

**Vivekanand College, Kolhapur (Autonomous)**

Department of Electronics

Academic Year: 2020-21

**Annual Teaching Plan**

Name of the teacher: **Mr. D. M. Panhalkar**

Programme: **B.Sc. III Semester-V**

Subject: Electronics Course Title: **DSE-1005E1 Microcontroller Interfacing and Embedded C**

Month : August 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Unit 1: Introduction to embedded C</b> GROUP A :( LIC & PLC)) 1. Instrumentation amplifier 2. Precision rectifier using OPAMP 3. Log amplifier using OPAMP 4. Active filter : Low and High pass 5. Study of active filter : band pass 6. Study of V to F and F to V using PLL. <b>Project work</b>	Advantages and disadvantages of programming in 8051-C & Assembly Language. Data types, operators and loops, I/O programming, Accessing SFR addresses, Logical operation. Data conversion programs, Accessing ROM space, programming for Time delay generation
12	80	92		
Month: September 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Unit 2:</b> <b>Real World Interfacing of 8051</b> GROUP A:(LIC & PLC) 7. Study of PLC Simulator and 8. implementing Boolean function Programming with PLC for 9. Sequential logic RS ,JK-FF,T,D-FF 10.Study of PLC timers and counters	Interfacing to output devices – LED, Relay, LCD, seven segment display, seven segment display (multiplexing mode), DC Motor, Stepper Motor. Interfacing to input devices – Switch, 4X4 matrix keyboard, opto-coupler, thumb wheel switch.
12	80	92		
Month : October 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Unit 3: Serial communication in 8051.</b> GROUP B: (Antenna) 1. Study of simple dipole $\lambda/2$ antenna 2. Study of folded dipole $\lambda/2$ antenna 3. Study of simple dipole $\lambda/4$ antenna 4. Study of Yagi - Uda with 3 and 5 ele. 5. Study of SCR characteristics 6. Study of AC / DC Timer 7. SCR firing by UJT 8. AC Voltage controller <b>Project work</b>	Serial Port : Serial port of 8051, RS-232 standard and IC MAX-232, Concept of Baud rate, Baud rate in 8051, SBUF register, SCON register, various modes of serial port, Importance of TI and RI flags, programming for data transmission and reception.
12	80	92		
Month : November 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Unit 4: Applications of 8051</b> GROUP B: (Power Electronics) <b>MATLAB &amp; Simulink/ Scilab Based :</b> 9. Introduction to MATLAB/Scilab 10. To study the simulation of single phase half wave controlled rectifier with R & RL 11.To study single phase half controlled bridge rectifier with R <b>Project work</b>	Case study's: i) Gate Emulator (Logic Gate study using microcontroller) ii) Water level controller iii) speed control of DC motor iv) Temperature measurement using LM35, ADC0804, LCD
12	80	92		

Mr. D. M. Panhalkar



Mr. D. M. Panhalkar

**Head**  
 Department of Electronics  
 Vivekanand College, Kolhapur.

# Vivekanand College, Kolhapur (Autonomous)

Department of Electronics

Academic Year: 2020-21

## Annual Teaching Plan

Name of the teacher: **Mr. D. M. Panhalkar**

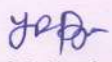
Programme: B.Sc. III Semester- VI

Subject: Electronics Course Title: **DSE-1005F1 Industrial Process Control**

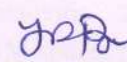
Month : February 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Unit 1: Introduction to control system</b> <b>GROUP C: (<math>\mu</math>C 8051 &amp; FPGA )</b> 1. Arithmetic and logical operations using 8051 $\mu$ C. 2. Switch and Relay interfacing to 8051 3. DC motor interfacing to 8051 $\mu$ C. 4. Study of Timers in 8051 $\mu$ C 5. Stepper Motor interfacing to 8051 $\mu$ C. 6. DAC0808 interfacing to 8051 $\mu$ C 7. ADC0804 interfacing to 8051 $\mu$ C 8. Serial communication with PC <b>Project work</b>	Significance Transfer Function, Types and order of transfer function (Open loop and Close loop transfer system), Block diagram of Control System and reduction rules, Basic elements of control system, open loop control system, closed loop control system Proportional control, PI controller, PD controller and PID control. Introduction to Fuzzy Controller
12	80	92		
Month: March 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Unit 2: Components of Control System</b> <b>GROUP C: (<math>\mu</math>C 8051 &amp; FPGA )</b> 9. Design and simulation of a 4 bit Adder using VHDL. 10. Write VHDL code to realize Mux (4x1) & De-Mux (1x4) 11. Write VHDL code to realize Decoder -Encoder using logic gates. 12. Write VHDL code to realize Clocked D, JK and T Flip flops	Op-amp as a zero crossing detector, non-inverting comparator, inverting comparator, two position control using op-amp, proportional controller, integral controller using Op-amp, derivative controller, PI controller, PID controller.
12	80	92		
Month : April 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Unit 3: Introduction to PLC</b>  <b>Practicals:</b> <b>GROUP D: (AVR &amp; Instrumentation)</b> 1. Interfacing of Switches and LED. 2. LCD Interfacing with Arduino 3. Stepper Motor Interfacing 4. Temperature sensor LM35 Interface 5. Interface temp. sensor & Humidity Sensor (DHT11)	Programmable logic controller (PLC) basics: Definition, overview of PLC systems, block diagram of PLC, input/output modules, power supplies, isolators, features like scan time, system scale, user interface
12	80	92		



Month : May 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit 4: <b>Ladder Programming basics</b> <b>Practicals:</b> GROUP D: (AVR and IoT) 6. Accelerometer Sensor Interfacing 7. Study of RTD and Thermister. 8. Function generator using IC 8038 9. Automatic Porch light control using LDR and relay. 10. Study of the characteristics of RTD <b>Project work</b>	<b>Basic components:</b> fuse, pushbutton, selector switches, limit switches, indicators, relay, timedelay relays functions and symbols. General PLC programming procedures, programming on-off inputs/ outputs. Auxiliary commands and functions: Application program Bottle filling plant, elevator control, washing machine control
12	80	92		

  
Mr. D. M. Panhalkar



  
Mr. D. M. Panhalkar

**Head**  
**Department of Electronics**  
**Vivekanand College, Kolhapur.**

# Vivekanand College, Kolhapur (Autonomous)

Department of Electronics

Academic Year: 2020-21


## Annual Teaching Plan

Name of the teacher: **Mr. P. R. Bagade**

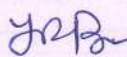
Programme: **B.Sc. II Semester- III**

Subject: Electronics Course Title: **DSC-1005C Section-I Electronics Communication**

Month : August 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit 1:Electronic Communication <b>Practicals Group A:</b>	Introduction to communication-meaning and types, Block diagram of an electronic communication system, TRAI, Electromagnetic communication spectrum, band designations and usage. Channels and base band signals, concept of Noise, (S/N) ratio.
12	32	44	1. To study Amplitude Modulator and demodulator 2. To study envelope detector for demodulation of AM signal 3. To study FM modulator 4. To study TDM. 5. Study Pulse Amplitude Modulation 6. To study Pulse Width Modulation	
Month: September 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit 2: Analog Modulation- Demodulation <b>Practicals Group A:</b>	Need for modulation, Amplitude Modulation (AM) modulation index and frequency spectrum. Generation of AM (using Transistor), Concept of DSB, SSB generation. AM: diode detector. PM ; concept only,
12	32	44	7. To study ASK Modulator 8. To study PSK Modulator 9. To study FSK Modulator	
Month : October 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit 2: Analog Modulation- Demodulation <b>Practicals Group B (8085):</b>	FM: Modulation index and frequency spectrum, equivalence between FM and AM. Generation of FM using VCO. FM detector (Slope detector), Super heterodyne radio receiver
12	32	44	1. Addition and subtraction of numbers using direct addressing mode 2. Addition and subtraction of numbers 3. Multiplication by repeated addition. 4. Division by repeated subtraction	
Month : November 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit 3: Satellite communication <b>Practical Group B (8085):</b>	Introduction, Need, Geosynchronous satellite orbits, geostationary satellite, advantages of geostationary satellite. Satellite visibility, transponders (C- Band), path loss, ground station, simplified block diagram of earth station. Uplink and down link.
12	32	44	5. Addition of 16-bit Numbers. 6. Use of CALL and RETURN Instruction. 7. Block data handling. 8. Other programs (e.g. Parity Check, using interrupts, etc.).	

  
Mr. P. R. Bagade



  
Mr. D. M. Panhalkar

**Head**  
**Department of Electronics**  
**Vivekanand College, Kolhapur.**

## Vivekanand College, Kolhapur (Autonomous)

Department of Electronics

Academic Year: 2020-21

### Annual Teaching Plan

Name of the teacher: **Mr. P. R. Bagade**

Programme: **B.Sc. II Semester-IV**

Subject: Electronics

Course Title: **DSC-1005D Section-I Advance Communication**

Month : February 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit 1: Analog Pulse Modulation <b>Practical's Group C (8051) :</b>	Channel capacity, Sampling theorem, Basic Principles-PAM, PWM, PPM, modulation and detection technique for PAM only.
12	32	44	1. Arithmetic operation using 8051 2. Logical operations using 8051. 3. Study of timers of 8051( mode 1& 2) 4. Study of interfacing of LED to 8051 microcontroller. 5. Study of interfacing of LED array. 6. Study of rotate instruction. 7. Interfacing of 7-segment display.	
Month: March 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit 2: <b>Digital Pulse Modulation</b> <b>Practical's Group C (8051):</b>	Need for digital transmission, Pulse Code Modulation, Sampling, Quantization and Encoding. Concept of Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), and Phase Shift Keying (BPSK and QPSK).
12	32	44	8. Study of interfacing multiplexed 7-segment display. 9. Study of interfacing of stepper motor. 10. Study of interfacing of D.C motor. <b>Practical's Group D (Skill Enhancement Course):</b> 1. Designing of Printed circuit board (PCB) using Software 2. Development of Printed circuit board 3. Soldering techniques: Assemble electronic circuit. 4. Temperature Controller using IC 741	
Month : April 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit 3: <b>Mobile Telephony System</b> <b>Practical's Group D (SEC):</b>	Basic concept of mobile communication, frequency bands used in mobile communication, concept of cell sectoring and cell splitting, Hand-off process, SIM number, IMEI number, Architecture (block diagram) of mobile communication network, idea of GSM, CDMA, TDMA and FDMA technologies, GPS navigation system (qualitative idea only)
12	32	44	5. Designing of Variable Power Supply using LM 317. 6. Build Regulated Power Supply using IC 7805 7. Build Dual Power Supply using IC 7809 and IC 7909 8. Assemble Electric Board with switches, sockets and Miniature circuit Breaker(MCB) 9. Build Lighting system using LED, Solar Panel and Chargeable Battery	

Mr. P. R. Bagade

Head  
Department of Electronics  
Vivekanand College, Kolhapur



Mr. D. M. Panhalkar

Head  
Department of Electronics  
Vivekanand College, Kolhapur.

**Vivekanand College, Kolhapur (Autonomous)**

Department of Electronics

Academic Year: 2020-21

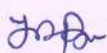
**Annual Teaching Plan**

Name of the teacher: **Mr. P. R. Bagade**

Programme: **B.Sc. III Semester-V**

Subject: Electronics Course Title: **DSE-1005E2 Section – II Antenna and Wave Propagation**

Month : August 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Unit 1:Antenna Basic</b> GROUP A :( LIC & PLC))	Antenna Definition and Function of antenna. Radiation Mechanism.
12	40	52	1. Instrumentation amplifier 2. Precision rectifier using OPAMP 3. Log amplifier using OPAMP 4. Active filter : Low and High pass 5. Study of active filter : band pass 6. Study of V to F and F to V using PLL. <b>Project work</b>	<b>Antenna Parameters:</b> Radiation pattern, Main Lobe and Side Lobes, Half-power, Radiation intensity, Antenna efficiency, Directivity, Gain, Bandwidth, Polarization, input impedance, radiation efficiency.
Month: September 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Unit 2:</b> <b>Antenna as a Transmitter/Receiver</b> GROUP A:(LIC & PLC)	Power delivered to antenna, Input impedance. Radiation from an infinitesimal small current element, Radiation from an elementary dipole (Hertzian dipole), Radiation resistance for small current element and half wave dipole antenna.
12	40	52	7. Study of PLC Simulator and implementing Boolean function 8. Programming with PLC for sequential logic RS ,JK-FF,T,D-FF 9. Study of PLC timers and counters	
Month : October 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Unit 3:Radiating wire Structures</b> GROUP B: (Antenna)	Monopole, Dipole, Folded dipole, Loop antenna and Biconical broadband Antenna. Basics of Patch Antenna and its design. Examples of Patch antenna like bowtie, sectoral, fractal. Concept of smart antenna.
12	40	52	1. Study of simple dipole $\lambda/2$ antenna 2. Study of folded dipole $\lambda/2$ antenna 3. Study of simple dipole $\lambda/4$ antenna 4. Study of Yagi - Uda with 3 and 5 ele. 5. Study of SCR characteristics 6. Study of AC / DC Timer 7. SCR firing by UJT 8. AC Voltage controller <b>Project work</b>	
Month : November 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Unit 4: Radio Wave Propagation</b> GROUP B: (Power Electronics) <b>MATLAB &amp; Simulink/ Scilab Based :</b>	Structure of atmosphere, Ground wave, Space Wave propagation. Sky Wave Propagation - Introduction, Structure of Ionosphere, Refraction and Reflection of Sky Waves by Ionosphere, Ray Path, Critical Frequency, MUF, Virtual Height and Skip Distance, Relation between MUF and skip Distance, Multi-hop Propagation
12	40	52	10.Introduction to MATLAB/Scilab 11.To study the simulation of single phase half wave controlled rectifier with R & RL 12.To study single phase half controlled bridge rectifier with R <b>Project work</b>	

  
Mr. P. R. Bagade



  
Mr. D. M. Panhalkar

**Head**  
**Department of Electronics**  
**Vivekanand College, Kolhapur.**

## Vivekanand College, Kolhapur (Autonomous)

Department of Electronics

Academic Year: 2020-21

### Annual Teaching Plan

Name of the teacher: **Mr. P. R. Bagade**

Programme: B.Sc. III Semester- VI

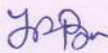
Subject: Electronics Course Title: **DSE-1005F2 Section – I Power Electronics**

Month : February 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Unit 1: Power semiconductor devices</b> <b>GROUP C: (<math>\mu</math>C 8051 &amp; FPGA )</b>	Definition, Need- semiconductor power devices, classification of power semiconductor devices, Power diode: structure, operation, conductivity modulation, I-V characteristics, Reverse recovery effect, series and parallel connection of diode, <b>Power transistor:</b> structure, operation, effect of drift layer. Switching characteristics, Power MOSFET: structure, characteristics, operation.
12	40	52	1. Arithmetic and logical operations using 8051 $\mu$ C. 2. Switch and Relay interfacing to 8051 3. DC motor interfacing to 8051 $\mu$ C. 4. Study of Timers in 8051 $\mu$ C 5. Stepper Motor interfacing to 8051 $\mu$ C. 6. DAC0808 interfacing to 8051 $\mu$ C 7. ADC0804 interfacing to 8051 $\mu$ C 8. Serial communication with PC <b>Project work</b>	
Month: March 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Unit 2: Thyristors</b> <b>GROUP C: (<math>\mu</math>C 8051 &amp; FPGA )</b>	Types of Thyristors, Structure of SCR, SCR Characteristics, two transistor analogy - Methods of turning ON and turning OFF, dv/dt and di/dt protection, gate protection circuits Diac and Triac: Basic structure, working and V-I characteristic. IGBT: Structure, characteristics, Operation and drive circuits, Comparison of power transistor, MOSFET and IGBT.
12	40	52	9. Design and simulation of a 4 bit Adder using VHDL. 10. Write VHDL code to realize Mux (4x1) & De-Mux (1x4) 11. Write VHDL code to realize Decoder -Encoder using logic gates. 12. Write VHDL code to realize Clocked D, JK and T Flip flops	
Month : April 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Unit 3: Controlled Rectifiers</b> <b>Practicals:</b> <b>GROUP D: (AVR &amp; Instrumentation)</b>	Basics of single and three phase supply phase and line voltage waveforms, SCR as a static switch, phase controlled rectification, single phase half wave, full wave, bridge rectifiers with resistive & inductive loads.
12	40	52	1. Interfacing of Switches and LED. 2. LCD Interfacing with Arduino 3. Stepper Motor Interfacing 4. Temperature sensor LM35 Interface 5. Interface temp. sensor & Humidity Sensor (DHT11)	

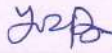
Head  
Department of Electronics  
Vivekanand College, Kolhapur



Month : May 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit 4: <b>Power Systems</b>	Power Supplies: Switch mode power supply (DC): flyback, forward, half bridge and full bridge converters. Uninterrupted power supply (UPS), Electronic Ballast, power factor correction
12	40	52	<b>Practicals:</b> GROUP D: (AVR and IoT) 6. Accelerometer Sensor Interfacing 7. Study of RTD and Thermister. 8. Function generator using IC 8038 9. Automatic Porch light control using LDR and relay. 10. Study of the characteristics of RTD <b>Project work</b>	

  
Mr. P. R. Bagade



  
Mr. D. M. Panhalkar

**Head**  
**Department of Electronics**  
**Vivekanand College, Kolhapur.**



# Vivekanand College, Kolhapur (Autonomous)

Department of Electronics

Academic Year: 2020-21

## Annual Teaching Plan


Name of the Teacher: **Mr. N. P. Mote**

Programme: B.Sc. I Semester- I

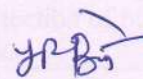
Subject: Electronics

Course Title: **Practicals**

Month : June 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Practicals:</b>	
0	16	16	2. Measurement of Amplitude, Frequency & Phase difference using Oscilloscope. 3. Verification of (a) Thevenin's theorem and (b) Norton's theorem. 4. Verification of Superposition Theorem.	
Month: July 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Practicals:</b>	
0	16	16	5. Verification of the Maximum Power Transfer Theorem. 6. Study of the I-V Characteristics of (a) p-n junction Diode, and (b) Zener diode. 7. Study of (a) Half wave rectifier and (b) Full wave rectifier (FWR).	
Month : August 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Practicals:</b>	
0	16	16	8. Study the effect of (a) C- filter and (b) Zener regulator on the output of FWR. 9. Study of the I-V Characteristics of UJT and design relaxation oscillator. 10. Study of the output and transfer I-V characteristics of common source JFET.	
Month : September 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Practicals:</b>	
0	16	16	11. Study of Fixed Bias and Voltage divider bias configuration for CE transistor. 12. Design of a Single Stage CE amplifier of given gain. 13. Study of the RC Phase Shift Oscillator.	

  
Mr. N. P. Mote



  
Mr. D. M. Panhalkar

**Head**  
**Department of Electronics**  
**Vivekanand College, Kolhapur.**

# Vivekanand College, Kolhapur (Autonomous)

Department of Electronics

Academic Year: 2020-21

## Annual Teaching Plan

Name of the Teacher: **Mr. N. P. Mote**

Programme: B.Sc. II Semester- III and IV

Subject: Electronics

Course Title: **Practicals**

Month : June 2020			Module/Unit:	Sub-units planned
Lectures 0	Practicals 48	Total 48	<b>Practicals:</b> <b>Group B : (Antenna and Power Electronics)</b> 1. Study of simple dipole $\lambda/2$ antenna 2. Study of folded dipole $\lambda/2$ antenna 3. Study of simple dipole $\lambda/4$ antenna 4. Study of Yagi-Uda with 3 and 5 element simple dipole antenna 5. Study of SCR characteristics (static) <b>Project work</b>	
Month: July 2020			Module/Unit:	Sub-units planned
Lectures 0	Practicals 48	Total 48	<b>Practicals:</b> <b>Group B : (Antenna and Power Electronics)</b> 6. Study of AC / DC Timer 7. SCR firing by UJT 8. AC Voltage controller 9. Speed Control of DC Motor. 10. Study of ON/OFF Temperature controller (LM34/LM35/AD590) 11. Phase Shift control of SCR <b>Project work</b>	
Month : August 2020			Module/Unit:	Sub-units planned
Lectures 0	Practicals 48	Total 48	<b>Practicals:</b> <b>Group B : (Antenna and Power Electronics)</b> 12. Study of Introduction to MATLAB/Scilab 13. To study the simulation of single phase half wave controlled rectifier with R & RL-load using MATLAB - simulink/Scilab 14. To study the simulation of single phase half controlled bridge rectifier with R using MATLAB - simulink/Scilab	
Month : January 2022			Module/Unit:	Sub-units planned
Lectures 0	Practicals 48	Total 48	<b>Practicals:</b> 15. Amplitude Modulation-Modulation & Demodulation using MATLAB & Simulink/Scilab 16. Sampling Theorem using MATLAB & Simulink/Scilab <b>Project work</b>	

Mr N. P. Mote



Mr. D. M. Panhalkar

**Head**  
 Department of Electronics  
 Vivekanand College, Kolhapur

# Vivekanand College, Kolhapur (Autonomous)

Department of Electronics

Academic Year: 2020-21


## Annual Teaching Plan

Name of the Teacher: **Mr. N. P. Mote**

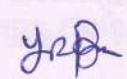
Programme: B.Sc. II Semester- III

Subject: Electronics Course Title: DSC -1005 C Electronics Communication and Microprocessor 8085

Month: June 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1) Microcomputer Organization:	Basic components of microcomputer (CPU, Program memory, Data memory, input and output ports, idea of RAM (SDRAM, DRAM) Types of ROM Memory Organization & addressing, Memory Interfacing, Memory Map.
12	00	12		
Month : July 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	2) Architecture of 8085 Microprocessor:	Silent features of 8085. Block diagram and Pin description of 8085. Data and address bus, Registers, ALU, Stack pointer, Program counter, Flag register, Clock and reset circuits. Interrupts in 8085. Demultiplexing of AD0-AD7. Tstates, Machine cycle, Instruction cycle. Timing diagram of MOV and MVI instructions.
12	00	12		
Month: August 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	3) Instruction Set of 8085 Microprocessor :	Instruction set, classification of Instruction Set, Instruction format, Addressing modes of Instructions, Instruction set: Data transfer (including stacks), Arithmetic, logical, branch and control instructions).
12	00	12		
Month: September 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	4) Programming with 8085 Microprocessor:	Programs of Addition (8 and 16 bit), Subtraction, Multiplication, Division, Block Transfer and Exchange, Masking, ascending and descending order, Time delay generation using register and register pair, Detection of odd and even numbers.
12	00	12		

  
Mr. N. P. Mote



  
Mr. D. M. Panhalkar

**Head**  
**Department of Electronics**  
**Vivekanand College, Kolhapur.**

# Vivekanand College, Kolhapur (Autonomous)

Department of Electronics

Academic Year: 2020-21

## Annual Teaching Plan

Name of the Teacher: **Mr. N. P. Mote**

Programme: B.Sc. II Semester- IV

Subject: Electronics Course Title: DSC -1005 D Advance Communication and Microcontroller 8051

Month: January 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1) Introduction to 8051 microcontroller:	Comparison between microprocessor and microcontroller. Silent feature of 8051 family, , Block diagram of 8051, Pin description of 8051 microcontroller, , RAM structure of 8051, SFR's and GPR's in 8051, PSW register ,Clock and reset circuit, Memory organization ,I/O Ports.
12	00	12		
Month : February 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	2) Instruction Set of 8051:	Classification of instruction sets, Addressing modes . Instruction set of 8051: data transfer, arithmetic, Logical, Jump, call, Boolean instructions
12	00	12		
Month: March 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	3) Timers, Serial port and Interrupts(Assembly)programming of 8051:	A. Timer: Timers in 8051, Timer Registers, modes and Programming of timers B. Serial ports: Serial port of 8051, modes, Registers Serial port, Serial port programming. C. Interrupt: Interrupt in 8051, Interrupt registers, Programming with interrupt.
12	00	12		
Month: April 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	4) Interfacing of Devices with 8051:	Introduction to embedded C, comparison of C and assembly, Data types in C, SFR accessing , I/O programming, logical operations in C. C language programming: Program to generate square wave on port pin, Interfacing of LED , Opto-coupler, Switch, Relay, DC motor and Stepper motor.
12	00	12		

Mr. N. P. Mote



Mr. D. M. Panhalkar

**Head**  
Department of Electronics  
Vivekanand College, Kolhapur.

## Vivekanand College, Kolhapur (Autonomous)

Department of Electronics

Academic Year: 2020-21

### Annual Teaching Plan

Name of the teacher: **Dr. P. S. Jadhav**

Programme: B.Sc. I Semester- I

Subject: Electronics Course Title: **DSC-1005A Section-II: Digital Electronics-I**

Month : August 2020			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Lecture: Unit 1: Number System, Binary Codes and Binary Arithmetic	Decimal, Binary, Octal and Hexadecimal number systems and their inter conversions. BCD code. ASCII code, Gray Code, Excess-3 Code, Binary Arithmetic: Addition, Subtraction by 1's complement and 2's complement method, Representation of signed and unsigned numbers
12	32	44	Practical's: Group A 1. To familiarize with basic electronic components (R, C, L, diodes, transistors), Digital Multimeter, Function Generator, power supplies and Oscilloscope etc. 2. Measurement of Amplitude, Frequency & Phase difference using Oscilloscope.	
Month: September 2020			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Lectures : Unit 2: Logic Gates, Boolean algebra:	Study of logic Gates: OR, AND, NOT, NOR, NAND, XOR, XNOR, Universal Gates, Boolean identities and Law's. Fundamental, theorems of Boolean algebra. Standard representation of logic functions (SOP and POS).
12	32	44	Practicals: 1. Verification of Norton's Theorem. 2. Verification of Superposition Theorem. 3. Verification of Thevenin's Theorem 4. Study of De-Morgans Theorems	
Month: October 2020			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Unit 3: Logic Families	Logic Families: Types of Logic Families, Characteristics of Logic Families, TTL NAND gate, TTL NOR gate, TTL NOT gate, Concept of Tristate Logic, MOS Technology, CMOS: NOR, NAND and NOT gates, Comparison of TTL and CMOS logic families
12	32	44	Practicals: 1. Study of the breakdown Characteristics of Zener Diode 2. Study of the I-V Characteristics of P-N junction Diodes. 3. Study of Half wave rectifier 4. Study of Full wave rectifier	



Month : November 2020			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Lecture :Unit 4:Combinational circuits: Practicals:	Multiplexers: - 2 to 1, 4 to 1 and 8 to 1.Demultiplexer: - 1 to 2,1 to 4, 1 to 8. Encoder: concept of encoder, Decimal to BCD Encoder. Basic Binary decoders: 2 to 4 line, 3 to 8 line and 4 to 16 line. BCD to decimal decoder, Study of BCD to seven-segment decoder driver IC 7447.
12	32	44	<ol style="list-style-type: none"> <li>1. Study of Logic Gates.</li> <li>2. Study of Universal Gates using fundamental gates.</li> </ol>	



Dr. P. S. Jadhav



Dr. C. B. Patil

**HEAD**  
**DEPARTMENT OF ELECTRONICS**  
**VIVEKANAND COLLEGE, KOLHAPUR**  
**(AUTONOMOUS)**



## Vivekanand College, Kolhapur (Autonomous)

Department of Electronics

Academic Year: 2020-21

Annual Teaching Plan

Name of the teacher: **Dr. P. S. Jadhav**

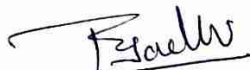
Programme: B.Sc. I Semester- II

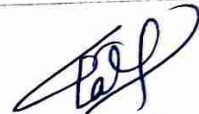
Subject: Electronics Course Title: **DSC-1005B Section- II Digital Electronics-II**

Month: December 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit 1: Sequential Circuit Practical: Group B	Concept of Flip-flop, RS, D and JK Flip-Flops Concept of Clock, Level and Edge Triggered RS, D, JK FF. Preset and Clear operations. Race-around conditions in JK Flip-Flop, Master-slave JK Flip-Flop, T-Flip-flop.
12	32	44	1. Study of Half Adder and Full Adder 2. Study of Multiplexer (4:1) and Demultiplexer (1:4) 3. Study of I-V Characteristics of JFET. 4. Study of Input and Output Characteristics of CE configuration of BJT	
Month : January 2021			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Unit 2: Shift registers and counters	Concept of register, Left shift and Right Shift operations, Types of shift registers: SISO, SIPO, PISO & PIPO (only up to 4 bits). Counters: classification of counters,
12	32	44	Practical: 1. Wein Bridge Oscillator. 2. Building and testing of RS Flip-Flop using NAND/NOR gate	
Month: February 2021			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Unit 2: Shift registers and counters	Asynchronous counters: 3 bit ripple counter, Decade Counter. Synchronous Counter: 3 bit and decade synchronous counter. Ring Counter and Johnson Counter .Applications of Counters.
12	32	44	Practical: 1. Building and testing D and JK Flip-Flop using IC 2. Design and study of an Astable Multivibrator using IC 555 Timer. 3. Design and study of a Monostable Multivibrator using IC 555 Timer.	
Month: March 2021			Module/Unit:	Sub-units planned



Lectures	Practical	Total	Unit 3: Data Converters	4 bit binary weighted and R-2R ladder network DAC: circuit and working. DAC Characteristics: Accuracy and Resolution. ADC: Flash, Counter type, successive approximation ADC. ADC Characteristics.
12	32	44	Practicals: 1. computer simulations: 2. Design clocked SR and JK Flip-Flops using Gates. 3. Design 4-bit asynchronous counter using Flip-Flop ICs	
Month: April 2021			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Lecture: Unit 4: Study of Timer IC555	IC555 timer: Introduction, Block diagram, Astable, Monostable and Bistable multivibrator circuits. Applications of IC555: PWM, square wave generator and FSK.
12	32	44	Practicals 1. Study of the Colpitt's oscillator 2. Study of the Hartley oscillator	

  
Dr. P. S. Jadhav

  
Dr. C. B. Patil

**HEAD**  
**DEPARTMENT OF ELECTRONICS**  
**VIVEKANAND COLLEGE, KOLHAPUR**  
**(AUTONOMOUS)**





## Vivekanand College, Kolhapur (Autonomous)

Department of Electronics

Academic Year: 2020-21

### Annual Teaching Plan

Name of the teacher: **Dr. P. S. Jadhav**

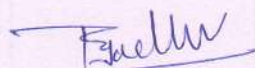
Programme: B.Sc. II Semester- III

Subject: Electronics Course Title: **ELECTRONICS LAB (II) : DSC -1005D(pr)**


Month: June 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1. To design an Amplitude Modulator using Transistor/ Op-amp 2. To study envelope detector for demodulation of AM signal 3. To study FM - Generator / Detector circuit	
0	16	16		
Month : July 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1. To study Pulse Amplitude Modulation (PAM) 2. To study Pulse Width Modulation (PWM) 3. To study Pulse Position Modulation (PPM)	
0	16	16		
Month: August 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1. Addition and subtraction of numbers using direct addressing mode 2. Addition and subtraction of numbers using indirect addressing mode 3. Multiplication by repeated addition.	
0	16	16		
Month: September 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1. Arithmetic operation using 8051 2. Logical operations using 8051. 3. Study of timers of 8051 in mode 1 and mode 2.	
0	16	16		
Month: October 2020			Module/Unit:	Sub-units planned



Lectures	Practicals	Total	1. Division by repeated subtraction. 2. Addition of 16-bit Numbers. 3. Use of CALL and RETURN Instruction. To study ASK modulator	
0	16	16		
Month: November 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1. To study FSK modulator 2. To study AM Transmitter / Receiver 3. To study FM Transmitter /Receiver	
0	16	16		
Month: December 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1. Block data handling. 2. To study Time Division Multiplexing (TDM) 3. To study PSK modulator	
0	16	16		

  
Dr. P. S. Jadhav



  
Mr. D. M. Panhalkar

**Head**  
**Department of Electronics**  
**Vivekanand College, Kolhapur.**

## Vivekanand College, Kolhapur (Autonomous)

Department of Electronics

Academic Year: 2020-21

### Annual Teaching Plan

Name of the teacher: **Dr. P. S. Jadhav**

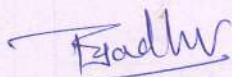
Programme: B.Sc. II Semester- IV

Subject: Electronics Course Title: **ELECTRONICS LAB (II) : DSC -1005D(pr)**

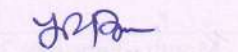
Month: January 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1. Logical operations using 8051. 2. Study of timers of 8051 in mode 1 and mode 2. 3. Study of interfacing of LED to 8051 microcontroller. 4. Study of interfacing of LED array	
0	16	16		
Month : February 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1. Study of interfacing of 7-segment display. 2. Study of interfacing multiplexed 7-segment display. 3. Study of interfacing of stepper motor. Study of interfacing of D.C motor. 4. Designing of Printed circuit board (PCB) using Software	
0	16	16		
Month: March 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1. Development of Printed circuit board (PCB) 2. Soldering techniques: Assemble electronic circuit 3. 4Temperature Controller using IC 741 /Microcontroller8051. 4. Designing of Variable Power Supply using LM 317.	
0	16	16		
Month: April 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1. Build Regulated Power Supply using	



0	16	16	IC 7805 2. Build Dual Power Supply using IC 7809 and IC 7909 3. Assemble Electric Board with switches, sockets and Miniature circuit Breaker(MCB) and measure Voltage, Current and Power for given device	
Month: May 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1. Study and fault finding of: Fan /Iron/ Mixer/Cell phone Charger 2. Build Lighting system using LED, Solar Panel and Chargeable Battery	
0	16	16		

  
Dr. P. S. Jadhav



  
Mr. D. M. Panhalkar

**Head**  
**Department of Electronics**  
**Vivekanand College, Kolhapur.**

## Vivekanand College, Kolhapur (Autonomous)

Department of Electronics

Academic Year: 2020-21

### Annual Teaching Plan

Name of the teacher: **Dr. P. S. Jadhav**

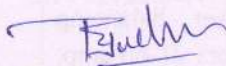
Programme: B.Sc. III Semester-V

Subject: Electronics Course Title: **DSC-1005E2 Section – I      Linear Integrated Circuits**

Month : June 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit 1: Operational Amplifier and Linear IC's	Transistor dc amplifier, Differential amplifier, Emitter coupled differential amplifier with its Operation, characteristics and parameters (I/O impedances, common mode and differential mode gain, CMRR), Dual input and single ended output configuration of differential amplifier.
12	0	12		
Month : July 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit1: Operational Amplifier and Linear IC's	Method to improve CMRR (constant current bias and current mirror bias), Introduction to op-amp, block diagram of op-amp, offset balancing technique of op-amp, drift Parameters of op-amp, study of IC 741 and comparative study of IC's OP 07, LM324, AD620
12	0	12		
Month: August 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit 2: Applications of Op-amp.	Virtual ground concept, Op-amp as inverting and non- inverting amplifier, summing amplifier (adder and Subtractor), V to I and I to V converter, voltage follower, bridge amplifier, Differentiator and integrator, log and antilog amplifier.
12	0	12		
Month: September 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit 2: Applications of Op-amp	Op-amp as comparator, regenerative comparator (Schmitt trigger), sine wave oscillators (phase shift and Wien -bridge), Triangular wave generator, square and pulse generator. Peak detector, clipping and clamping circuits
12	0	12		

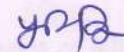


Month: October 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit 3: Precision Rectifier and Active filters	Precision rectifier, Op-amp as precision rectifier, Absolute value precision rectifier. Advantage of active filters over passive filters. Study of filter response (Butterworth, Chebyshev.) Different types of active filters. Study and design of low pass, high pass, band pass and band stop filter.
12	0	12		
Month : November 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit 4: Phase Locked Loops (PLL)	Block diagram of PLL with functioning of each block, calculation of capture range and lock range frequencies, application of PLL (frequency multiplier, FM modulator, frequency synthesizer and FSK) Study of IC565, IC8038. IC555 timer as variable duty cycle (10% to 90%), sequential timer, ramp generator.
12	0	12		



Dr. P. S. Jadhav





Mr. D. M. Panhalkar

**Head**  
**Department of Electronics**  
**Vivekanand College, Kolhapur.**

**Vivekanand College, Kolhapur (Autonomous)**

## Vivekanand College, Kolhapur (Autonomous)

Department of Electronics

Academic Year: 2020-21

### Annual Teaching Plan

Name of the teacher: **Dr. P. S. Jadhav**

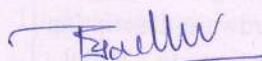
Programme: B.Sc. III Semester- VI

Subject: Electronics Course Title: **DSE-1005F2 Section- II FPGA& VHDL Programming**

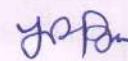
Month: March 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit 1: Introduction to Programmable Logic Devices	Evolution of Programmable logic devices, PAL, PLA and GAL. CPLD and FPGA architectures. Placement and routing. Logic Cell structure, Programmable interconnects, Logic blocks and I/O Ports. Clock distribution in FPGA
12	0	12		
Month: April 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit 2: Basics of VHDL	Introduction: Introduction to Computer-aided design tools for digital systems. Hardware description languages, introduction to VHDL, data objects classes and data types, operators,
12	0	12		
Month: May 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit 2: Basics of VHDL	overloading, logical operators, Types of delays, Entity and Architecture declaration, Introduction to behavioral, dataflow and structural models
12	0	12		
Month : June 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit 3: VHDL Programming	VHDL statements: Assignment statements, sequential statements and process, conditional statements, case statement, Array and loops, resolution functions, packages and Libraries, concurrent statements.



Month: July 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit 3: VHDL Programming	Subprograms: Application of Functions and Procedures, Structural Modelling, Component declaration, structural layout and generic
12	0	12		
Month: August 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit 4: Sequential and Combinational Circuit Design:	VHDL Models and Simulation of combinational circuits such as Multiplexers, Demultiplexers, encoders ,decoders, code converters, comparators. Implementation of Boolean functions etc. Sequential Circuits Design: VHDL Models and Simulation of sequential Circuits, Shift Registers, counters etc.
12	0	12		
12	0	12		

  
Dr. P. S. Jadhav



  
Mr. D. M. Panhalkar

**Head**  
**Department of Electronics**  
**Vivekanand College, Kolhapur.**



# Vivekanand College, Kolhapur (Autonomous)

Department of Electronics

Academic Year: 2020-21

## Annual Teaching Plan

Name of the teacher: **Dr. Milind S. Patil**

Programme: B.Sc. I Semester- I

Subject: Electronics

Course Title: **Practicals**

Month : June 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Practicals:</b> 2. Measurement of Amplitude, Frequency & Phase difference using Oscilloscope. 3. Verification of (a) Thevenin's theorem and (b) Norton's theorem. 4. Verification of Superposition Theorem.	
0	32	32		
Month: July 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Practicals:</b> 5. Verification of the Maximum Power Transfer Theorem.6. Study of the I-V Characteristics of (a) p-n junction Diode, and (b) Zener diode. 7. Study of (a) Half wave rectifier and (b) Full wave rectifier (FWR).	
0	32	32		
Month : August 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Practicals:</b> 8. Study the effect of (a) C- filter and (b) Zener regulator on the output of FWR. 9. Study of the I-V Characteristics of UJT and design relaxation oscillator. 10. Study of the output and transfer I-V characteristics of common source JFET.	
0	32	32		
Month : September 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Practicals:</b> 11. Study of Fixed Bias and Voltage divider bias configuration for CE transistor. 12. Design of a Single Stage CE amplifier of given gain. 13. Study of the RC Phase Shift Oscillator.	
0	32	32		

*Milind S. Patil*

Dr. Milind S. Patil



*D.M. Panhalkar*

Mr. D.M.Panhalkar

**Head**  
Department of Electronics  
Vivekanand College, Kolhapur.



Department of Electronics  
Vivekanand College, Kolhapur

# Vivekanand College, Kolhapur (Autonomous)

Department of Electronics

Academic Year: 2020-21

## Annual Teaching Plan

Name of the teacher: **Dr. Milind S. Patil**

Programme: B.Sc. III Semester- V

Subject: Electronics

Course Title: **Practicals**

Month : June 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Practicals:</b>	
0	40	40	<b>Group B : (Antenna and Power Electronics)</b> 1. Study of simple dipole $\lambda/2$ antenna 2. Study of folded dipole $\lambda/2$ antenna 3. Study of simple dipole $\lambda/4$ antenna 4. Study of Yagi-Uda with 3 and 5 element simple dipole antenna 5. Study of SCR characteristics (static) <b>Project work</b>	
Month: July 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Practicals:</b>	
0	40	40	<b>Group B : (Antenna and Power Electronics)</b> 6. Study of AC / DC Timer 7. SCR firing by UJT 8. AC Voltage controller 9. Speed Control of DC Motor. 10. Study of ON/OFF Temperature controller (LM34/LM35/AD590) 11. Phase Shift control of SCR <b>Project work</b>	
Month : August 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Practicals:</b>	
0	40	40	<b>Group B : (Antenna and Power Electronics)</b> 12. Study of Introduction to MATLAB/Scilab 13. To study the simulation of single phase half wave controlled rectifier with R & RL-load using MATLAB - simulink/Scilab 14. To study the simulation of single phase half controlled bridge rectifier with R using MATLAB - simulink/Scilab	
Month : January 2022			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Practicals:</b>	
0	40	40	15. Amplitude Modulation-Modulation & Demodulation using MATLAB & Simulink/Scilab 16. Sampling Theorem using MATLAB & Simulink/Scilab <b>Project work</b>	<i>M.D.P.</i>

*Milind S. Patil*

Dr. Milind S. Patil



*D.M. Panhalkar*

Mr. D.M.Panhalkar

**Head**

**Department of Electronics**  
**Vivekanand College, Kolhapur.**

# Vivekanand College, Kolhapur (Autonomous)

Department of Electronics

Academic Year: 2020-21

## Annual Teaching Plan

Name of the teacher: **Dr. Milind S. Patil**

Programme: B.Sc. III Semester- VI

Subject: Electronics Course Title: **DSE1005 F1 Section II Advanced Microcontroller**

Month: December 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1) Embedded Systems Design: 2) Introduction to AVR microcontroller:	1) What is embedded system, embedded system basic blocks, embedded system hardware and software, embedded system characteristics, embedded system applications.
12	40	52	<b>Practicals:</b> <b>Group D : (AVR and Instrumentation)</b> 1. Interfacing of Switches and LED with Arduino/AVR microcontroller. 2. LCD Interfacing with Arduino/AVR microcontroller. 3. Stepper Motor Interfacing with Arduino/AVR microcontroller. 4. Interface temperature sensor LM35 with Arduino board and display temperature on LCD. <b>Project work</b>	2) Overview of AVR family, ATmega8 pin configuration & function of each pin. AVR Microcontroller architecture, status register, Special function registers, SRAM, ROM & EEPROM space, On-Chip peripherals.
Month : January 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	3) AVR programming in C:	3) AVR Data types, AVR I/O port programming, Timer programming, Input capture and Wave Generator, PWM programming, External Interrupt programming, ADC programming, Serial Port programming.
12	40	52	4) Peripheral interfacing and embedded system:	4) Interfacing of Switches, Relays, LEDs, seven segment display 16x2 LCD Interfacing, Stepper interfacing.
			<b>Practicals:</b> <b>Group D : (AVR and Instrumentation)</b> 5. Interface temperature sensor Humidity Sensor (DHT11) with Arduino/AVR board and display temperature and humidity values on LCD. 6. Accelerometer Sensor Interfacing with Arduino/AVR microcontroller. 7. Study of temperature sensor RTD and Thermistor 8. Function generator using IC 8038 <b>Project work</b>	



Month: Feb 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	5) Designing of an Embedded System:	5) DC Motor speed control using PWM technique, Measurement of Temperature of an environment using sensor LM35, Dual channel Digital Voltmeter.
12	40	52		
Month: March 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Practicals:</b> <b>Group D : (AVR and Instrumentation)</b> 9. Automatic Porch light control using LDR and relay. 10. Study of the characteristics of Resistance Temperature Detector (RTD) 11. To study transducer (Thermistor/ Thermocouple) <b>Project work</b>	
12	40	52		

*Milind S. Patil*

Dr. Milind S. Patil



*D. M. Panhalkar*

Mr. D. M. Panhalkar

**Head**  
**Department of Electronics**  
**Vivekanand College, Kolhapur.**