Mc Craw-Hill
2.	Harward Business Review on Entrepreneurship	Harvard Business School Press
3.	Entrepreneurship Development in small scale proceedings of National Seminar, DCSSI, New Delhi	Patel V.G.
4.	Entrepreneurship : Strategies & Resources	Abrams Grant Pass, Oregon: Oasis Press

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

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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

Sub. Code	Subject	Period per week			Scheme of Examination					Total Marks	Credit L+(T+P)/2
					Theory			Practical			
		L	T	P	ESE	CT	TA	ESE	TA		
234621 (34)	Major Project	-	-	3	-	-	-	50	20	70	2

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.
4. Design & Fabrication of PCB & Component-Mounting.
5. Procurement of components & Accessories.
6. Working skill of fabrication of the cabinet / Chassis and mounting components & controls displays.
7. Safety & Precaution Measurements.
8. Disposals of Waste & Hazard Materials (Part of Environment)
9. Testing of Product and Test-Report.
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