

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

## Scheme of Teaching and Examination B.E. V SEMESTER

### APPLIED ELECTRONICS AND INSTRUMENTATION

S. No	Board of Studies	Subject Code	Subject Name	Periods Per Week			Scheme of Exam. (Theory/ Practical)			Total Marks	Credit L+(T+P)/2
				L	T	P	ESE	CT	TA		
1	Electronics and Instrumentation	312551(27)	Signal Conditioning Circuits	3	1	-	80	20	20	120	4
2	Electronics and Instrumentation	312552(27)	Industrial Instrumentation	3	1	-	80	20	20	120	4
3	Applied Electronics and Instrumentation	312553(12)	Communication Systems & Engineering	3	1	-	80	20	20	120	4
4	Applied Electronics and Instrumentation	312554(12)	Medical Measurements & Instrumentation	3	1	-	80	20	20	120	4
5	Electronics and Instrumentation	312555(27)	Control System Engineering	3	1	-	80	20	20	120	4
6	Electronics and Telecomm.	312556(28)	Advanced Microprocessor & Interfacing	3	1	-	80	20	20	120	4
7	Applied Electronics and Instrumentation	312561(12)	Control System Engineering Laboratory	-	-	3	40	-	20	60	2
8	Applied Electronics and Instrumentation	312562(12)	Signal Conditioning Circuits Laboratory	-	-	4	40	-	20	60	2
9	Applied Electronics and Instrumentation	312563(12)	Advanced Microprocessor & Interfacing Laboratory	-	-	4	40	-	20	60	2
10	Applied Electronics and Instrumentation	312564(12)	Medical Measurements & Instrumentation Laboratory	-	-	2	40	-	20	60	1
11	Humanities	300565(46)	Personality Development	-	-	2	-	-	20	20	1
12	Applied Electronics and Instrumentation	312566(12)	Practical Training Evaluation/ Library	-	-	1	-	-	20	20	1
<b>Total</b>				<b>18</b>	<b>6</b>	<b>16</b>	<b>640</b>	<b>120</b>	<b>240</b>	<b>1000</b>	<b>33</b>

**L:** Lecture

**T:** Tutorial **P:** Practical

**ESE:** End Semester Examination

**CT:** Class Test **TA:** Teacher's Assessment

*\* Industrial Training of ten weeks is mandatory for B.E. student. It is to be completed in two parts. The first part will be in summer after IV sem. after which students have to submit a training report which will be evaluated by the college teachers during B.E. V sem.*

Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years

# Chhattisgarh Swami Vivekanand Technical University, Bilai

Branch: **Electronics & Instrumentation/Applied Electronics & Instrumentation** Semester: **V**  
Subject: **Signal Conditioning Circuits** Code: **312551(27)**  
Total Theory Periods: **40** Total Tutorial Periods: **10**  
No. of class Tests to be conducted: **2 (Minimum)** No. of assignments to be submitted: **2 (Minimum)**  
ESE Duration: **Three Hours** Maximum Marks in ESE: **80** Minimum Marks in ESE: **28**

## Course Objectives:

To introduce the concepts for realizing functional building blocks of OPAMP and application of OPAMP.

## Course outcomes: Students will be able to

1. Realize circuits; design for signal analysis using OPAMP IC's.
2. Gain knowledge of applications of OPAMPs.
3. Design of OPAMP based application circuits.
4. Gain knowledge of special OPAMP circuits.
5. Gain knowledge of internal functional blocks and the applications of special IC's like timers, regulator circuits.

- UNIT I OPERATIONAL AMPLIFIERS:** Amplifier fundamentals, Basics of Differential amplifier: Differential Gain, Common Mode Gain, Common Mode Rejection Ratio, Features, Transistorised Differential amplifier: Differential Mode and Common Mode Operation, Configurations of Differential Amplifier, Analysis of Differential Amplifier: A.C. Analysis, D.C. Analysis, Transfer Characteristics of Differential Amplifier, Current Mirror Circuit, Wilson Current Source Circuit, Widlar Current Source Circuit, OPAMP Symbol and terminology, Block Schematic of OPAMP, Ideal and Practical OPAMP Characteristics, Open and Closed Loop Configuration of OPAMP, Frequency response, Frequency Compensation, Inverting and non-inverting amplifier.
- UNIT II APPLICATIONS OF OPAMP:** Voltage Follower, Comparator, Zero crossing Detector, Level detector, Window detector, Precision Half wave & Full wave rectifier, Integrator, Differentiator, Summer, Subtractor, Bridge amplifier, Instrumentation amplifier, Voltage to Current & Current to Voltage converter, Logarithmic Amplifier, Norton Amplifier.
- UNIT III SIGNAL GENERATORS & CONDITIONERS:** Square wave generator, Triangular wave generator, Saw tooth wave generator, Schmitt trigger, Clipper circuit – Series & parallel clipper, Clipper Clamper Circuit: Negative & Positive Clamper, Highpass RC Circuit as Differentiator, Lowpass RC Circuit as integrator. Basics of Voltage sweep generator, Basics of Current Sweep generator.
- UNIT IV MULTIVIBRATORS:** Transistor as Switch, Types of Multivibrator (bistable, astable & monostable), Fixed and self biased binary, Use of Commutating Capacitor, improve in resolution, Schmitt trigger Emitter Coupled, Monostable Multi: Collector– Coupled and Emitter–Coupled Multi.
- UNIT V TIMER & REGULATOR:** Timer: Functional Diagram, Monostable & Astable Operation, IC555 & 556: Block diagram, Applications. Voltage Regulator: Characteristics, Performance Parameters, Shunt Regulator using OPAMP, Transistorized Series Feedback Regulator; Safe Operating area, Protection CKT, Short Circuit Protection, Current Limiting Circuit, Foldback Limiting, Three terminal IC Regulator, (LM317, LM337, 78XX, 79XX) [Only Schematic Diagram and pin Diagram], General Purpose IC Regulator(723): Important Features & internal structure, VCO(565).

## Text Books:

1. A. P. Godse & U. A. Bakshi, Linear Integrated Circuits, Technical Publications.
2. Gaykwad Ramakant, Operational Amplifier, PHI Publication.
3. Pulse, Digital and Switching Waveforms by Millman & Taub, Tata McGraw Hill Publishing Co.

## Reference Books:

1. Millman & Halkias, Integrated Electronics, Tata McGraw Hill Publication.
2. David. A. Bell Electronic Devices & Circuit PHI Publication.
3. K. R. Botkar, Integrated Circuits, Khanna Publications.

Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years

# Chhattisgarh Swami Vivekanand Technical University, Bilai

Branch:	<b>Electronics &amp; Instrumentation/Applied Electronics &amp; Instrumentation</b>	Semester:	<b>V</b>		
Subject:	<b>Industrial Instrumentation</b>	Code:	<b>312552(27)</b>		
Total Theory Periods:	<b>40</b>	Total Tutorial Periods:	<b>10</b>		
No. of class Tests to be conducted:	<b>2 (Minimum)</b>	No. of assignments to be submitted:	<b>2 (Minimum)</b>		
ESE Duration:	<b>Three Hours</b>	Maximum Marks in ESE:	<b>80</b>	Minimum Marks in ESE:	<b>28</b>

## Course Objectives:

1. The course intends to provide an overview of the principles, operation and application of the different Industrial Instruments like, acceleration, vibration, level, flow, thickness, sound measurement instrument.
2. To equip the students with the calibration concept, selection & application of Industrial Instruments.
3. To equip the students with the basic and advanced knowledge of acceleration, vibration, level, flow, thickness, sound measurement.

## Course Outcomes:

1. Students should have the knowledge of acceleration, vibration and jerk measurement.
2. Students should have the knowledge of level measurement.
3. Students should have the knowledge of flow measurement.
4. Students should have the knowledge of thickness & sound measurement.
5. Students should have knowledge of fluid properties measurement.

- UNIT I ACCELERATION, VIBRATION AND JERK MEASUREMENT:** Vibration measurement, Nature of vibration, Seismic transducer, Capacitive & inductive vibration sensor, Reed vibrometer, Laser-Doppler vibrometer, calibration of vibration pickup, Acceleration measurement, Potentiometric, LVDT, Piezoelectric Accelerometer, Accelerometer selection criteria, Jerk meter.
- UNIT II LEVEL MEASUREMENT:** Method of Liquid Level measurement, Hook & float level indicator, displaced level detectors, Pressure gauge method, level indicator- Air bellows, Air purge, liquid purge, Capacitance & Radiation level detector, Laser Level sensors, Ultrasonic level sensor, Microwave level switch, Optical level detector, Eddy current level measurement.
- UNIT III FLOWMEASUREMENT:** Target flowmeter, Flow switches, Rotameter, Laser-Doppler flowmetry, Flow direction Probe, Vane type probe, Pressure probe, Flow calibration.
- UNIT IV THICKNESS & SOUND MEASUREMENT:** Electrical method, Inductive & capacitive method, Ultrasonic method, Nuclear Radiation method, Microphones, Types of Microphones, Piezoelectric microphone, Electromagnet microphone.
- UNIT V FLUID PROPERTIES MEASUREMENT:** Measurement of Viscosity, Density, Humidity-Hygrometer, moisture measurement, Thermal conductivity measurement, pH-meter.

## TEXT BOOKS:

1. Shawney A.K., "Measurement & Measuring Instrument", Dhanpat Rai & Co.
2. Doebelin, E.O.,: "Measurement Systems Application and Design", fourth edition McGraw Hill International.
3. Singh S.K., "Industrial Instrumentation & Control", Tata McGraw Hill Publishing.

## REFERENCE BOOKS:

1. Flow measurement, "Practical guides for measurement and control", ISA publication, 1991.
2. D.S. Kumar, "Mechanical Measurement & Control", Metropolitan Publication
3. Anderew, W.G., : "Applied instrumentation In process industries" - a survey Vol-I Gulf Publishing company.
4. Liptak, B.G.,: "Process measurement & analysis", IV edition Chilton Book company 1995.
5. Joseph J. Carr, "Elements of Electronic Instrumentation and Measurements, 3/e", Pearson Education.
6. R. K. Jain, "Mechanical & Industrial instrumentation", Khanna Publication.

Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years

# Chhattisgarh Swami Vivekanand Technical University, Bilai

Branch:	<b>Applied Electronics &amp; Instrumentation</b>	Semester:	<b>V</b>
Subject:	<b>Communication Systems &amp; Engineering</b>	Code:	<b>312553(12)</b>
Total Theory Periods:	<b>40</b>	Total Tutorial Periods:	<b>10</b>
No. of class Tests to be conducted:	<b>2 (Minimum)</b>	No. of assignments to be submitted:	<b>2 (Minimum)</b>
ESE Duration:	<b>Three Hours</b>	Maximum Marks in ESE:	<b>80</b>
		Minimum Marks in ESE:	<b>28</b>

## Course Objectives:

1. To know about the need of communication system.
2. To gain knowledge about need of modulation methods.
3. To know about the basic blocks of a communication system.
4. To gain knowledge about classifications of modulation methods.
5. Familiarize Students with analog and digital modulation.
6. Familiarize Students with analog and digital communication system.
7. To know about various applications of communication system.

## Course outcomes: Students will be able to

1. To know about the basic blocks and elements of a general communication system.
2. To gain knowledge about various amplitude modulation & demodulation techniques, their classification & their respective advantages, disadvantages & applications.
3. To understand the concept of frequency modulation & demodulation techniques.
4. To understand the concept of digital modulation & demodulation techniques, their classification & their respective advantages, disadvantages & applications.
5. To know about the elements & operating principle of satellite & mobile communication system.

**UNIT I Amplitude Modulation Systems:** Introduction, Elements of communication system, Elements & comparison of analog & digital communication system, Method of Frequency translation, Recovery of baseband signal, Amplitude modulation, Maximum allowable modulation, Square law demodulation, Spectrum of amplitude modulated signal, Modulators & Balanced modulators, SSB modulation, Method of generating SSB signal, VSB modulation. Multiplexing.

**UNIT II Frequency Modulation Systems:** Angle modulation, Phase & frequency modulation, Relationship between FM & PM, Phase & frequency deviation, Spectrum of FM signal, Features of Bessel's coefficients, Bandwidth of sinusoidal modulated FM signal, Effect of modulation index on bandwidth, Spectrum of constant bandwidth FM signal, Phasor diagram for FM signals, Spectrum of NBFM & WBFM, FM generation using parameter variation method & Armstrong method, FM demodulation.

**UNIT III Pulse Modulation Systems:** Sampling theorem, Pulse amplitude modulation, Channel bandwidth for PAM signal, Natural sampling, Flat top sampling, Signal recovery through holding, Quantization of signals, Quantization of signals, Quantization error, PCM, Electrical representation of binary digits, PCM systems, Companding, DPCM, Delta modulation, Adaptive delta modulation.

**UNIT IV Digital Modulation Techniques:** Introduction, Digital Modulation Formats, Types of Digital Modulation Techniques, Coherent & Non-coherent methods for generation & detection of Binary Amplitude Shift Keying (BASK), Binary Phase Shift Keying (BPSK), Binary Frequency Shift Keying (BFSK) & Quadrature amplitude shift keying (QPSK).

**UNIT V Introduction to Advanced Communication Techniques**  
**Satellite Communication:** Components and block diagram of satellite communication system, satellite orbits, satellite transponders, up-link and down-link budget calculations.  
**Mobile Communication:** Components and block diagram of mobile communication system, Cellular architecture, frequency re-use, hands off strategy, umbrella cell approach, cell splitting.

## Text Books:

1. "Principles of Communication system", H. Taub and K.L. Schilling, Tata Mc Graw Hill publisher.
2. "Communication System - Analog & Digital", Sanjay Sharma, S.K. Kataria & Sons.
3. "Principle of communication Engineering", Anokh Singh & A.K. Chhabra, S. Chand Publication,

## Reference Books:

1. "Electronic Communication System", Kennedy & Davis, Tata Mc Graw Hill publishing.
2. "Electronic Communications", Roddy & Coolen, PHI.
3. "Communication System", A.B. Carlson, Mc-Graw Hill.

Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years

# Chhattisgarh Swami Vivekanand Technical University, Bilai

Branch:	<b>Applied Electronics &amp; Instrumentation</b>	Semester:	<b>V</b>		
Subject:	<b>Medical Measurements &amp; Instrumentation</b>	Code:	<b>312554(12)</b>		
Total Theory Periods:	<b>40</b>	Total Tutorial Periods:	<b>10</b>		
No. of class Tests to be conducted:	<b>2 (Minimum)</b>	No. of assignments to be submitted:	<b>2 (Minimum)</b>		
ESE Duration:	<b>Three Hours</b>	Maximum Marks in ESE:	<b>80</b>	Minimum Marks in ESE:	<b>28</b>

## Course Objectives:

- To develop and apply mathematical & engineering skills to identify, formulate, and solve medical problems.
- This subject seeks to close the gap between Engineering & Medical field.
- This subject provides the knowledge of different types of Biomedical Instruments used in Hospitals & medical Field.

## Course Outcomes: The students will be able to:

- Understand Basics of Medical Terminology and their application in different Medical Instruments.
  - Know the Operational activity of Human Body & its behavioral analysis.
  - Understand of various disease identification & their measurement system used in medical diagnosis & Treatment.
- Identify the problems encountered in measurement of biomedical signal.

- UNIT I Principles of Biomedical Electronics & Signal Processing:** Biomedical Engineering, Biometrics, Brief Review of Human Anatomy & Physiology, Components of man instrument system, Sensors used in biomedicine, Physiological system of the Body, cells & their structure, Resting & Action Potential (Generation & Propagation), The heart & cardiovascular system, Basic structure of Heart.
- UNIT II Medical Equipment Measurement Instruments:** Electrode theory, Types of Electrodes, Chemical Electrodes, Biomedical signal conditioning Devices, Amplifiers, Biopotential recorders, Display devices and Pace Makers, types of pacing modes, power sources in Pacemaker, types of Defibrillators, Methods of stimulation, stimulator, types of stimulators.
- UNIT III Principles of Medical Telemetry & Equipments:** Electrocardiographic lead system, The Electrocardiogram (ECG), Electrocardiography. Electroencephalography (EEG) Recording setup & Analysis, Electromyography, (EMG) Recording Setup, Introduction of Electroretinography (ERG) and Electroculogram (EOG) Telemetry: Biotelemetry, Introduction of Biotelemetry system, Radio telemetry system, Problems in implant telemetry.
- UNIT IV Medical Imaging System & Radiology:** Introduction, Generation of ionizing Radiation, X-Ray System, Radiography, X-Ray Diagnostic, Angiography, Radio Isotope, Radiation therapy, Ultra Sonics, properties of Ultra Sound, Ultra sonic Imaging systems, Echocardiography, Tomography, Principles of computer assisted tomography, MRI, Blood pressure measurement, pH of blood-ESR measurement.
- UNIT V Patient Monitoring System:** Patient monitoring systems: Intensive care operating room, Ambulatory patient monitoring, Electrical safety: Physiological effects of electricity, Micro & Macro shock hazards, precaution, Ventilators, Heart-Lung machine.

## Name of Text Books:

1. "Biomedical Instrumentation & Measurement" - L. Cromwell, F.J. Weibell and E.A. Pfeiffer, 2nd Ed., PHI
2. "Biomedical Instrumentation" - Dr. A. Arumugam, Anuradha Agencies, Chennai.
3. "Handbook of Biomedical Instrumentation by R.S. Khandpur", TMH Pub. Co.

## Name of Reference Books:

1. "Electronics in Medicine and Biomedical Instrumentation" - Nandini K. Jog, PHI India
2. "Principles of Medical Electronics & Biomedical Instrumentation", C Raja Rao & S.K Guha, University Press.
3. "Medical Instrumentation-application & design" John G Webster, 3<sup>rd</sup> edition, Willey student edition
4. "Introduction to Biomedical Engineering", Domach, Pearson Education

Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years

# Chhattisgarh Swami Vivekanand Technical University, Bilai

Branch: **Electronics & Instrumentation/Applied Electronics & Instrumentation** Semester: **V**  
Subject: **Control System Engineering** Code: **312555(27)**  
Total Theory Periods: **40** Total Tutorial Periods: **10**  
No. of class Tests to be conducted: **2 (Minimum)** No. of assignments to be submitted: **2 (Minimum)**  
ESE Duration: **Three Hours** Maximum Marks in ESE: **80** Minimum Marks in ESE: **28**

## Course Objectives:

1. To provide knowledge about the Block Diagram Algebra and Modeling of System.
2. To provide knowledge about the Time Response Analysis of Control Systems.
3. To provide knowledge about the Root Locus & Bode Plots.
4. To provide knowledge about the polar & Nyquist Plots.
5. To make familiar the students about the Basic Compensators.
6. To make familiar the students about the State Space Analysis.

## Course outcomes: Students will be able to

1. Gain knowledge about the Block Diagram Algebra and Modeling of System.
2. Analyze Time Response Analysis of Control Systems.
3. Gain knowledge about the Root Locus & Bode Plots.
4. Gain knowledge about the polar & Nyquist Plots.
5. Familiar about the Basic Compensators and State Space Analysis.

**UNIT I Block Diagram Representation and Modeling Systems:** Basic of Control Systems, Classification of Control systems, Transfer Function, Block Diagram Algebra, Signal Flow Graphs. Analysis of Mechanical System, Analogous Systems, Analogous Systems, Analysis of Commonly Used Systems.

**UNIT II Time Response Analysis of Control Systems:** Definition and classification of Time Response, Standard Test Signals, Time Response Analysis of First Order Control System, Time Response Analysis of Second order Control System, Design Specification of second order Systems, Steady State Error and Error Constants, Dynamic Error Coefficients, Routh-Hurwitz Stability, Introduction to PID Controllers.

**UNIT III Root locus & Bode Plots:** Basic Concept of Root Locus, Rules for Construction of Root Locus, Effect of Addition of Open Loop Poles & Zeros on Root Locus and Stability Analysis, Root Contours, Introduction to Bode Plot, Bode Plots of Standard Factors of Open Loop Transfer Function, Frequency Response Specifications, Effect of adding poles and zeros on stability, Asymptotic stability.

**UNIT IV Polar & Nyquist Plots:** Introduction to Polar Plots, Stability on Polar Plots, Nyquist Stability Criteria, Assessment of Relative Stability. Types of Compensation, Cascade & Feedback Compensation, Realization of Basic Compensators, M & N circles, Nicholas Chart, Relative stability due to addition of poles and zeros of a transfer function.

**UNIT V State Space Analysis:** Introduction to State Space, Concept of State Model, Transfer Function Decomposition, State Modal of Electrical Network, Solution of State Equation, State Transition Matrix, Concept of Controllability and Observability, Advantages of State Space Analysis.

## Name of Text Books:

1. Control System Engineering, L. Nagrath and Gopal, New Age International Publications.
2. Automatic Control System, B. C. Kuo, PHI.

## Name of Reference Books:

1. Modern Control Engineering, Ogata, Person Education.
2. Principles of Control Systems, S. C. Goyal & U. A. Bakshi, Technical Publications.
3. Modern Control Of Engineering, Roy Choudhury, PHI.
4. Principles of Control Systems, B. S., Technical Publication.

Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch:	<b>Electronics &amp; Telecommunication/Electronics &amp; Instrumentation/Applied Electronics &amp; Instrumentation</b>	Semester:	<b>V</b>		
Subject:	<b>Advanced Microprocessors &amp; Interfacing</b>	Code:	<b>312556(28)</b>		
Total Theory Periods:	<b>40</b>	Total Tutorial Periods:	<b>10</b>		
No. of class Tests to be conducted:	<b>2 (Minimum)</b>	No. of assignments to be submitted:	<b>2 (Minimum)</b>		
ESE Duration:	<b>Three Hours</b>	Maximum Marks in ESE:	<b>80</b>	Minimum Marks in ESE:	<b>28</b>

## Course Objectives:

1. To learn the functional and technological characteristics of 8086 microprocessor.
2. Understand about memory components, peripherals and their interface.
3. Enable the students to understand the general and advanced features of 16/32 bit microprocessors

## Course Outcomes:

1. Gain knowledge about architecture of advance microprocessors.
2. Demonstrate the ability to program the 8086 microprocessor.
3. Interface the 8086 microprocessor to the outside world.
4. Understand multiprocessor systems and learn about co-processors.

- UNIT I Architecture of 8086:** Differences Between 8085 and 8086, Overview of 8086 Microprocessor Family, Architecture and Pin Configuration of 8086, System Bus Structure: Basic 8086/8088 system bus architecture, Minimum Mode Configuration, Maximum Mode configuration; System Bus Timings, Bus Standards. 8087 Numeric Data Processor & 8089 I/O Processor: Architecture only (no Programming)
- UNIT II Instruction Set and Assembly Language Programming of 8086:** Instruction Format; Addressing modes, Data Transfer Instruction, Arithmetic Instructions, Branching and Looping Instructions, NOP and Halt, Flag Manipulation Instructions, Logical, Shift and Rotate Instruction. Byte and String Manipulation: String Instructions; REP Prefix, Table Translation, Number Format conversions. Assembler Directives and Operators, Translation of Assembler Instructions. Programming of Microprocessor 8086, Interrupts of Microprocessor 8086.
- UNIT III Interfacing – I (With 8086 only):** Memory interfacing, Interrupt Priority Management System based on 8259A, Interfacing of 8254 (Programmable Interval Timer), Interfacing of 8257 and 8251 with 8086.
- UNIT IV Interfacing – II (with 8086 only):** Architecture and Interfacing of 8-bit ADC (0808/0809) and DAC (0800) with 8086 using PPI 8255. Interfacing of Stepper motor, 8279 (Keyboard & Display Driver) and LCD interface with 8086.
- UNIT V Architecture of 32 Bit Microprocessors:** Intel 80386 Architecture, Special 80386 Registers, Memory Management, Interrupts and Exceptions, Management of Tasks – Real, Protected and Virtual 8086 mode, Architectural Differences Between 80486 and 80386 Microprocessor.

## Text Books:

1. Microcomputer Systems: The 8086/8088 Family - Architecture, Programming, and Design; Y. Liu and G. A. Gibson, 2nd Ed., PHI. (Unit I, II, III & IV)
2. Microprocessors & Interfacing – Douglas V Hall, The McGraw-Hill Companies. (Unit I, II & V)

## Reference Books:

1. The 8086 Microprocessor: Programming & Interfacing the PC, Kenneth J. Ayala, Penram International Publishing (India).
2. The Intel Microprocessor 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium & Pentium Pro Processor: Architecture, Programming & Interfacing – Barry B Brey, Pearson Education.
3. Advanced Microprocessors and Peripherals, K M Bhurchandi and A K Ray, 3rd Edition, The McGraw-Hill Companies.
4. Advanced Microprocessor, Rajasree, New Age International Publishers.

Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years

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# Chhattisgarh Swami Vivekanand Technical University, Bilai

Branch: **Applied Electronics & Instrumentation**  
Subject: **Control System Engineering Laboratory**  
Total Lab Periods: **36**  
Maximum Marks: **40**

Semester: **V**  
Code: **312561(12)**  
Batch Size: **30**  
Minimum Marks: **20**

## **List of Experiments:** (At least ten experiments are to be performed by each student)

1. To determine the Gain of an Open Loop and Closed Loop System.
2. To Study the Effect of Disturbance On an Open loop and Closed Loop System.
3. To Determine the Transfer function of a DC Servomotor.
4. To Study the time response of a second order system.
5. Characteristics of Synchro Transmitter and Receiver Pair.
6. Determination of Transfer Function of an AC Servomotor.
7. To study a potentiometer as an Error Detector.
8. Study of bode Plot of a Type 0, Type I and Type II Systems.
9. Displacement Measurement using LVDT.
10. Simulation of Transfer Function using Op-Amp (Analog Computer Trainer)
11. Study of P, PI controller on second order system.
12. Study of PID controller on second order system.
13. To study the operation and Characteristic of a Stepper Motor.
14. To study the Lag Compensator and Lead Compensator.
15. To study the Lag-Lead Compensator.

## **Matlab based Experiments**

16. Simulation of step response and ramp response of first order system using simulink.
17. Simulation of step response of second order system using simulink.
18. Determination of time domain specification and step response of second order under damped system using simulink.
19. Root locus, bode plot and polar plots for a given transfer function.
20. Frequency response of lead and lag compensator networks.
21. Simulation response of speed control of series and shunt excited dc motor.

## **Apparatus/Software Required:**

An open and closed loop system with two input signals (one acting as reference and the other as the disturbance signal), A R-L or R-C Circuit, Bread board, CRO, Multimeters, Function Generator, Synchro Transmitter-receiver Pair, AC Servomotor, Potentiometer, Bode Plot Analyzer, Linear Variable Differential Transformer, Analog Computer trainer, P, PI, PID Controller trainer, Stepper Motor, Lag Compensator, Lead Compensator, Lag-Lead Compensator, Matlab with simulink.

## **Reference Books:**

1. Control System Engg. By Nagrath and Gopal, New Age International Publications.
2. Linear control systems; Prof. B.S.Manke, Khanna Publication.

# Chhattisgarh Swami Vivekanand Technical University, Bilai

Branch: **Applied Electronics & Instrumentation**  
Subject: **Signal Conditioning Circuits Laboratory**  
Total Lab Periods: **36**  
Maximum Marks: **40**

Semester: **V**  
Code: **312562(12)**  
Batch Size: **30**  
Minimum Marks: **20**

**List of Experiments:** (At least ten experiments are to be performed by each student)

1. To design and implement voltage follower using operational amplifier.
2. To design a Monostable Multivibrator using transistors.
3. To design an Astable Multivibrator using transistors.
4. To design and implement clipper and clamper circuits using operational amplifier.
5. To design and implement RC integrator and differentiator circuits using operational amplifier.
6. To design and implement zero crossing detector using operational amplifier.
7. To design and implement precision half wave & full wave rectifier using operational amplifier.
8. To design and implement log and antilog amplifier using operational amplifier.
9. Study of integrator & differentiator circuit using operational amplifier.
10. To design and implement summer and subtractor using operational amplifier.
11. To design and implement a Schmitt trigger circuit using operational amplifier.
12. To design a Monostable Multivibrator using IC-555 timer.
13. To design an Astable Multivibrator using IC-555 timer.
14. To design and implement Peak detector using operational amplifier.
15. To design a Bistable Multivibrator using transistor.

## **List of Equipments/Machine Required:**

Discrete Components, Function Generator, Power Supply, CRO, IC 741.

## **Recommended Books:**

Laboratory Manual for Operational Amplifiers and Linear ICs, David Bell, PHI.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch:	<b>Applied Electronics &amp; Instrumentation</b>	Semester:	<b>V</b>
Subject:	<b>Advanced Microprocessor &amp; Interfacing Laboratory</b>	Code:	<b>312563(12)</b>
Total Lab Periods:	<b>36</b>	Batch Size:	<b>30</b>
Maximum Marks:	<b>40</b>	Minimum Marks:	<b>20</b>

**List of Experiments:** *(At least Ten experiments are to be performed by each student)*

1. To write a program to perform subtraction X-Y where X and Y are 48 bit numbers.
2. To write a program to multiply 4 and 5 in ASCII and store the result.
3. To find the largest number from a block of 15 bytes
4. To find the smallest number from a block of 15 bytes
5. To write a program to add series of 20 bytes.
6. A block of 200-signed bytes is present in memory from address BA: EA add all the positive bytes and store 8 bit signed result in memory after this block.
7. To write a program to compare two data blocks.
8. To write a program to scan for a specific word in the block and to store the location of the word at a suitable memory location.
9. To write an assembly language program to solve following arithmetic equation:  $3AX+5DX+BP$ .
10. To write a program to arrange a data block in ascending/descending order.
11. To write a program to arrange a data block in descending order.
12. To write a program to insert a specific data byte in an array under certain given conditions.
13. To write program to input a 4 bit BCD number, look up the seven segment code for this number and output to the display.
14. Interface 8279 and Write a program to display a message.
15. Interface 8254 with 8086 and write a program to generate a given delay.
16. Interface 8255 with 8086 and write a program to input a given set of data through Port A and output the complement of the set of data through Port B.
17. Study the Traffic Light Interface.
18. Interface a stepper motor with 8086 and write a program to rotate the motor in a given step in a given direction.
19. Interface 8251 with 8086 and write a program to generate a train of Sync pulses of given duration.

### List of Equipments/Machine Required:

8086 Microprocessor kit, Keyboard, Assembler, PCs.

### Recommended Books:

The Intel 8086/8088 Microprocessor Architecture, Programming, Design and Interfacing – Bhupinder Singh Chhabra, Dhanpat Rai Publications.

Name of the Programme: Bachelor of Engineering ::: Duration of the Programme: Four Years

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch: **Applied Electronics & Instrumentation**  
Subject: **Medical Measurement & Instrumentation Laboratory**  
Total Lab Periods: **36**  
Maximum Marks: **40**

Semester: **V**  
Code: **312564 (12)**  
Batch Size: **30**  
Minimum Marks: **20**

**List of Experiments:** (At least ten experiments are to be performed by each student)

1. Processing of simulated ECG signal
2. Processing of simulated EEG signal
3. Processing of simulated Heart sound
4. To measure pH value of given solution pH meter.
5. Find out concentration of (Na or K) by flame photo meter in the given sample.
6. To measure transmittance and absorption of a solution using Single beam spectrophoto meter.
7. To study water analysis kit & measure pH, temperature, conductivity of a given solution.
8. To measure the dissolved O<sub>2</sub> of a given solution.
9. Study of Blood Pressure Measurement.
10. Study of Respiration Rate Monitor system.
11. Study of Ultrasonic investigation with the eye dummy.
12. Study of Electro-myograph.
13. Study of Phonocardiograph System
14. Study of Doppler Sonography
15. To study and measure the blood *glucose*.

**List of equipments:**

Electronic Workbench, biomedical sensor, biomedical trainer kit.

**Reference book:**

Handbook of Biomedical Instrumentation by R.S. Khandpur, Tata Mc Graw Hill publisher

Biomedical Instrumentation & Measurement by L. Cromwell, F.J. Weibell and E.A. Pfeiffer, 2nd Ed., PHI

# Chhattisgarh Swami Vivekanand Technical University, Bilai

Name of Program:	<b>Bachelor of Engineering</b>	Semester:	<b>V</b>
Branch:	<b>Common to All Branches</b>	Code:	<b>300565 (46)</b>
Subject:	<b>Personality Development</b>	Tutorial Period:	<b>NIL</b>
No. of Lectures:	<b>2/Week</b>	Marks in TA:	<b>20</b>
Total Marks in ESE:	<b>NIL</b>	Minimum number of Class Tests to be conducted:	<b>Two</b>

**Objective:** The course is introduced to develop one's outer and inner personality tremendously and enrich the abilities to enable one to meet the challenges associated with different job levels. Personality Development is essential for overall development of an individual apart from gaining technical knowledge in the subject.

## Course Objectives

Upon completion of this course, the student shall be able

- To understand the concept of personality and image;
- To develop leadership, listening and interacting skills;
- To develop attitudinal changes;
- To develop decision-making qualities; and
- To communication skill.

**UNIT I Personality concepts:** What is Personality – its physical and psychic aspects. How to develop a positive self-image. How to aim at Excellence. How to apply the cosmic laws that govern life and personality. How to improve Memory – How to develop successful learning skills. How to develop and effectively use one's creative power. How to apply the individual MOTIVATORS that make you a self-power personality.

**UNIT II Interpersonal Skills:** Leadership: Leaders who make a difference, Leadership: your idea, What do we know about leadership? If you are serious about Excellence. Concepts of leadership, Two important keys to effective leadership, Principles of leadership, Factors of leadership, Attributes. Listening: Listening skills, How to listen, Saying a lot- just by listening, The words and the music, How to talk to a disturbed person, Listening and sometimes challenging. How to win friends and influence people, How to get along with others. How to develop art of convincing others. How can one make the difference. How to deal with others particularly elders. Conflicts and cooperation.

**UNIT III Attitudinal Changes: Meaning of attitude,** benefits of positive attitudes, How to develop the habit of positive thinking.

**Negative attitude and wining:** What is FEAR and how to win it. How to win loneliness. How to win over FAILURE. How to win over PAIN. How to win over one's ANGER and others anger. What is stress and how to cope up with it? The art of self-motivation. How to acquire mental well-being. How to acquire physical well-being.

**UNIT IV Decision Making:** How to make your own LUCK. How to plan goals/objectives and action plan to achieve them. How to make RIGHT DECISION and overcome problems. How to make a Decision. Decision making: A question of style. Which style, when? People decisions: The key decisions. What do we know about group decision making? General aids towards improving group decision making.

**UNIT V Communication Skills: Public Speaking:** Importance of Public speaking for professionals. The art of Speaking - Forget the fear of presentation, Symptoms of stage fear, Main reason for speech failure, Stop failures by acquiring Information; Preparation & designing of speech, Skills to impress in public speaking & Conversation, Use of presentation aids & media.

**Study & Examination:** How to tackle examination, How to develop successful study skills.

**Group discussions:** Purpose of GD, What factors contribute to group worthiness, Roles to be played in GD.

## Course Outcomes:

- The students will be able to develop inner and outer personality exposure;
- The students will be able to develop effective leadership qualities and interacting skills;
- The students will be able to develop positive attitude, motivating skills and develop winning philosophies;
- The students will be able to develop decision-making tools; and
- The students will be able to develop group presentation, public speaking and impressive conversation.

## Text Books:

1. Basic Managerial Skills for all by E. H. McGrawth, prentice Hall India Pvt. Ltd., 2006
2. Basic Employability Skills by P. B. Deshmukh, BSP Books Pvt. Ltd., Hyderabad, 2014

## Reference Books:

1. How to Develop a Pleasing Personality by Atul John Rego, Better Yourself Books, Mumbai, 2000
2. How to Succeed by Brain Adams, Better Yourself Books, Mumbai, 1969
3. Personality: Classic Theories & Modern Research; Friedman ; Pearson Education, 2006
4. How to Win Friends and Influence People by Dale Carnigie, A. H. Wheeler 2006

Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years