To,
The Registrar
Bidar University,
Bidar.

Date 06.08.2026

Respected Sir,

Subject : Regarding the submission of B.SC V and VI semester Syllabus for ELECTRONICS Subject.

With reference to the above cited subject the Board of Studies in Electronics has conducted a meeting on 06.08.2026 in finalising the syllabus for B.Sc FIFTH and SIXTH semester ELECTRONICS subject. The board has prepared the syllabus by in depth discussion of the subject considering the future job opportunities. A special emphasis is provided for higher education in Electronics. The Board has prepared the syllabus and the question paper pattern along with distribution of marks in practical examinations. The syllabus will be effective from 2026-27 .

Board of Studies in Electronics

S.No	Name	Designation in BOS	Signature
1	**Sri Somnath Biradar** Principal and Associate Professor in Electronics, Karnatak College, Bidar	**Chairman**	
2	**Dr. Nagraj Kulkarni** Associate Professor in Electronics, GFGC, Naubad, Bidar	**Member**	
3	**Dr. Bharathi** Associate Professor in Electronics, GFGC, Naubad, Bidar	**Member**	

Thanking you

Yours faithfully

(Sri Somnath Biradar)
Chairman
BOS in Electronics
Bidar University, Bidar

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No. 166
Date: 6/8/26
BIDAR UNIVERSITY

7/8/2026

Program Name	**BSc in Electronics**	Semester	**Fifth Semester**
Course Title	**Electronic Communication-Analog and Digital (Theory)**		
Course Code:	**ELE CT 5**	No. of Credits	**4**
Contact hours	**60 Hours**	Duration of SEA/Exam	**3 hours**
Formative Assessment Marks	**20**	Summative Assessment Marks	**80**

Course Objectives:

- To understand the communication system, Principle and working communication system, means and medium of communication.
- To understand the Principle and working of different modulation techniques.
- Will be able to differentiate between analog and digital communication.
- To understand the Principle and working of Satellite and optical fibre communication.

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

CO1. Know the basic concept of Analog Communication, means and medium of communication.

CO2. Understand the principle of Analog and digital modulation.

CO3. Familiar with "AM" and "FM "techniques.

CO4. Understand the basic concept of Pulse Modulation, Carrier Modulation for digital transmission and able to construct simple pulse modulation.

CO5. Understand the basic concept of Satellite Communication

CO6. Understand the basic concept of Optical Fiber Communication

Contents	**60Hrs**
Unit–1:	**15 Hrs**

Electronic communication: Introduction to communication – means and modes. Need for modulation. Block diagram of an electronic communication system. Brief idea of frequency allocation for radio communication system in India (TRAI). Electromagnetic communication spectrum, band designations and usage. Channels and base-band signals. Concept of Noise, signal-to-noise (S/N) ratio.

Propagation of "EM" Wave: Introduction, Loss of "EM" Energy due to noise, Ground Wave, Sky-wave and Space-wave propagation. Ionosphere and its effects.

Communication medium: Transmission lines, coaxial cables and wave guides (Qualitative only).

Antenna: Introduction, Antenna parameters, dipole and folded dipole Ferrite rod antenna, yagi-Uda antenna, Dish-antenna, principle, Working and applications.

Microstrip antenna- Types, feeding methods, structure, radiation pattern and applications.

Unit–2:	**15 Hrs**

Analog Modulation: Amplitude modulation(derivation for instantaneous voltage), modulation index and power relations(derivations),frequency spectrum. Generation of AM (Emitter Modulation). Amplitude Demodulation (diode detector), Concept of Single sided band generation and detection AM-transmitter and receiver (SHD-Receiver). Frequency Modulation (derivation for instantaneous voltage), modulation index and frequency spectrum. Comparison between FM and AM. Generation of FM using VCO, FM detector (slope detector), FM-Transmitter and qualitative idea of super heterodyne FM receiver. Phase Modulation (PM-Qualitative)

Unit–3:	**15 Hrs**

Analog and Digital Pulse Modulation: Channel capacity, sampling theorem, Basic Principles- PAM, PWM, PPM. Modulation and detection technique for PAM only.

Digital communication: Need for digital transmission, Block diagram of digital transmission and reception, concepts of companding and quantization. Pulse Code Modulation and delta modulation.

Digital Carrier Techniques: Bit Rate and Baud Rate. Generation and detection of Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), Binary Phase Shift Keying (BPSK) and Quadrature Phase Shift Keying (QPSK)- Applications of each techniques. Advantage and disadvantages of digital transmission, Shannon limit for information capacity, bandwidth requirements, data transmission, speed, noise and cross talk. MODEM– modes and classification.

Unit–4	**15 Hrs**

Introduction to Satellite Communication System: Satellite Communication Introduction, need, geosynchronous satellite orbits, geostationary satellite advantages of geostationary satellites. Satellite visibility, transponders (C - Band), path loss, ground station, simplified block diagram of earth station. Uplink and downlink.

Optical Fiber Communication: Optical Fibers: types of fibers and Structure. Principle of light transmission in optical fiber. Basic optical laws and definitions, Rays and modes in fiber. Losses in Optical fiber attenuation, scattering losses, radiative losses, absorption losses, core and cladding losses. Connectors and Splicers, Block diagram of optical fiber communication system **Optical sources:** LEDs and Laser diodes: Construction, working and V-I characteristics **Optical Receivers:** Photodiode & PiN diode-Construction working and V-I Characteristics

References	
1	Electronic Communications, D. Roddy and J. Coolen, Pearson Education India.
2	Advanced Electronics Communication Systems- Tomasi, 6th edition, Prentice Hall.
3	Modern Digital and Analog Communication Systems, B.P. Lathi, 4th Edition, 2011, Oxford University Press.
4	K.D Prasad, "Antenna and Wave Propagation", Satyaprakashan, New Delhi.
5	Sanjeev Gupta, "Electronic Communication Systems", Khanna Publishers, New Delhi.
6	Electronic Communication systems, G. Kennedy, 3rd Edn., 1999, Tata McGraw Hill.
7	Principles of Electronic communication systems – Frenzel, 3rd edition, McGraw Hill
8	Communication Systems, S. Haykin, 2006, Wiley India Electronic Communication system, Blake, Cengage, 5th edition.
9	Wireless communications, Andrea Goldsmith, 2015, Cambridge University Press
10	Gerd Keiser, "Optical Fibre Communication ", McGraw Hill, 3rd Edn.

Program Name	**BSc in Electronics**	Semester	**Fifth Semester**
Course Title	**Electronic Communication-Analog and Digital (Practical)**		
Course Code:	**ELE CP 5**	No. of Credits	**2**
Formative Assessment Marks	**10**	Summative Assessment Marks	**40**
Note: Minimum of 10 Experiments are to be performed using Hardware /Simulation.			

List of Experiments	
1.	Construct Amplitude modulator using transistor -Determination of Modulation Index.
2.	Construct Frequency Modulator Circuit-Determined modulation index for different modulating amplitude and frequency.
3.	Construct AM Linear diode detector and trace of Input & Output waveforms.
4.	Construct frequency modulator circuit – determine the modulation index.
5.	"FM" Detector – Plot the frequency response curve.
6.	Study of Balanced demodulator
7.	Construct I.F (Single tuned) amplifier-Determination of I.F frequency, Band Width and Q-factor.
8.	Construct Pre-Emphasis and De-Emphasis circuits and verify cutoff frequency.
9.	Study of Characteristics of Equalizer(Passive components).
10.	Construct Double Tuned I.F Amplifier and determination of I.F frequency, Band Width and Q-factor.
11.	Construct AGC Circuit for AM detector and trace the response curve.
12.	Construct Frequency Mixer circuit using transistor and Verify Output frequency for different Input frequencies.
13.	Study of frequency of Twin- T network.
14.	Frequency response of Cross over Network. Determination of crossover frequency.
15.	Construct R.F (Class-C) Amplifier determine the conversion efficiency.
16.	Study of Squelch Circuit.
17.	Construct Harmonic Generator/ (Class-C Tuned) amplifier and trace the Input & Output

waveforms.

18. Construct Single slope detector for FM and trace the Output waveforms for different modulating amplitude and frequency.
19. Study of Blocking Oscillator.
20. Characteristics of Loud Speaker.
21. Characteristics of Microphone.
22. Pulse amplitude modulation (PAM) – trace the output waveforms.
23. Pulse width modulation (PWM) – trace the output waveforms.
24. Pulse position modulation (PPM) – trace the output waveforms
25. Amplitude Shift Keying-modulation and demodulation(Trace the wave forms)
26. Frequency Shift Keying-modulation and demodulation(Trace the wave forms)
27. Phase Shift Keying-modulation and demodulation(Trace the wave forms)
28. Characteristics of LED/LASER(any one)
29. Characteristics of Photodiode/PiN diode(any one)
30. Determination of losses in fiber
31. Determination of Numerical Aperture.
32. Setting up simple OFC Link.

Program Name	**BSc in Electronics**	Semester	**Fifth Semester**
Course Title	**Electronic Communication-Analog and Digital (Practical)**		
Course Code:	**ELE CP 5**	No. of Credits	**2**
Formative Assessment Marks	**10**	Summative Assessment Marks	**40**

Practical Exam marks Distribution

S.No	Particulars	Marks
1	Circuit diagram , tabular column, formula, nature of graph. etc	10
2	Circuit connection and record of observations	8
3	Calculation and plotting the graph	10
4	Results matching and explanation of experiment	5
5	Record/journal book	5
6	Viva-voce	2
Total		**40**

Semester- V

Electronics

ELE CT 5 : Electronic Communication-Analog and Digital (Theory)

Instructions: 1. Answer as per the instructions given

2. Draw the diagrams wherever necessary

Time: 3 Hours | Max. Marks: 80

Section-A

Answer any TEN Questions 2x10=20

1.
2.
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10.
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12.

Section-B

Answer any FOUR Questions 5x4=20

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14.
15.
16.
17.
18.

Section-C

Answer any FOUR Questions 10x4=40

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24.

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ProgramName	**BScin Electronics**	Semester	**SixthSemester**
CourseTitle	**EmbeddedControllers and Internet of Things(Theory)**		
CourseCode:	**DSC-ELE 6T**	No.ofCredits	**4**
Contacthours	**60Hours**	DurationofSEA/Exam	**3Hours**
FormativeAssessmentMarks	**20**	SummativeAssessmentMarks	**80**

CourseObjectives:

- Toknowtheimportanceofmicrocontrollersanditsapplications
- Understandthe basicsofEmbeddedSystemshardwareandsoftware concepts.
- Acquireknowledgeabout 8051andPICMicrocontrollersanditsperipherals.
- Understandthebasicconceptsandprinciplesoftheinternetof Things.
- Gainknowledge ofdifferentIoTtechnologiesandprotocols.
- Acquirepracticalskillsindesigningandimplementing IoTapplications.

CourseOutcomes:

- Identifyandunderstandfunctionofdifferentblocksof8051microcontrollers.
- Developprogramfor I/Oportoperations,Timers,SerialportandInterruptsusingC.
- Gaintheknowledgetointerface LCD,Keyboard,ADC,DAC,DCmotor,etc.
- Designanddevelopsmallscaleembeddedsystems.
- Understandthebasicconceptsandprinciplesoftheinternetof Things.
- Gainknowledge ofdifferentIoTtechnologiesandprotocols.
- Acquirepracticalskillsindesigningandimplementing IoTapplications.

Contents	**60Hrs**
Unit1	**15Hrs**

8051 Microcontroller: Architecture-Registers, Pin diagram, I/O ports functions, Internal Memory organization. External Memory (ROM & RAM) interfacing. Addressing Modes, Data Transfer instructions, Arithmetic instructions, Logical instructions, Branch instructions, Bit manipulation instructions.SimpleAssemblylanguageprograms tousetheseinstructions.

8051Stack,StackandSubroutineinstructions.Assemblylanguageprogramexamplesonsubroutineand involvingloops

Unit2	**15Hrs**

8051 Microcontroller Hardware Programming in C: Data types and time delays, I/O Programming, Timer Programming, Serial Communication- Basics of Serial Data Communication, UASRT Serial port programming. Interfacing 8051 to Keyboard, LED, Relay, ADC, DAC, and Stepper motor.

PIC18 Microcontrollers: Overview of the PIC18 Family, Architecture and features of 18F458, Status register, Data memory and Special Function Register Program Counter,

Configurationregisters, Stacks, Automatic Stackoperations, Programmer access to the Stack, FastRegister Stack, Interrupts. Power supply and reset, Power supply, Power-up and Reset, Oscillator sources. Clocksource switching,Parallel Ports, Parallel Slave Port, Watchdog Timer, Capture/Compare/PWM (CCP) Modules, MSSP Serial Port, Low-Voltage Detect, Nano-watt technology, Enhanced Peripherals.	
Unit-3	**15 Hrs**
Definition and evolutionof theInternet of Things. IoTarchitectureand components. IoT communicationprotocols: MQTT,CoAP, HTTP. IoTapplication domains Overview of IoT devices: sensors and actuators. Types and characteristics of sensors used in IoT Introduction to IOT hardware: Arduino ESP and Raspberry pi- Introduction, architecture and programming. Interfacing with sensors and actuators.	
Unit-4	**15 Hrs**
Wireless communication technologies for IoT: Wi-Fi, Bluetooth, Zigbee, LoRaWAN, etc.IoT network topologies: star, mesh, and hybrid networks.IoT data management and storage.IoT protocols for device-to-device and device-to-cloud communication.	

ReferenceBooks

1.	Muhammad Tahir and KashifJaved, "ARMMicroprocessor Systems:Cortex-MArchitecture, Programming,and Interfacing," 1st Edition, CRC Press, 2017.
2.	KennethJ.Ayala,"The8051Microcontroller",3rd Edition,Thomson/CengageLearning, 1997
3.	MuhammadAli MazidiandJanice GillespieandRollin D, "The 8051 Microcontrollerand Embedded Systems using assembly and C,"1st Edition, Pearson, 2006.
4.	Tim Wilmshurst,"Designing EmbeddedSystems with PIC Microcontrollers: Principles and applications",First Edition, Elsevier, 2007.
5.	MuhammadAliMazidiandRolinD,Mckinlay, "PICMicrocontrollerandEmbeddedSystems using assembly and C for PIC18," 1st Edition, Pearson, 2008.
6.	JohnPitman,"DesignwithPICMicrocontrollers,"1st Edition,PrenticeHall,1997.
7	Internet of Things: Principles and Paradigms by RajkumarBuyya, Amir VahidDastjerdi, and Anton Y. Dongarra.
8	IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things by David Hanes, Gonzalo Salgueiro, Patrick Grossetete, and Robert Barton.

ProgramName	**BScin Electronics**	Semester	**SixthSemester**
CourseTitle	**PROJECT WORK**		
CourseCode	**DSC-ELE6P**	No.ofCredits	**2**
FormativeAssessmentMarks	**10**	SummativeAssessmentMarks	**40**

It is considered as special course involving the application of knowledge in solving/ analyzing / exploring a real life situation / difficult problem etc.A Project work may be given in lieu of a discipline specific elective papers of the course.

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Semester- VI

Electronics

DSC-ELE 6T: EmbeddedControllers and Internet of Things(Theory)

Instructions: 1. Answer as per the instructions given

2. Draw the diagrams wherever necessary

Time: 3 Hours **Max. Marks: 80**

Section-A

2x10=20

Answer any TEN Questions

1.
2.
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10.
11.
12.

Section-B

5x4=20

Answer any FOUR Questions

13.
14.
15.
16.
17.
18.

Section-C

10x4=40

Answer any FOUR Questions

19.
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21.
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23.
24.

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Program Name	BSc in Electronics		Semester	Sixth Semester
Course Title	PROJECT WORK			
Course Code	DSC-ELE6P		No. of Credits	2
Formative Assessment Marks		10	Summative Assessment Marks	40

Distribution of marks for Project/Dissertation

S.No	Particulars	Marks
1	Module preparation	18
2	Project Report	12
3	Project explanation and Viva-voce	10
	Total	**40**