VIJAYANAGARA SRI KRISHNADEVARAYA UNIVERSITY
JNANASAGARA CAMPUS, BALLARI-583105

Department of Electronics

V & VI Semester Syllabus

B.Sc. Electronics

With effect from 2023-24 and onwards

Third Year: 5th Semester										
Objective: Real time learning and ability to solve complex problems that are ill-structured										
Category	Course code	Title of the Paper	Marks			Teaching hours/week			Credit	Duration of exam (Hrs)
			IA	SEE	Total	L	T	P		
DSC5	21BSC5C5ELL	Electronic Communication	40	60	100	4	-	-	4	2
	21BSC5C5ELP	Electronic Communication Lab	25	25	50	-	-	2	2	3
DSC6	21BSC5C6ELL	Digital Circuits and Microprocessors	40	60	100	4	-	-	4	2
	21BSC5C6ELP	Digital Circuits and Microprocessors Lab	25	25	50	-	-	2	2	3
Other dept. DSC course	21BSC5CXXXXX	Course title - Theory	40	60	100	4	-	-	4	2
	21BSC5CXXXXX	Course title - Lab	25	25	50	-	-	2	2	3
Other dept. DSC course	21BSC5CXXXXX	Course title - Theory	40	60	100	4	-	-	4	2
	21BSC5CXXXXX	Course title - Lab	25	25	50	-	-	2	2	3
SEC3	21BSC5S3EL1	Cyber Security	25	25	50	2		2	3	1
Total Credit									27	

Third Year: 6th Semester										
Objective: Real time learning and ability to solve complex problems that are ill-structured										
Category	Course code	Title of the Paper	Marks			Teaching hours/week			Credit	Duration of exam (Hrs)
			IA	SEE	Total	L	T	P		
DSC7	21BSC6C7ELL	Television and Digital Communication System	40	60	100	4	-	-	4	3
	21BSC6C7ELP	Television and Digital Communication System Lab	25	25	25	-	-	2	2	4
DSC8	21BSC6C8ELL	Instrumentation and Microcontrollers	40	60	100	4	-	-	4	3
	21BSC6C8ELP	Instrumentation and Microcontrollers Lab	25	25	25	-	-	2	2	4
Other dept. DSC course	21BSC5CXXXXX	Course title - Theory	40	60	100	4	-	-	4	3
	21BSC5CXXXXX	Course title - Lab	25	25	25	-	-	2	2	3
Other dept. DSC course	21BSC5CXXXXX	Course title - Theory	40	60	100	4	-	-	4	3
	21BSC5CXXXXX	Course title - Lab	25	25	25	-	-	2	2	3
IC1	21BSC6IC1EL1	Internship	25	25	25			4	2	2
								Total Credit	26	

Name of the Department: Electronics

Semester-V

DSC 5: Electronic Communication

Course Title: Electronic Communication	**Course code: :** 21BSC5C5ELL
Total Contact Hours: 60	**Course Credits: 04**
Internal Assessment Marks: 40 marks	**Duration of SEE: 02 hours**
Semester End Examination Marks: 60 marks	

Course Outcomes (CO's): After the successful completion of the course, the student will be able to:

- Describe propagation of the Radio Engineering and its Fundamentals and transmissions lines.
- Distinguish the characteristics of Modulations and Demodulation techniques.
- Design of Modulators and demodulators (AM and FM).
- Able to know the radio transmitters and receivers.

DSC 5: Electronic Communication

Unit	Description	Hours
1	**Module 1: Antennas and radio wave propagation** Antenna requirements, antenna parameters, resonant antenna, dipole antenna, folded dipole antenna, reflectors, directors and yagi-uda antenna. EM theory- qualitative analysis of electromagnetic theory, Maxwell's equations, (no derivations) pointing theorem Propagation of radio waves, ionosphere-formation and composition, mechanism of radio wave propagation, different modes of radio wave propagation (qualitative analysis).	**12**
2	**Module 2: Transmission lines (T-lines)** Introduction to T- lines, Types of T- lines, distributed parameters of T- lines, basic T-line equation, characteristic impedance, impedance matching, propagation constant (attenuation and phase constants), frequency and phase distortion, condition for distortion less T- line, Standing wave ratio (SWR) and VSWR	**12**
3	**Module 3: Amplitude Modulation (AM)** Define modulation, Need for modulation, different types of modulations – AM, FM and PM, Expression for instantaneous voltage of AM waves, modulation index, frequency spectrum and bandwidth, power relation in AM waves, SSB transmission and its advantages. AM modulators - emitter modulator, base modulator and collector modulation. AM detectors- square law diode detector and linear diode detector.	**12**
4	**Module 4: Frequency modulation (FM)** Advantages of FM over AM, Expression for instantaneous voltage of frequency modulated wave, modulation index and international standards on FM broadcasting. FM modulator - varactor diode modulator and theory of FET reactance modulator, FM detectors- slop detector, balanced slop detector and Foster-seelay discriminator.	**12**

5	**Module 5: Transmitters and Receivers** Function of AM transmitters and FM transmitters with block diagrams, Receiver characteristics, AM-TRF receiver and super heterodyne receivers, need for Automatic gain control (AGC) circuit. FM super heterodyne receiver explanation with block diagram, comparison of AM &FM receivers	**12**

Reference Books:

1. Electronic Communication Systems – George Kennedy
2. Electronic Communication – Sanjeev Gupta.
3. Electronic Communication – Roddy and Coolen.
4. Radio Engineering – GK Mittal.
5. Handbook of Electronics – Gupta and Kumar.

Name of the Department: Electronics
Semester-V

DSC 5: Electronic communication lab

Course Title: Electronic communication lab	**Course code: :** 21BSC5C5ELP
Total Contact Hours: 56	**Course Credits: 02**
Internal Assessment Marks: 25 marks	**Duration of SEE: 03 hours**
Semester End Examination Marks: 25 marks	

Course Outcomes (CO's): After the successful completion of the course, the student will be able to:

- Observe circuit signals and their Behavior.
- Study of various frequency response circuits of various amplifiers.
- Study of various radio circuits experiments and verify its behavior.
- Study of AM and FM modulation techniques.

Lab experiments:

1. RC Differentiator and Integrator (Trace input and output waveforms for sine, square and triangular waves).
2. Clipping Circuits – Positive, Negative and Biased.
3. Clamping Circuits - Positive, Negative and Biased.
4. Linear Ramp Generator using UJT.
5. Construction of Astable Multivibrator using IC 555.
6. Schmitt Trigger using IC 555.
7. Construction of Mono and Bistable Multivibrator using IC 741.
8. Two Stage RC Coupled Amplifier-Frequency Response.
9. Amplitude Modulator using Transistor.
10. A M Detector using Linear Diode Detector.
11. IF Amplifier.
12. Study of Pre-Emphasis and De-Emphasis Circuits.
13. Frequency Response of Loud Speaker.
14. Study of Characteristics of Receiver – Sensitivity, Selectivity and Fidelity.
15. Double Tuned Amplifier.
16. Study of AGC Circuit (in AM detector).
17. Frequency Response of Microphone.

Note:

1. Minimum of EIGHT experiments must be carried out.
2. Experiments may be added as and when required with the approval of BoS.

Reference Books:

1. Electronic Communication Systems – George Kennedy
2. Electronic Communication – Sanjeev Gupta.
3. Electronic Communication – Roddy and Coolen.

Name of the Department: Electronics
Semester-V

DSC 6: Digital Circuits and Microprocessor

Course Title: Digital Circuits and Microprocessor	**Course code: :** 21BSC5C6ELL
Total Contact Hours: 60	**Course Credits: 04**
Internal Assessment Marks: 40 marks	**Duration of SEE: 02 hours**
Semester End Examination Marks: 60 marks	

Course Outcomes (CO's): After the successful completion of the course, the student will be able to:

- Describe the registers and counters and their use-case in real time integrating on different circuits. Explore the knowledge of data conversion and its applications.
- Understanding the Assembly level programming with 8085 and performing the different programs and observe the outputs.
- Able to interface the various devices to 8085 microprocessor and study the impact and applications of the same by writing the programs.

DSC 6: Digital Circuits and Microprocessor

Unit	Description	Hours
1	**Module 1: Registers and counters** Introduction, types of registers,4- bit serial in serial out, serial in parallel out, parallel in serial out and parallel in parallel out shift registers. Asynchronous counters logic diagram, truth table and timing diagram, 3-bit ripple counter, 4-bit up-down counter and modified counters – mod-3, mod-5, mod-7. 4- bit synchronous counter decade counter, IC7490. Synchronous updown	**12**
2	**Module 2: Data processing circuits and converters** Multiplexers: block diagram, truth table and logic circuit of 4-to-1 multiplexer and 16 to1multiplexer .The 74150 TTL multiplexer-pin out diagram, truth table explanation Demultiplexer-1-to4, 1-to-16 demultiplexer block diagram, truth table and logic diagram and explanation. The 74154demultiplexer-pin out diagram, truth table explanation Data converters- D to A converters-Binary weighted resister network and R-2R ladder network. A to D converters- Dual slope integrating type, successive approximation method, flash converter, resolution and accuracy for the above converters.	**12**
3	**Module 3: Memory Devices** Basic memory cell, classification, primary and secondary memories. Semiconductor memories- diode matrix, Magnetic memory, hard disc and floppy disc, optical memory-CD ROM, CD-RW and DVD. RAM- static and dynamic cells, ROM, EPROM, EEPROM, CCD's,	**12**

4	**Module 4: 8085Microprocessor** Introduction to 8085 based microcomputer system, 8085 MPU, Architecture and pin configuration of 8085, Flags and special purpose registers. Instruction and timings- instruction classification, instruction format, instruction timing and operation status, instruction set, addressing mode and groups, instruction cycle.	**12**
5	**Module 5: 8085 programming and interfacing** Programs on Data transfer instruction, arithmetic operation, logic operation, branch operation, flow chart and executing, writing assembly language programs. Need of interfacing devices, parallel and serial interfacing, PPI 8255, USART8251	**12**

Reference Books:

1. Modern Digital Electronics – RP Jain,
2. Digital Principles & applications – AP Malvino,
3. Microprocessor – Architecture, Programming and applications- RA Goankar .
4. Fundamentals of Microprocessors and Microcontrollers – B Ra, Dhanpat Rai
5. Microprocessors and Digital Systems – DV Hall

Name of the Department: Electronics
Semester-V

DSC 6: Digital Circuits and Microprocessor Lab

Course Title: Digital Circuits and Microprocessor Lab	**Course code: :** 21BSC5C6ELP
Total Contact Hours: 56	**Course Credits: 02**
Internal Assessment Marks: 25 marks	**Duration of SEE: 03 hours**
Semester End Examination Marks: 25 marks	

Course Outcomes (CO's): After the successful completion of the course, the student will be able to:

- Observe circuit connections and their Behaviour.
- Study of various programs and their hands-on response.
- Study of various interfacing devices with 8085 and their response.
- Study of different IC's for multiplexing and demultiplexing.

Lab experiments:

1 Study of Multiplexer and using IC 74LS150.
2. Study of Demultiplexer using IC 74LS154.
3. Construction of DAC using R-2R ladder network.
4. Transfer of Data from various registers of 8085.
5. 1`s and 2`s Complements of 8-bit numbers using 8085
6. Addition and Subtraction of two 8-bit numbers using 8085
7. Addition of two 16-bit numbers using 8085
8. Larger among two hexadecimal numbers using 8085
9. Smaller among two hexadecimal numbers using 8085
10. Arranging the numbers in ascending order using 8085
11. Arranging the numbers in descending order using 8085
12. Finding the square root of a number using 8085
13. Interfacing 8-bit DAC and generating different waveforms.
14. Four bit binary counter using IC 7476
15. Interfacing 7- segment LED display and display of alphanumeric characters.
16. Interfacing 8-bit ADC.

Note: 1. Minimum of EIGHT experiments must be carried out.
2. Experiments may be added as and when required with the approval of BoS.

Reference Books:

1. Modern Digital Electronics – RP Jain,
2. Digital Principles & applications – AP Malvino,
3. Microprocessor – Architecture, Programming and applications- RA Goankar .
4. Fundamentals of Microprocessors and Microcontrollers – B Ra, Dhanpat Rai
5. Microprocessors and Digital Systems – DV Hall,

Name of the Department: Electronics
Semester- VI

DSC 7: Television and Digital Communication System

Course Title: Television and Digital Communication System	**Course code:** 21BSC6C7ELL
Total Contact Hours: 60	**Course Credits: 04**
Internal Assessment Marks: 40 marks	**Duration of SEE: 02 hours**
Semester End Examination Marks: 60 marks	

Course Outcomes (CO's): After the successful completion of the course, the student will be able to:

- Describe the basic principles transmission and reception of monochrome and color TV and its various circuitary.
- Explore the knowledge of satellite and mobile communication and its applications.
- Advancement in the communication systems like digital signal processing and transmission techniques.
- Will understand basic principles of optical communication systems and applications.

DSC 7: Television and Digital Communication System

Unit	Description	Hours
1	**Module 1: Basic television principles** Introduction, Elements of TV broad casting system, block diagram and function of monochrome TV transmitter & receiver, Scanning- aspect ratio, progressive, horizontal, vertical, & interlaced scanning, composite video signal, blanking and synchronizing pulses, channel band width, CCIR –B TV channels allotment of frequencies, Camera tubes-introduction, types, construction, working and characteristics of vidicon and image orthicon camera tubes.	**12**
2	**Module 2: Colour television** Introduction, essentials of CTV , mixing of colours, additive &subtractive mixing, colour TV signals, luminance and chrominance signals, colour TV camera, colour sub carrier frequency, PAL colour TV system, PAL encoder & decoder, colour picture tube, block diagram & function of colour TV receiver	**12**
3	**Module 3: Satellite communication** Introduction, kepler's laws, (statements only) satellite orbits, circular, elliptical & geosynchronous satellite orbits, satellite links, the uplink & downlink, the transponder, path loss, multiple access methods- Qualitative study of FDMA, TDMA, CDMA, cellular/mobile communication, requirements, PCS system, computer network,- LAN&WAN, internet & its services.	**12**
4	**Module 4: Digital communication** Introduction & basic digital communication, pulse modulation systems, PAM, PTM, PWM &PPM, Synchronous and Asynchronous transmission, probability of bit error, matched filter, Pulse code modulation systems, block diagram &working	**12**

	of PCM system, delta modulation, digital carrier systems, Block diagram &function of ASK, FSK, PSK, QPSK &DPSK	
5	**Module 5: Optic fibers & communication** Introduction, block diagram & function of optical communication system, advantages of optical communication, optical fiber & cable, types of optical fibers, modes of propagation, step index & graded index fiber, single and multimode fibers, propagation of light within a fiber Launching angle expression for numerical aperture(NA), fiber materials.	**12**

Reference Books:
1. Electronic communication – Sanjeev gupta 2. Electronic communication- Roody & coolen 3. principles of communication system- taub & schilling 4. Fibre optic communication – G.kisser 5. Basic digital & analog communication systems – B PLathi 6. Basic television – Bernold Grob

Name of the Department: Electronics
Semester- VI

DSC 7: Television and Digital Communication System Lab

Course Title: Television and Digital Communication System Lab	**Course code:** 21BSC6C7ELP
Total Contact Hours: 56	**Course Credits: 02**
Internal Assessment Marks: 25 marks	**Duration of SEE: 03 hours**
Semester End Examination Marks: 25 marks	

Course Outcomes (CO's): After the successful completion of the course, the student will be able to:

- Observe circuit connections and their Behaviour.
- Study of various pulse modulation techniques and their hands-on response.
- Study of various Temperature Transducer and their response.
- Study of various TV circuits and digital communications

Lab experiments:

1. Photo transistor characteristics.
2. Study of different optical fibers
3. Demonstration of TV transmitters using ICT
4. Four-bit binary adder using IC7483
5. Study of PAM,
6. Study of PWM.
7. Study of PPM.,
8. Study of ASK
9. Study of FSK,
10. Study of PSK.

Note:

1. Minimum of EIGHT experiments must be carried out.
2. Experiments may be added as and when required with the approval of BoS.

Reference Books:

1. Electronic communication – Sanjeev gupta
2. Electronic communication- Roody & coolen
3. principles of communication system- taub & schilling
4. Fibre optic communication – G.kisser
5. Basic digital & analog communication systems – B PLathi
6. Basic television – Bernold Grob

Name of the Department: Electronics
Semester- VI

DSC 8: Instrumentation and Microcontrollers

Course Title: Instrumentation and Microcontrollers	**Course code:** 21BSC6C8ELL
Total Contact Hours: 60	**Course Credits: 04**
Internal Assessment Marks: 40 marks	**Duration of SEE: 02 hours**
Semester End Examination Marks: 60 marks	

Course Outcomes (CO's): After the successful completion of the course, the student will be able to:

- Describe the different sensors and their use-case in real time integrating on different circuits.
- Explore the knowledge of data Filtering, Amplification and its applications.
- Understanding the Assembly level programming with 8051 and performing the different programs and observe the outputs.
- Able to interface the various devices to 8051 microcontroller and study the impact and applications of the same by writing the programs.

DSC 8: Instrumentation and Microcontrollers

Unit	Description	Hours
1	**Module 1: Instrumentation-Sensors and applications** Resistance type temperature sensors- metallic resistance thermometer, semiconductor resistance thermometer (thermistors), thermocouples, solid state sensors, quartz thermometers. Radiation type sensors - optical pyrometers. Displacement and strain transducers: LVDT, strain gauge-type of strain gauges, material for strain gauge. Pressure transducer: elastic transducer, bourdon or helical tubes, piezoelectric pressure transducer.	**12**
2	**Module 2: Signal Conditioners** Filters- integrators, differentiators and active filters- low pass, high pass, band pass, band rejection filters Precision rectifier using opamp, peak detectors, sample and hold circuits, phase sensitive detector, instrumentation amplifier, isolation amplifier, lock in amplifier.	**12**
3	**Module 3: 8051 Microcontroller** Microcontroller and embedded processors, overview of 8051 family, 8051 architecture, registers and memories in 8051, register banks, flag bits, PSW register, data types, JUMP, LOOP and CALL instructions.	**12**
4	**Module 4: 8051 Addressing modes and Instruction set** I/O programming of 8051- I/O programming, bit manipulation, addressing modes, arithmetic, logical and single bit instructions and programming.	**12**

5	**Module 5: 8051 Timer/Counter Programming and Interfacing** 8051 Timer/Counter programming, TCON register, Baud rate and Interrupts in 8051, stepper motor description and stepper motor interfacing via ULN2003, interfacing of ADC and DAC to 8051.	**12**

Reference Books:

1. Transducers and instrumentation- DVS Murthy
2. The 8051 Microcontroller and embedded systems- Ali Mazidi and Janice Mazidi
3. 8051 microcontroller architecture, programming and applications – KJ Ayala
4. Microcontrollers (Theory and applications) – Ajay V Deshmukh

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Semester- VI

DSC 8: Instrumentation and Microcontroller Lab

Course Title: Instrumentation and Microcontroller Lab	**Course code:** 21BSC6C8ELP
Total Contact Hours: 56	**Course Credits: 02**
Internal Assessment Marks: 25 marks	**Duration of SEE: 03 hours**
Semester End Examination Marks: 25 marks	

Course Outcomes (CO's): After the successful completion of the course, the student will be able to:

- Observe circuit connections and their Behavior with programming.
- Study of various programs and their hands-on response.
- Study of various interfacing devices with 8051 and their response.
- Study of different IC's, sensors, filters, and amplifiers.

Lab experiments:

1`s and 2`s Complements of 8-bit numbers using 8051 microcontrollers.
2. Addition and Subtraction of two 8-bit numbers using 8051 microcontrollers.
3. Addition of two 16-bit numbers using 8051 microcontrollers.
4. Larger among two hexadecimal numbers using 8051 microcontrollers.
5. Smaller among two hexadecimal numbers using 8051 microcontrollers.
6. Seven segment LED Interfacing with Intel 8051 microcontroller through PPI.
7. Relay Interfacing with Intel 8051 microcontroller through PPI.
8. Stepper motor interfacing with 8051 microcontrollers through PPI.
9. Precision Full-wave Rectifier using OP-Amp.
10. Temperature Transducer and its response curve.

Reference Books:

1. Transducers and instrumentation- DVS Murthy
2. The 8051 Microcontroller and embedded systems- Ali Mazidi and Janice Mazidi
3. 8051 microcontroller architecture, programming and applications – KJ Ayala
4. Microcontrollers (Theory and applications) – Ajay V Deshmukh