

DEPARTMENT OF PHYSICS

COURSE CURRICULUM & MARKING SCHEME

B.Sc. V & VI Semester ELECTRONICS

(Based on Choice Based Credit System)

SESSION : 2025-26



ESTD: 1958

**GOVT. V.Y.T. PG AUTONOMOUS COLLEGE,
DURG, 491001 (C.G.)**

(Former Name – Govt. Arts & Science College, Durg)

NAAC Accredited Grade A⁺, College with CPE - Phase III (UGC),

STAR COLLEGE (DBT) Phone : 0788-2212030

Website - www.govtsciencecollegedurg.ac.in,

Email – autonomousdurg2013@gmail.com



**Govt. V.Y.T. PG Autonomous College, Durg
(Chhattisgarh)**
(Erstwhile: Govt. Arts & Science College, Durg)

B. Sc. WITH ELECTRONICS

V & VI Semester

2025-26



Govt. V.Y.T. PG Autonomous College, Durg (Chhattisgarh)

(Erstwhile: Govt. Arts & Science College, Durg)

Appendix-II (Amended)

UGCF for Multidisciplinary Courses of Study							
Sem.	DSC	DSE	GE	AEC	SEC/ Internship/ Apprenticeship / Project/ Dissertation / Community outreach (2)	VAC	Total Credits
I	DSC A 1-(4)		Choose one from a pool of courses GE-1 (4)	Choose one from a pool of AEC courses (2)	Choose one from a pool of courses (2)	Choose one from a pool of courses (2)	22 Credits
	DSC B 1-(4)						
	DSC C 1-(4)						
II	DSC A 2-(4)		Choose one from a pool of courses GE-2 (4)	Choose one from a pool of AEC courses (2)	Choose one from a pool of courses (2)	Choose one from a pool of courses (2)	22 Credits
	DSC B 2-(4)						
	DSC C 2-(4)						
Students exiting shall be awarded Undergraduate Certificate (in the Field of study/Discipline) after securing the minimum 40 credits in semester I and II							Total = 44 Credits
III	DSC A 3-(4)	Choose one from a pool of courses DSE A/B/C (4) Or Choose one from a pool of courses GE-3(4)		Choose one from a pool of AEC courses (2)	Choose one SEC (2) OR Internship/Apprenticeship/Pro ject/community outreach (2)	Choose one from a pool of courses (2)	22 Credits
	DSC B 3-(4)						
	DSC C 3-(4)						
IV	DSC A 4-(4)	Choose one from a pool of courses DSE A/B/C (4) Or Choose one from a pool of courses GE-4(4)		Choose one from a pool of AEC courses (2)	Choose one SEC (2)OR Internship/Apprenticeship/Pro ject/community outreach (2)	Choose one from a pool of courses (2)	22 Credits
	DSC B 4-(4)						
	DSC C 4-(4)						
Students exiting shall be awarded Undergraduate Diploma (in the Field of study/Discipline) after securing the minimum 80 credits on completion of semester IV							Total = 88 Credits
V	DSC A 5-(4)	Choose two from a pool of courses DSE A/B/C (4+4) OR Choose two from a pool of courses GE-5 (4) & GE-6 (4)			Choose one SEC (2) OR Internship/Apprenticeship/Pro ject/community outreach (2)		22 Credits
	DSC B 5-(4)						
	DSC C 5-(4)						
VI	DSC A 6-(4)	Choose two from a pool of courses DSE A/B/C (4+4) Choose one from a pool of courses GE-7 (4)& GE-8 (4)			Internship/Apprenticeship/Pro ject/community outreach (2)		22 Credits
	DSC B 6-(4)						
	DSC C 6-(4)						
Students exiting shall be awarded Bachelor of (in the Field of Multidisciplinary study) in relevant Discipline after securing the minimum 120 credits on completion of semester VI							Total = 132 Credits
VII	DSCA/B/C-(4)	Choose Four DSE (4x4) courses OR Choose three DSE-(3x4) and one GE-(1x4) course OR Choose one DSE (1 x 4) and Three GE (3 x 4) courses OR All Four GE 9, 10, 11 & 12 (4x4) (total=16)					20 credits
VIII	DSC A/B/C-(4)	Choose Four DSE(4x4) courses OR Choose three DSE-(3x4) and one GE-(1x4) course OR Choose one DSE -(1x4) and Three GE(4) (3x4) courses OR All Four GE 13, 14, 15 & 16 (4x4) (total=16)					20 credits
Students shall be awarded Bachelor of (in the Field of Multidisciplinary study) (Honours)in relevant Discipline after securing the minimum 160 credits on completion of Semester VIII OR							Total = 172 Credits
VII	DSCA/B/C-(4)	Choose Four DSE(4x4) courses OR Choose three DSE-(3x4) and one GE-(1x4) course OR Choose one DSE (1 x 4) and Three GE (3 x 4) courses OR All Four GE 9, 10, 11 & 12(4x4) (total=16)					20 credits
VIII	DSC A/B/C-(4)	Choose one DSE (1 x 4) courses OR Choose one GE(1 x 4) course OR			Research Project / Dissertation (12)		20 credits
Students shall be awarded Bachelor of (in the Field of Multidisciplinary study) (Honours with Research) in relevant Discipline after securing the minimum 160 credits on completion of Semester VIII							Total = 172 Credits



Govt. V.Y.T. PG Autonomous College, Durg (Chhattisgarh)

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**Approved syllabus for Semester and CBCS curriculum of B.Sc.
with ELECTRONICS, by the members of Board of Studies
for
Session 2025-26**

Semester V	No. of Credits	Semester VI	No. of Credits
DSC : BEL501 Industrial Electronics, Information Theory and Coding	3	DSC : BEL601 Advance Microprocessor and Microcontroller	3
DSC : BELL501 Industrial Electronics, Information Theory and Coding Lab	1	DSC : BELL601 Advance Microprocessor and Microcontroller Lab	1
DSE : BEL502 Operational Amplifier	3	DSE : BEL602 Signals and Systems (3Th+1T)	4
DSE : BELL502 Operational Amplifier Lab	1	-	-

***DSC – Discipline Specific Course**

***GEC – Generic Elective Course**

***DSE – Discipline Specific Elective**

***SEC – Skill Enhancement Course**



**Govt. V.Y.T. PG Autonomous College, Durg
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Absolute Grading System (for conversion of marks into grade points)

Letter Grade	Grade point	Obtained Score
O (Outstanding) 10	10	>90 and =100
A+(Excellent) 9	9	>80 and =90
A(Very Good) 8	8	>70 and =80
B+(Good) 7	7	>60 and =70
B(Above Average) 6	6	>50 and =60
C(Average) 5	5	>40 and =50
P (Pass) 4	4	=40
F(Fail) 0	0	<40
Ab (Absent) 0	0	0



Govt. V.Y.T. PG Autonomous College, Durg (Chhattisgarh)

(Erstwhile: Govt. Arts & Science College, Durg)

Syllabus and Marking Scheme for B.Sc. with Electronics

Session 2025-2026

Semester V

(For Regular Students)

Course Type	Title of the Paper	No. of Credits	Marks Allotted in Theory & Practical			
			SEM. END	INTERNAL ASS.	TOTAL MARKS	
			Max	Max	Max	Min
DSC	BEL501 : Industrial Electronics, Information Theory and Coding	3	80	20	100	40
DSC	BELL501 : Industrial Electronics, Information Theory and Coding Lab	1	50	-	50	20
DSE	BEL502 : Operational Amplifier	3	80	20	100	40
DSE	BELL502 : Operational Amplifier Lab	1	50	-	50	20

For ATKT/EX Students

Course Type	Title of the Paper	No. of Credits	Marks Allotted in Theory & Practical			
			SEM. END	INTERNAL ASS.	TOTAL MARKS	
			Max	Max	Max	Min
DSC	BEL501 : Industrial Electronics, Information Theory and Coding	3	60	15	75	30
DSC	BELL501 : Industrial Electronics, Information Theory and Coding Lab	1	25	-	25	10
DSE	BEL502 : Operational Amplifier	3	60	15	75	30
DSE	BELL502 : Operational Amplifier Lab	1	25	-	25	10

GOVT. V.Y.T.PG AUTONOMOUS COLLEGE DURG
FOUR YEAR UNDERGRADUATE PROGRAM
DEPARTMENT OF PHYSICS
COURSE CURRICULUM 2025-26

PART A: INTRODUCTION			
Program: FYUP B.Sc. with Electronics		Class: B.Sc.	Semester - V
		Session: 2025-2026	
1	Course Code	BEL501	
2	Course Title	INDUSTRIAL ELECTRONICS, INFORMATION THEORY AND CODING	
3	Course Type	Discipline Specific Course (DSC)	
4	Course Learning Outcome (CLO)	This Course will enable the students to: • Understand various types of voltage regulators. • Understand the basic knowledge of Thyristor family. • Understand the controlled rectification. • Understand mechanism of Inverters and Choppers. • Understand the concept of various source coding and error control coding techniques.	
5	Credit Value	3 Credits	1 credit =15 Hours – Learning and Observation
6	Total Marks	Maximum Marks : 100	Minimum Passing Marks: 40
PART B: CONTENT OF THE COURSE			
Total no. of Teaching/ Learning Periods = 45 Periods (45 Hours)			
Unit	Topics (COURSE CONTENTS)		No. of Periods
I	Regulated Power Supply: Block diagram of regulated power supply, voltage regulator characteristics, Types of voltage regulators, Zener diode voltage regulator, Transistorized series voltage regulator, Transistorized shunt voltage regulator, Op-amp voltage regulator, Switch Mode Power Supply (SMPS), Comparison of Linear Power Supply and SMPS, Uninterruptible Power Supply (UPS).		9
II	Thyristors: Introduction to thyristor family, Construction, equivalent circuit, working principle, symbol, characteristics and applications of SCR, UJT, DIAC, TRIAC, PUT, LASCR, IGBT, GTO.		12

III	Turn-on and Turn-off Methods of Thyristors: Triggering methods of SCR, different methods of turning on of SCR, Commutation Techniques: Types of commutation, Natural commutation, Forced commutation, Series resonance/current commutation, Voltage commutations, Auxiliary thyristor for commutation, External pulse commutation. di/dt rating, dv/dt rating, Protection against dv/dt, over voltage & over current protection, necessity of series and parallel combination.	8
IV	Phase Controlled Rectifiers: Half wave & full wave rectifiers, phase controlled Rectifier with R, RL & RL with free-wheeling diode load, 3 phase half wave & full wave rectifier with Resistive load. Inverters: Working principle of inverter, Single phase half bridge inverter and Single phase full bridge inverter. Chopper: Principle of operation, Step down chopper and Step up chopper. Types of chopper circuit (A-type to D-type).	9
V	Information Theory: Introduction, Unit of Information, Entropy, Rate of Information, Joint Entropy and Conditional Entropy, Mutual Information, Channel Capacity. Coding: Introduction, Coding Efficiency, Shannon-Fano Coding, Huffman Coding, Error-Control, Hamming codes.	7

PART C - LEARNING RESOURCES

Text Books, Reference Books, Other Resources

TEXT BOOKS Recommended :

- Power Electronics - Muhammad H. Rashid, Prentice Hall of India, Second Edition, New Delhi.
- Information theory: F.M Reza, McGraw Hill.

Reference Books :

- Power Electronics - A.K. Gupta & L.N. Singh, Dhanpat Rai Publishing Company, 1st Edition.
- Power Electronics - J. Asger, PHI Publication.
- Communication System - R. P. Singh & S.D. Sapre TMH.
- Power Electronics: R.M. Jalnekar & N.B. Pasalkar.
- Pspice Simulation of Power Electronic Circuits: Raymond Ramshaw.
- Spice for Power Electronics and Electric Power: Muhammad H. Rashid, Prentice Hall of India.
- Communication Systems, Simon Haykin, John Wiley & sons, NY, 4th Edition.

Online Resources: (e- Resources/ e- Books/ e- Learning Portals)

PART D: ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:

Maximum Marks: **100 Marks**

Continuous Comprehensive Evaluation (CCE): **20 Marks**

Semester End Exam (SEE): **80 Marks**

Internal Assessment:

Continuous Comprehensive Evaluation (CCE)

Internal Test of 20 Marks and Assignment of 20 Marks

Semester End Exam (SEE)

Pattern -FOUR Questions (A, B, C, D) from each Unit

Question - A & B: (Compulsory) Very short answer type (02 each) 04 x 5 = 20 Marks

Question - C: Short answer type question 05 x 5 = 25 Marks

Question - D: Long answer type question 07 x 5 = 35 Marks

Total = 80 Marks

Name & Signature of Members of Board of Studies

V.C. Nominee	Departmental members
Subject Expert	1. H.O.D/ Dr. Jagjeet Kaur Saluja
Subject Expert	2. Dr. Anita Shukla
Alumni (member).....	3. Dr. Siteshwari Chandraker
Prof. from other Dept. of Sc. Faculty	4. Dr. Abhishek Kumar Misra
Specialist from Industry.....	5. Dr. Kusumanjali Deshmukh.....

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FOUR YEAR UNDERGRADUATE PROGRAM
DEPARTMENT OF PHYSICS
COURSE CURRICULUM 2025-26
LAB COURSE

PART A: INTRODUCTION			
Program: FYUP B.Sc. with Electronics		Class: B.Sc.	Semester - V
		Session: 2025-2026	
1	Course Code	BELL501	
2	Course Title	INDUSTRIAL ELECTRONICS, INFORMATION THEORY AND CODING LAB	
3	Course Type	Discipline Specific Course (DSC)	
4	Course Learning Outcome (CLO)	This Course will enable the students to: • Demonstrate the applications of various power electronics devices. • Analyze the parameters of waveforms generated by various power electronics devices.	
5	Credit Value	1 Credit	1 credit = 30 Hours – Learning and Observation
6	Total Marks	Maximum Marks: 50	Minimum Passing Marks: 20
PART B: CONTENT OF THE COURSE			
S. No.	List of Experiments		
1	Study of regulated power supply using zener diode and transistor.		
2	Study of VI characteristic of a silicon controlled Rectifier (SCR).		
3	Study of VI characteristic of a DIAC.		
4	Study of VI characteristic of a TRIAC.		
5	Study of VI characteristic of a UJT.		
6	Application of UJT as relaxation Oscillator.		
7	To obtain the output and transfer characteristics of MOSFET and to plot the same		
8	To obtain the steady state output and transfer characteristics of IGBT and to plot the same		
9	To study the operation of single phase half controlled bridge converter with R and RL load and to determine rectification ratio, form factor and ripple factor.		
10	To study the operation of single phase fully controlled bridge converter with R and RL load and to determine rectification ratio, form factor and ripple factor.		

PART C - LEARNING RESOURCES

Text Books, Reference Books, Other Resources

TEXT BOOKS Recommended:

- Fundamentals of Power Electronics ISTE S. K. Bhattacharrya.
- Fundamentals of Power Electronics by S. Rama Raddy.
- Industrial and Power Electronics by Harish C. Rai.

Online Resources: (e- Resources/ e- Books/ e- Learning Portals)

PART D: ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:

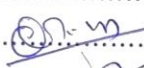
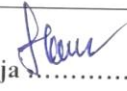
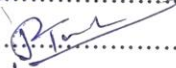
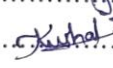
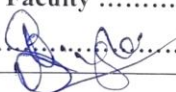
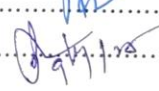
Maximum Marks: 50 Marks

(Will include Internal assessment, Lab records and End Semester Viva/Voce and performance)

Semester End Exam (SEE)

Laboratory performance: Students are required to perform one experiment, take observation and make calculations in the allotted duration of 2 hours. Viva voce will be based on the experiment performed.

Name & Signature of Members of Board of Studies

V.C. Nominee	Departmental members
Subject Expert 	1. H.O.D/ Dr. Jagjeet Kaur Saluja 
Subject Expert 	2. Dr. Anita Shukla 
Alumni (member)..... 	3. Dr. Siteshwari Chandraker 
Prof. from other Dept. of Sc. Faculty	4. Dr. Abhishek Kumar Misra 
Specialist from Industry..... 	5. Dr. Kusumanjali Deshmukh 

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FOUR YEAR UNDERGRADUATE PROGRAM
DEPARTMENT OF PHYSICS
COURSE CURRICULUM 2025-26

PART A: INTRODUCTION			
Program: FYUP B.Sc. with Electronics		Class: B.Sc.	Semester - V
		Session: 2025-2026	
1	Course Code	BEL502	
2	Course Title	OPERATIONAL AMPLIFIER	
3	Course Type	Discipline Specific Elective (DSE)	
4	Course Learning Outcome (CLO)	This Course will enable the students to: • Know and discuss differential amplifier circuits. • Understand basics of Operational Amplifier and its applications. • Understand electronics wave-shaping circuits. • Understand timer IC and its applications. • Understand designing concepts of active filters.	
5	Credit Value	3 Credits	1 credit =15 Hours – Learning and Observation
6	Total Marks	Maximum Marks :100	Minimum Passing Marks: 40
PART B: CONTENT OF THE COURSE			
Total no. of Teaching/ Learning Periods = 45 Periods (45 Hours)			
Unit	Topics (COURSE CONTENTS)		No. of Periods
I	Differential Amplifier: Basics of differential amplifier, BJT differential amplifier analysis using T-model (re-model), BJT differential amplifier analysis using hybrid model, Configurations of differential amplifier, Differential amplifier with swamping resistors, Constant current bias, current mirror, cascode or CE-CB configuration.		7
II	Operational Amplifier: : Op-Amp Symbol and terminal characteristics, Block schematic of Op-Amp, Ideal Op-Amp characteristics, Transfer characteristic of Op-Amp, Practical Op-Amp characteristics, Open loop configuration of Op-Amp, Closed loop configuration of Op-Amp: Voltage series feedback amplifier, Voltage shunt feedback amplifier, Concept of virtual ground. Op-Amp Parameters: Input offset voltage, Input offset current, Input bias current, Differential input resistance, Common mode rejection ratio, Slew rate, Supply voltage rejection ratio.		7

III	Linear Applications of Op-Amp: Ideal inverting amplifier, Ideal non-inverting amplifier, Voltage Follower, Adder or Summing Amplifier, Subtractor or Difference Amplifier, Integrator, Differentiator, Instrumentation Amplifier, Voltage to Current Converter, Current to Voltage Converter.	9
IV	Comparators and Converters: Comparator, Zero Crossing Detector, Schmitt Trigger, Window Detector, Peak Detector, Sample and Hold Circuit, Clipper, Clamper, Frequency to Voltage and voltage to frequency Converters.	9
V	Signal Generator: Square Wave Generator, Triangular Wave Generator, Saw-tooth Wave Generator. IC-555 Timer: Functional Block Diagram of IC-555, Features of IC-555, Monostable Multivibrator using IC-555, Astable Multivibrator using IC-555. Active Filters: First and Second Order Low Pass and High Pass Butterworth Filters, All Pass Filter.	13

PART C - LEARNING RESOURCES

Text Books, Reference Books, Other Resources

TEXT BOOKS Recommended :

- OP-AMP and linear Integrated Circuits- Ramakant Gayakwad, PHI, New Delhi.
- Linear Integrated Circuit and Application by Godse and Baksi (Technical Publication).

Reference Books :

- Pulse, Digital and Switching Waveforms by Millman & Taub, TMH Publishing Co.
- Integrated Circuits: K. R. Botkar, 9th Ed., Khanna Publications.
- Operational Amplifiers and Linear Integrated Circuits, Coughlin and Driscoll, 6th Ed., PHI.
- Linear Integrated Circuits, Roy Choudhury and Jain, 2nd Ed., New Age International Publishers.

Online Resources: (e- Resources/ e- Books/ e- Learning Portals)

PART D: ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Comprehensive Evaluation (CCE): 20 Marks

Semester End Exam (SEE): 80 Marks

Internal Assessment:

Continuous Comprehensive Evaluation (CCE)

Internal Test of 20 Marks and Assignment of 20 Marks

Semester End Exam (SEE)

Pattern -FOUR Questions (A, B, C, D) from each Unit

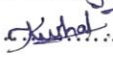
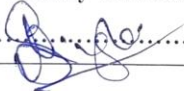
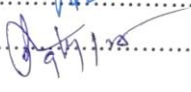
Question - A & B: (Compulsory) Very short answer type (02 each) 04 x 5 = 20 Marks

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Question - D: Long answer type question 07 x 5 = 35 Marks

Total = 80 Marks

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FOUR YEAR UNDERGRADUATE PROGRAM
DEPARTMENT OF PHYSICS
COURSE CURRICULUM 2025-26
LAB COURSE

PART A: INTRODUCTION			
Program: FYUP B.Sc. with Electronics		Class: B.Sc.	Semester - V
		Session: 2025-2026	
1	Course Code	BELL502	
2	Course Title	OPERATIONAL AMPLIFIER LAB	
3	Course Type	Discipline Specific Elective (DSE)	
4	Course Learning Outcome (CLO)	This Course will enable the students to: • Demonstrate the linear applications of op-amp and calculate the gain of amplifiers. • Demonstrate the linear applications of IC 555 timer and calculate the gain of amplifiers. • Analyze the frequency response of different amplifiers. • Analyze the frequency response of various types of filters.	
5	Credit Value	1 Credit	1 credit = 30 Hours – Learning and Observation
6	Total Marks	Maximum Marks: 50	Minimum Passing Marks: 20
PART B: CONTENT OF THE COURSE			
S. No.	List of Experiments		
1	To design inverting amplifier using OP-AMP 741 IC for DC voltage and calculate the voltage gain.		
2	To design non-inverting amplifier using OP-AMP 741 IC for DC voltage and calculate the voltage gain.		
3	To design summing amplifier using OP-AMP 741 IC for DC voltage and calculate the voltage gain.		
4	To design difference amplifier using OP-AMP 741 IC for DC voltage and calculate the voltage gain.		
5	To design and setup a Differentiator circuit using OP-AMP 741 IC and plot their pulse response.		
6	To design and setup an integrator circuit using OP-AMP 741 IC and plot its pulse response.		
7	To design an astable multivibrator using 555 timer.		
8	To design a monostable multivibrator using 555 timer		
9	To design High Pass Filter using OP-AMP 741 IC		
10	To design Low Pass Filter using OP-AMP 741 IC.		

PART C - LEARNING RESOURCES

Text Books, Reference Books, Other Resources

TEXT BOOKS Recommended :

- Integrated Circuits: K. R. Botkar, Khanna Publishers.
- Linear Interated Circuit and Application by Godse and Baksi (Technical Publication).

Online Resources: (e- Resources/ e- Books/ e- Learning Portals)

PART D: ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:

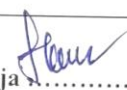
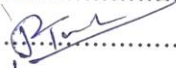
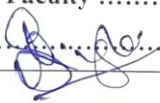
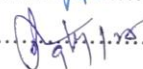
Maximum Marks: 50 Marks

(Will include Internal assessment, Lab records and End Semester Viva/Voce and performance)

Semester End Exam (SEE)

Laboratory performance: Students are required to perform one experiment, take observation and make calculations in the allotted duration of 2 hours. Viva voce will be based on the experiment performed.

Name & Signature of Members of Board of Studies

V.C. Nominee	Departmental members
Subject Expert 	1. H.O.D/ Dr. Jagjeet Kaur Saluja 
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Govt. V.Y.T. PG Autonomous College, Durg (Chhattisgarh)

(Erstwhile: Govt. Arts & Science College, Durg)

Syllabus and Marking Scheme for B.Sc. with Electronics

Session 2025-2026

Semester VI

(For Regular Students)

Course Type	Title of the Paper	No. of Credits	Marks Allotted in Theory & Practical			
			SEM. END	INTERNAL ASS.	TOTAL MARKS	
			Max	Max	Max	Min
DSC	BEL601 : Advance Microprocessor and Microcontroller	3	80	20	100	40
DSC	BELL601 : Advance Microprocessor and Microcontroller Lab	1	50	-	50	20
DSE	BEL602 : Signals and Systems	4	80	20	100	40

For ATKT/EX Students

Course Type	Title of the Paper	No. of Credits	Marks Allotted in Theory & Practical			
			SEM. END	INTERNAL ASS.	TOTAL MARKS	
			Max	Max	Max	Min
DSC	BEL601 : Advance Microprocessor and Microcontroller	3	60	15	75	30
DSC	BELL601 : Advance Microprocessor and Microcontroller Lab	1	25	-	25	10
DSE	BEL602 : Signals and Systems	4	80	20	100	40

GOVT. V.Y.T.PG AUTONOMOUS COLLEGE DURG
FOUR YEAR UNDERGRADUATE PROGRAM
DEPARTMENT OF PHYSICS
COURSE CURRICULUM 2025-26

PART A: INTRODUCTION			
Program: FYUP B.Sc. with Electronics		Class: B.Sc.	Semester - VI
		Session: 2025-2026	
1	Course Code	BEL601	
2	Course Title	ADVANCE MICROPROCESSOR AND MICROCONTROLLER	
3	Course Type	Discipline Specific Course (DSC)	
4	Course Learning Outcome (CLO)	This Course will enable the students to: • Gain knowledge about architecture of advance microprocessors. • Demonstrate the ability to program the 8086 microprocessor. • Describe the architecture and functional block of 8051 microcontroller. • Develop an embedded C and assembly language program in 8051 microcontroller using the internal functional blocks for the given specification.	
5	Credit Value	3 Credits	1 credit =15 Hours – Learning and Observation
6	Total Marks	Maximum Marks :100	Minimum Passing Marks:40
PART B: CONTENT OF THE COURSE			
Total no. of Teaching/ Learning Periods = 45 Periods (45 Hours)			
Unit	Topics (COURSE CONTENTS)		No. of Periods
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.		9
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, Programming of Microprocessor 8086.		11

III	8051 Microcontroller: Introduction of 8051 microcontroller, Comparison between Microprocessor & Micro controller, Overview of 8051 Family, Architecture of 8051 microcontroller, Registers, Program Counter and ROM Memory Map, Data Types and Directives, Flag Bits and Program Status Word(PSW) Register, JUMP, LOOP and CALL Instructions.	7
IV	8051 I/O Port Programming: I/O Port Pins Descriptions and their Functions, I/O Port Programming in 8051 (Using Assembly Language), I/O Bit Manipulation Programming, Pin Out Diagram of 8051 Microcontroller. 8051 Programming: 8051 Addressing Modes and Accessing Memory Locations using various addressing Modes, Bit addressable RAM, Arithmetic and Logic Instructions.	9
V	8051 Programming in C: Data types and time delay in 8051 C, I/O programming in 8051 C, Logic Operations in 8051 C, Data conversion programs in 8051 C (ASCII and BCD Conversions). Introduction to embedded system: Embedded System versus General purpose Computer Systems, Architecture of Embedded System, Characteristics, Classifications, Applications and Purpose of Embedded System.	9

PART C - LEARNING RESOURCES

Text Books, Reference Books, Other Resources

TEXT BOOKS Recommended :

- Advance Microprocessors & peripherals, A.K. Ray & K.M. Bhurchundi (TMH).
- 8051 micro controller & embedded systems, M.A. Mazidi & J.G. Mazidi.
- Introduction to embedded system, k. V. Shibu, I edition, 2009, McGraw Hill.

Reference Books :

- Programming & Interfacing of 8086/8088, Douglas V. Hall (TMH).
- The Intel 8086/8088, 80286, 80386, 80486, Pentium & Pentium, Pro processor Architecture & Interfacing, Barry B. Brey.
- Microcomputer systems 8086/8088 family, programming and interfacing, Y. Liu & G.A. Gibson (PHI).
- Introduction to programmable logic controller, Dunning, Gary, Delmar, Thomson.
- The 8051 micro controller architecture programming & applications, Kenneth J. Ayala.
- Embedded Systems: Architecture, Programming & Design, Raj Kamal, 2008, Tata McGraw Hill.
- Embedded Systems: Design & applications, S.E Barrett, 2008, Pearson Education India.

Online Resources: (e- Resources/ e- Books/ e- Learning Portals)

PART D: ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Comprehensive Evaluation (CCE): 20 Marks

Semester End Exam (SEE): 80 Marks

Internal Assessment:

Continuous Comprehensive Evaluation (CCE)

Internal Test of 20 Marks and Assignment of 20 Marks

Semester End Exam (SEE)

Pattern -FOUR Questions (A, B, C, D) from each Unit

Question - A & B: (Compulsory) Very short answer type (02 each) 04 x 5 = 20 Marks

Question - C: Short answer type question 05 x 5 = 25 Marks

Question - D: Long answer type question 07 x 5 = 35 Marks

Total = 80 Marks

Name & Signature of Members of Board of Studies

V.C. Nominee	Departmental members
Subject Expert	1. H.O.D/ Dr. Jagjeet Kaur Saluja
Subject Expert	2. Dr. Anita Shukla
Alumni (member).....	3. Dr. Siteshwari Chandraker
Prof. from other Dept. of Sc. Faculty	4. Dr. Abhishek Kumar Misra
Specialist from Industry.....	5. Dr. Kusumanjali Deshmukh.....

GOVT. V.Y.T.PG AUTONOMOUS COLLEGE DURG
FOUR YEAR UNDERGRADUATE PROGRAM
DEPARTMENT OF PHYSICS
COURSE CURRICULUM 2025-26
LAB COURSE

PART A: INTRODUCTION			
Program: FYUP B.Sc. with Electronics		Class: B.Sc.	Semester - VI
		Session: 2025-2026	
1	Course Code	BELL601	
2	Course Title	ADVANCE MICROPROCESSOR AND MICROCONTROLLER LAB	
3	Course Type	Discipline Specific Course (DSC)	
4	Course Learning Outcome (CLO)	This Course will enable the students to: • Set up programming strategies and select proper mnemonics and run their program on the training kits. • Practice different types of programming keeping in mind technical issues and evaluate possible causes of discrepancy in practical experimental observations in comparison. • Primarily via team-based laboratory activities, students will demonstrate the ability to interact effectively on a social and interpersonal level with fellow students.	
5	Credit Value	1 Credit	1 credit =30 Hours – Learning and Observation
6	Total Marks	Maximum Marks: 50	Minimum Passing Marks: 20
PART B: CONTENT OF THE COURSE			
S. No.	List of Experiments		
	<u>8086 Microprocessor</u>		
1	Write a program to add two 16 bit numbers.		
2	Write a program to subtract two 16 bit numbers.		
3	Write a program to multiply two 8 bit numbers.		
4	Write a program to divide 16 bit number by 8 bit number.		
5	Write a program to add ten data bytes.		
6	Write a program to move a block of data from one memory location to the other.		
7	Write a program to arrange data in ascending order.		
8	Write a program to arrange data in descending order		
9	Write a program to find largest number in an array.		

8051 Microcontroller (Keil Software)

1	Addition of Two 8-Bit Numbers.
2	Addition of Two 16-Bit Numbers.
3	Subtraction of Two 8-Bit Numbers.
4	Subtraction of Two 16-Bit Numbers.
5	Multiplication of Two 8-Bit Numbers.
6	Program for Swapping and Complement of 8-Bit Numbers.
7	Program to Find the Largest Number In Given Array.
8	Program to Find the Smallest Number In Given Array.

PART C - LEARNING RESOURCES

Text Books, Reference Books, Other Resources

TEXT BOOKS Recommended :

- Advance Microprocessors & peripherals, A.K. Ray & K.M. Bhurchundi (TMH).
- 8051 micro controller & embedded systems, M.A. Mazidi & J.G. Mazidi.

Online Resources: (e- Resources/ e- Books/ e- Learning Portals)

PART D: ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:

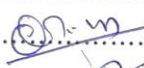
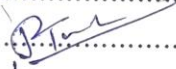
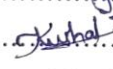
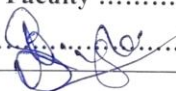
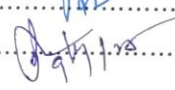
Maximum Marks: 50 Marks

(Will include Internal assessment, Lab records and End Semester Viva/Voce and performance)

Semester End Exam (SEE)

Laboratory performance: Students are required to perform one experiment, take observation and make calculations in the allotted duration of 2 hours. Viva voce will be based on the experiment performed.

Name & Signature of Members of Board of Studies

V.C. Nominee	Departmental members
Subject Expert 	1. H.O.D/ Dr. Jagjeet Kaur Saluja 
Subject Expert 	2. Dr. Anita Shukla 
Alumni (member)..... 	3. Dr. Sitieshwari Chandraker 
Prof. from other Dept. of Sc. Faculty	4. Dr. Abhishek Kumar Misra 
Specialist from Industry..... 	5. Dr. Kusumanjali Deshmukh..... 

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FOUR YEAR UNDERGRADUATE PROGRAM
DEPARTMENT OF PHYSICS
COURSE CURRICULUM 2025-26

PART A: INTRODUCTION			
Program: FYUP B.Sc. with Electronics		Class: B.Sc.	Semester - VI
		Session: 2025-2026	
1	Course Code	BEL602	
2	Course Title	SIGNALS AND SYSTEMS	
3	Course Type	Discipline Specific Elective (DSE)	
4	Course Learning Outcome (CLO)	This Course will enable the students to: • Understand the classification of signals and systems. • Gain knowledge about the frequency domain analysis of continuous time and discrete time signals. • Analyze state equation for continuous and discrete type systems. • Apply the fourier, Laplace and Z-transform for solving continuous time and discrete time signals.	
5	Credit Value	3 Credits + 1 Tutorial	1 credit =15 Hours – Learning and Observation
6	Total Marks	Maximum Marks :100	Minimum Passing Marks:40
PART B: CONTENT OF THE COURSE			
Total no. of Teaching/ Learning Periods = 45 Periods (45 Hours)			
Unit	Topics (COURSE CONTENTS)		No. of Periods
I	CLASSIFICATION OF SIGNALS & SYSTEMS: Classification of Signals: Continuous Time signals: Definition and expressions of Unit step, Ramp, Unit Impulse, Complex Exponential, General complex exponential, Real exponential, Sinusoidal signal. Discrete time signal: Unit sample sequence, Unit step sequence, Unit ramp sequence, Exponential sequence. Representation of discrete time signals: Deterministic and Random Signals, Periodic & Non-periodic Signal, Even & Odd Signals, Energy & Power Signals. Discrete Time systems: Adder, Constant multiplier, Signal multiplier, Unit delay block, Unit advance block. Classification of discrete time systems: Static & Dynamic, Causal & Non-causal, Time invariant & Time variant, Linear & Non-linear, Stable & Unstable systems		7

II	ANALYSIS OF CONTINUOUS TIME SIGNALS: Fourier series representation of Periodic signals, Representation of Fourier series in Exponential form, Frequency spectrum, Properties of Continuous time Fourier series, Parseval's theorem, Fourier Transform, Properties of Fourier Transform, Fourier transform of some common time function Convolution property, Laplace Transform, Properties of Laplace Transform, Region of Convergence. Laplace transform of some common time function.	12
III	LINEAR TIME INVARIANT CONTINUOUS TIME SYSTEM: Transfer function and Impulse response, Block diagram representation and Reduction technique, Convolution integral, State variable techniques, State equations for Electrical networks, State equations from transfer functions.	7
IV	ANALYSIS OF DISCRETE TIME SIGNALS: Discrete Time Fourier Transform, Properties of DTFT, Discrete Fourier transform, Properties of DFT, Circular convolution, Z-Transform, Region of Convergence, Relation between Z-transform and DTFT, Properties of Z-transform, Inverse Z-Transform.	12
V	ANALYSIS OF DISCRETE TIME LTI SYSTEM: Transfer function & Impulse response, Eigen function & Eigen value, Causality, Stability, LTI system characterized by Linear constant, Convolution sum, Convolution by graphical method, Block diagram representation for LTI systems described by difference equation, Unit impulse response, Introduction to Fast Fourier Transform.	7
Tutorial Topics	• Types of Signal and Transformations. • Fourier Transform of Continuous Time Signals. • Convolution and LTI System Properties. • Laplace Transform. • Fourier Series of Continuous-Time Periodic Signals and Properties. • Discrete-Time LTI Systems and Sampling. • Discrete-Time Fourier Transform (DTFT). • Z-Transform.	15

PART C - LEARNING RESOURCES

Text Books, Reference Books, Other Resources

TEXT BOOKS Recommended :

- Signals & Systems: Alan Oppenheim & Alan Wilsky, S Nawab, PHI.
- Signals & Systems: Smarjit Ghosh, Pearson Education.
- Simon Haykin, Signals and Systems, 2nd Edition, Wiley India.

Reference Books :

- Signals & Systems: A. Anand Kumar, 2nd Edition, PHI.
- Signals & Systems: H. P. Hsu, McGraw-Hill Publication.
- Signals & Systems: Nagrath, Sharan, Ranjan & Kumar, TMH.
- Signals & Systems: Farooq Husain, Umesh Publications.
- Signals, Systems and Communications: B.P. Lathi, BS Publications.
- Signals & Systems: Babu & Natarajan, Scitech Publications.

Online Resources: (e- Resources/ e- Books/ e- Learning Portals)

PART D: ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Comprehensive Evaluation (CCE): 20 Marks

Semester End Exam (SEE): 80 Marks

Internal Assessment:

Continuous Comprehensive Evaluation (CCE)

Internal Test of 20 Marks and Assignment of 20 Marks

Semester End Exam (SEE)

Pattern -FOUR Questions (A, B, C, D) from each Unit

Question - A & B: (Compulsory) Very short answer type (02 each) 04 x 5 = 20 Marks

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