

Revised Syllabus

DEPARTMENT OF PHYSICS

COURSE CURRICULUM & MARKING SCHEME

B.Sc. I & II Semester ELECTRONICS

(Based on Choice Based Credit System)

SESSION : 2022-23



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)

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

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

DEPARTMENT OF PHYSICS (ELECTRONICS)

GOVT. V.Y.T. PG. AUTONOMOUS COLLEGE DURG

Approved syllabus for B.Sc. Electronics by the members of Board of Studies for the Session 2022-23

Under Graduate Programme in Electronics

The syllabus with the paper combinations is as under

B.Sc. Semester I & II:

| Semester I | Credits | Semester II | Credits |
|--|----------------|---|----------------|
| BEL 101: Network Analysis And Analog Electronics | 03 | BEL 201: Linear And Digital Integrated Circuits | 03 |
| BELL 101: Network Analysis And Analog Electronics Lab | 01 | BELL 201: Linear And Digital Integrated Circuits Lab | 01 |
| BELSE 101: Cyber Security | 01 | BELSE 201: Arduino Software | 01 |
| BELSEL 101: Cyber Security Lab | 01 | BELSEL 201: Arduino Software Lab | 01 |

* Students may take any of the SEC offered by the department upto six semesters. At least one SEC of the department is mandatory for accomplishment of Degree.

B.Sc. II:

| | |
|---|--|
| Paper I: COMMUNICATION ELECTRONICS | Paper II: 8085 MICROPROCESSOR AND MICROCONTROLLER |
| ELECTRONICS PRACTICALS LAB | |

B.Sc. III:

| | |
|--|---|
| Paper I: Industrial Electronics | Paper II: Advanced Microprocessors & Interfacing |
| ELECTRONICS PRACTICALS LAB | |



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The syllabus for B.Sc. ELECTRONICS is hereby approved for the session 2022-23.

Marking Scheme 4Yr UG Program B.Sc. with Electronics CBCS Pattern Session 2022-23 B.Sc. Semester I &II

| Course. Type | Course Code | Marks | |
|-----------------|-------------|-------|-----|
| | | Max | Min |
| DSC | BEL101 | 75 | 30 |
| DSC | BELL101 | 75 | 30 |
| DSC | BEL201 | 75 | 30 |
| DSC | BELL201 | 75 | 30 |
| SEC | BELSE 101 | 25 | 10 |
| SEC | BELSEL 101 | 25 | 10 |
| SEC | BELSE 201 | 25 | 10 |
| SEC | BELSEL 201 | 25 | 10 |

Absolute Grading System (for conversion of marks into grade points)

| Letter Grade | Grade point | Elex TH | Elex Lab | SEC |
|--------------------|-------------|---------|----------|--------|
| O (Outstanding) 10 | 10 | 90-100 | 95-100 | 95-100 |
| A+(Excellent) 9 | 9 | 80-90 | 90-95 | 80-95 |
| A(Very Good) 8 | 8 | 70-80 | 80-90 | 70-80 |
| B+(Good) 7 | 7 | 60-70 | 70-80 | 60-70 |
| B(Above Average) 6 | 6 | 50-60 | 60-70 | 50-60 |
| C(Average) 5 | 5 | 40-50 | 50-60 | 40-50 |
| P (Pass) 4 | 4 | 35-40 | 40-50 | 35-40 |
| F(Fail) 0 | 0 | 0 | 0 | 0 |
| Ab (Absent) 0 | 0 | 0 | 0 | 0 |



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Sample Grade Sheet

| Courses | Credit Ci | Marks | Marks obtained | % Marks Obtained | Grade Point Gi | CiGi | SGPA |
|--------------|-----------|------------|----------------|------------------|----------------|------------|------|
| Phy | 4 | 50 | 30 | 60 | 7 | 28 | 6.92 |
| Elex | 4 | 50 | 30 | 60 | 7 | 28 | |
| Maths | 4 | 50 | 30 | 60 | 7 | 28 | |
| Phy Lab | 2 | 50 | 30 | 60 | 6* | 12 | |
| Elex Lab | 2 | 50 | 30 | 60 | 6 | 12 | |
| Maths Lab | 2 | 50 | 30 | 60 | 6 | 12 | |
| Hindi | 2 | 50 | 30 | 60 | 7 | 14 | |
| Eng | 2 | 50 | 30 | 60 | 7 | 14 | |
| SEC1 | 2 | 50 | 40 | 80 | 9 | 18 | |
| Total | 24 | 450 | 280 | 560 | 62 | 166 | |

CGPA of an Academic Yr = $\frac{SGPA1 + AGPA2}{2}$ or $\frac{(SGPA1 + SGPA2 + \dots + SGPA_n)}{n}$

Where n is total number of semesters



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Syllabus and Marking Scheme for B.Sc. with Electronics

Session 2022-2023

Semester I

| Course Type | Title of the Paper | Marks Allotted in Theory | |
|-------------|---|--------------------------|-----|
| | | Max | Min |
| DSC | BEL 101: Network Analysis And Analog Electronics | 75 | 30 |
| DSC | BELL 101: Network Analysis And Analog Electronics Lab | 25 | 10 |
| SEC | BELSE 101: Cyber Security | 25 | 10 |
| SEC | BELSEL 101: Cyber Security Lab | 25 | 10 |

DSC Theory - 75 Marks

DSC Practical - 25 Marks

SEC Theory - 25 Marks

SEC Practical - 25 Marks



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Question Paper Format and Distribution of marks for Under Graduate

Examination

1. The question paper for UG Classes is to be divided into five units, each consisting of three Sections - A, B & C.
2. Section A shall contain very short answer type questions (answer in one or two sentences) or objective type questions.
3. Section B shall contain short answer type questions.
4. Section C shall contain long answer/descriptive type questions.
5. Part A of each unit shall be compulsory. However, internal choices may be given in Part B and C.
6. 20 % out of total marks obtained by the students in each paper in internal examinations will be added to 80 % of marks obtained in each paper of end semester examination.

Total Marks Obtained= 20 % of internal assessments + 80 % of ESE

7. The scheme of marks should be as follows :

END SEMESTER EXAMIBNATIONS

| Question Type | MM 75 (Marks x No. of Questions) | MM 50 (Marks x No. of Questions) |
|------------------------------|---|---|
| A (Very short Answer) | 1x10 = 10 | 1x10 = 10 |
| B (Short Answer) | 4x5 = 20 | 3X5 = 15 |
| C (Long Answer) | 9x5 = 45 | 5X5=25 |



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**स्नातक कक्षाओं के लिए प्रश्न पत्र का प्रारूप तथा अंक
विभाजन**

1. स्नातक कक्षाओं के लिए प्रत्येक प्रश्न पत्र तीन खण्डों अ, ब, स में विभाजित होगा।
2. खण्ड अ में अतिलघूत्तरी प्रश्न (एक या दो वाक्यों में उत्तर) या वस्तुनिष्ठ प्रश्न होंगे। (बहुविकल्पीय प्रश्न नहीं होंगे। 'रिक्त स्थानों की पूर्ति करें' जैसे प्रश्न भी नहीं होंगे।)
3. खण्ड ब में लघूत्तरी प्रश्न होंगे।
4. खण्ड स में दीर्घ उत्तरी/निबंधात्मक प्रश्न होंगे।
5. प्रश्नपत्र का प्रारूप एवं अंक विभाजन निम्नानुसार होगा :

सेमेस्टर परीक्षा

| प्रश्न का प्रकार | पूर्णांक ७५ (अंकग प्रश्नों की संख्या) | पूर्णांक ५०(अंकग प्रश्नों की संख्या) |
|---------------------|---------------------------------------|--------------------------------------|
| अतिलघूत्तरी प्रश्न | 1x10 = 10 | 1x10 = 10 |
| लघूत्तरी प्रश्न | 4x5 = 20 | 3X5 = 15 |
| दीर्घ उत्तरी प्रश्न | 9x5 = 45 | 5X5=25 |

6. आंतरिक मूल्यांकन परीक्षा आयोजित होगी। इस परीक्षा में प्रत्येक प्रश्नपत्र के प्राप्तांक का 20: वार्षिक परीक्षा के प्रत्येक प्रश्नपत्र में प्राप्त अंको के ८०: के साथ जोड़ा जाएगा।

कुल प्राप्त अंक = आंतरिक मूल्यांकन का 20% + ईएसई का 80%



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GOVT.V.Y.T. PG AUTO. COLLEGE, DURG (C.G.)

SYLLABUS FOR 2022-2023

B.Sc. with Electronics

SEMESTER I

BEL 101: NETWORK ANALYSIS AND ANALOG ELECTRONICS

Credits: Theory-03, Practicals-01

Theory: 45 Hours

Course Outcomes:

After the completion of the course, Students will be able to

CO1: Apply their knowledge in analyzing Circuits by using network theorems.

CO2: Understand working and applications of semiconductor devices.

CO3: Understand the current voltage characteristics of semiconductor devices.

CO4: Know the concept of cascading of the amplifier and their characteristics.

CO5: Know the concept of feedback amplifier and their characteristics.

UNIT-1

Basic Circuit Concepts: Voltage and Current Sources, Review of Resistors, Inductors, Capacitors. Circuit Analysis: Kirchhoff's Current Law (KCL), Kirchhoff's Voltage Law (KVL).

AC Circuit Analysis: Sinusoidal Voltage and Current, Definition of Instantaneous, Peak, Peak to Peak, Root Mean Square and Average Values. AC applied to Series RC and RL circuits: Impedance of series RC & RL circuits. AC applied to Series and parallel RLC circuit, Series and Parallel Resonance, condition for Resonance, Resonant Frequency, Bandwidth and significance of Quality Factor (Q).

Passive Filters: Low Pass, High Pass.

Network Theorems: Principal of Duality, Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Reciprocity Theorem, Millman's Theorem, Maximum Power Transfer Theorem.

UNIT-2

Junction Diode and its applications: PN junction diode (Ideal and practical) constructions, Formation of Depletion Layer, Diode Equation and I-V characteristics. Idea of static and dynamic resistance, dc load line analysis, Quiescent (Q) point. Zener diode, Reverse saturation current, Zener and avalanche breakdown. Rectifiers- Half wave rectifier, Full wave rectifiers (center tapped and bridge), circuit diagrams, working and waveforms, ripple factor and efficiency. Filter-Shunt capacitor filter, its role in power supply, output waveform, and working. Regulation- Line and load regulation, Zener diode as voltage regulator, and explanation for load and line regulation.



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UNIT-3

Bipolar Junction Transistor: CE, CB Characteristics and regions of operation, Transistor biasing, DC load line, operating point, thermal runaway, idea about stability and stability factor. Voltage divider bias, circuit diagrams and their working.

Field Effect Transistors: JFET: Construction, Working and Characteristics. MOSFET: Construction, Working and Characteristics.

Power Devices: UJT: Construction, Working and Characteristics. SCR, Diac, Triac: Construction, Working and Characteristics and Applications.

UNIT-4

Amplifiers: Transistor biasing and Stabilization circuits- Fixed Bias and Voltage Divider Bias. Thermal runaway, stability and stability factor S . Transistor as a two port network, h-parameter equivalent circuit. Small signal analysis of single stage CE amplifier. Input and Output impedance, Current and Voltage gains. Class A, B and C Amplifiers.

Cascaded Amplifiers: Two stage RC Coupled Amplifier and its Frequency Response.

UNIT-5

Feedback in Amplifiers: Concept of feedback, negative and positive feedback, advantages of negative feedback (Qualitative only).

Sinusoidal Oscillators: Barkhausen criterion for sustained oscillations. Phase shift, Weins bridge, Crystal and Colpitt's oscillator. Determination of Frequency and Condition of oscillation.

REFERENCE BOOKS:

1. Electric Circuits, S. A. Nasar, Schaum's outline series, Tata McGraw Hill(2004)
2. Electrical Circuits, M. Nahvi & J. Edminister, Schaum's Outline Series, Tata McGraw-Hill(2005)
3. Electrical Circuits, K.A. Smith and R.E. Alley, 2014, Cambridge University Press
4. Network, Lines and Fields, J.D. Ryder, Prentice Hall of India.
5. Electronic Devices and Circuits, David A. Bell, 5th Edition 2015, Oxford University Press.
6. Electronic Circuits: Discrete and Integrated, D.L. Schilling and C. Belove, Tata McGraw Hill
7. Electrical Circuit Analysis, Mahadevan and Chitra, PHI Learning
8. Microelectronic circuits, A.S. Sedra, K.C. Smith, A.N. Chandorkar, 2014, 6th Edn., Oxford University Press.
9. J. Millman and C. C. Halkias, Integrated Electronics, Tata McGraw Hill(2001)
10. J. J. Cathey, 2000 Solved Problems in Electronics, Schaum's outline Series, Tata McGraw Hill (1991)



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BELL 101: NETWORK ANALYSIS AND ANALOG ELECTRONICS

The scheme of practical examination will be as follows-

| | | |
|------|----------------|-----------|
| (i) | One experiment | 3 HOURS |
| (ii) | Marks | |
| | Experiment | 15 |
| | Viva-voce | 05 |
| | Sessional | <u>05</u> |
| | Total | <u>25</u> |

1. Determination of Energy Band –gap of a Diode.
2. Study of P-N Junction Diode Characteristics.
3. Study of Zener diode characteristics.
4. Study of LED Characteristics.
5. Study of Transistor characteristics in Common Base Mode (CB).
6. Study of Transistor characteristics in Common Emitter Mode (CE).
7. Study of Transistor bias stability.
8. Study of Field Effect Transistor Characteristics.
9. Verification of Norton's Theorem.
10. Verification of Super position Theorem.

Note:

- Other experiments of equal standard may also be set.



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SKILL ENHANCEMENT COURSE (SEC): (Credit: 02 T+L)

BELSE 101: CYBER SECURITY

Credits: Theory+Lab=02

Total Lectures: 45 Hours

Course Outcomes:

At the end of this course, Students will be able to:

Understand the issues of cyber security.

Learn the techniques of for encryption and Steganography.

Familiarize with cyber security law.

Introduction of Cyber security: Importance of Cyber security, Cyber security Fundamentals

Cyber Attacks: Various types of Cyber attacks

Seven Layers of Cyber Security: Brief introduction of each layer

Cyber-Attacker Actions: Active Attacks and Passive Attacks

Need of Security policies

Cyber Space: Regulations, NIST Compliance

Indian Cyber Space: National cyber security policy

Cyber Forensic: Digital forensics, the need for computer forensics, cyber forensics and digital evidence

Cryptography: Information Security, Introduction to Cryptography

Image Steganography: Introduction, Difference between Cryptography, Steganography and Watermarking











BELSEL 101: CYBER SECURITY LAB

1. Write a programme to hide text in row in an Image.
2. Write a programme to hide text in column in an Image.

References:

1. "Cryptography and Network Security - Principles and Practice", by William Stallings (Pearson) 2017
2. "Cyber Security", by Nina Godbole and Sunit Belapure (Wiley) 2011.
3. "Investigator's Guide to Steganography", by Gregory Kipper, Auerbach Publications, 2003

Name and Signatures

| Departmental Members | |
|--|--|
| V.C. Nomine  | 1. H.O.D Dr. Jagjeet Kaur Saluja  |
| Subject Expert | 2. Dr. R. S. Singh  |
| Subject Expert:  | 3. Dr. Anita Shukla:  |
| Alumni (member)..... | 4. Mrs. Siteshwari Chandrakar  |
| Prof. from other Dept. Of Sc. Faculty.  | 5. Dr. Abhishek Kumar Misra:  |
| Specialist from Industry  | 6. Dr Kusumanjali Deshmukh  |



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Syllabus and Marking Scheme for B.Sc. with Electronics

Session 2022-2023

Semester II

| Course Type | Title of the Paper | Marks Allotted in Theory | |
|-------------|---|--------------------------|-----|
| | | Max | Min |
| DSC | BEL 201: Linear And Digital Integrated Circuits | 75 | 30 |
| DSC | BELL 201: Linear And Digital Integrated Circuits Lab | 25 | 10 |
| SEC | BELSE 202: Arduino Software | 25 | 10 |
| SEC | BELSEL 202: Arduino Software Lab | 25 | 10 |

DSC Theory - 75 Marks
DSC Practical - 25 Marks
SEC Theory - 25 Marks
SEC Practical - 25 Marks



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Question Paper Format and Distribution of marks for Under Graduate

Examination

1. The question paper for UG Classes is to be divided into five units, each consisting of three Sections - A, B & C.
2. Section A shall contain very short answer type questions (answer-in one or two sentences) or objective type questions.
3. Section B shall contain short answer type questions.
4. Section C shall contain long answer/descriptive type questions.
5. Part A of each unit shall be compulsory. However, internal choices may be given in Part B and C.
6. 20 % out of total marks obtained by the students in each paper in internal examinations will be added to 80 % of marks obtained in each paper of end semester examination.

Total Marks Obtained= 20 % of internal assessments + 80 % of ESE

7. The scheme of marks should be as follows :

END SEMESTER EXAMIBNATIONS

| Question Type | MM 75 (Marks x No. of Questions) | MM 50 (Marks x No. of Questions) |
|------------------------------|---|---|
| A (Very short Answer) | 1x10 = 10 | 1x10 = 10 |
| B (Short Answer) | 4x5 = 20 | 3x5 = 15 |
| C (Long Answer) | 9x5 = 45 | 5x5=25 |



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स्नातक कक्षाओं के लिए प्रश्न पत्र का प्रारूप तथा अंक

विभाजन

1. स्नातक कक्षाओं के लिए प्रत्येक प्रश्न पत्र तीन खण्डों अ, ब, स में विभाजित होगा।
2. खण्ड अ में अतिलघूत्तरी प्रश्न (एक या दो वाक्यों में उत्तर) या वस्तुनिष्ठ प्रश्न होंगे। (बहुविकल्पीय प्रश्न नहीं होंगे। 'दिए गए स्थानों की पूर्ति करें' जैसे प्रश्न भी नहीं होंगे।)
3. खण्ड ब में लघूत्तरी प्रश्न होंगे।
4. खण्ड स में दीर्घ उत्तरी/निबंधात्मक प्रश्न होंगे।
5. प्रश्नपत्र का प्रारूप एवं अंक विभाजन निम्नानुसार होगा :

सेमेस्टर परीक्षा

| प्रश्न का प्रकार | पूर्णांक 04 (अंकन प्रश्नों की संख्या) | पूर्णांक 10 (अंकन प्रश्नों की संख्या) |
|---------------------|---------------------------------------|---------------------------------------|
| अतिलघूत्तरी प्रश्न | 1x10 = 10 | 1x10 = 10 |
| लघूत्तरी प्रश्न | 4x5 = 20 | 3x5 = 15 |
| दीर्घ उत्तरी प्रश्न | 9x5 = 45 | 5x5=25 |

6. आंतरिक मूल्यांकन परीक्षा आयोजित होगी। इस परीक्षा में प्रत्येक प्रश्नपत्र के प्राप्तांक का 20: वार्षिक परीक्षा के प्रत्येक प्रश्नपत्र में प्राप्त अंकों के 80: के साथ जोड़ा जाएगा।

कुल प्राप्त अंक = आंतरिक मूल्यांकन का 20% + ईएसई का 80%



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GOVT.V.Y.T. PG AUTO. COLLEGE, DURG (C.G.)

SYLLABUS FOR 2022-2023

B.Sc. with Electronics

SEMESTER II

BEL 201: LINEAR AND DIGITAL INTEGRATED CIRCUITS

Credits: Theory-03, Practicals-01

Theory: 45 Hours

Course Outcomes:

After the completion of the course, Students will be able to

CO1: Define the basic concepts related to Op-amp and explain the working of op-amp based circuits.

CO2: Understand fundamentals of Number Systems, Boolean algebra and minimization techniques.

CO3: Design combinational digital circuits.

CO4: Design sequential digital circuits.

CO5: Understand working and applications of analog to digital and digital to analog converters.

UNIT-1

Operational Amplifiers (Black box approach): Characteristics of an Ideal and Practical Operational Amplifier (IC 741), Open and closed loop configuration. CMRR. Slew Rate and concept of Virtual Ground.

Applications of Op-Amps: (1) Inverting and non-inverting amplifiers, (2) Summing and Difference Amplifier, (3) Differentiator, (4) Integrator, (5) Comparator and (6) Active low pass and high pass.

UNIT-2

Number System and Codes: Decimal, Binary, Octal and Hexadecimal number systems base conversions. Representation of signed and unsigned numbers, BCD code. Binary, octal and hexadecimal arithmetic; addition, subtraction by 2's complement method, multiplication.

Logic Gates and Boolean algebra: Truth Tables of OR, AND, NOT, NOR, NAND, XOR, XNOR, Universal Gates, Basic postulates and fundamental theorems of Boolean algebra.

UNIT-3

Combinational Logic Analysis and Design: Standard representation of logic functions (SOP and POS), Minimization Techniques (Karnaugh map minimization up to 4 variables for SOP).



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Arithmetic Circuits: Binary Addition, Half and Full Adder, Half and Full Subtractor.

Data processing circuits: Multiplexers, De-multiplexers, Decoders, Encoders.

UNIT-4

Sequential Circuits: SR, D, T and JK Flip-Flops. Clocked (Level and Edge Triggered) Flip-Flops. Preset and Clear operations. Race-around conditions in JK Flip-Flop. Master-slave JK Flip-Flop.

Shift registers: Serial-in-Serial-out, Serial-in-Parallel-out, Parallel-in-Serial-out and Parallel- in-Parallel-out Shift Registers (only up to 4 bits).

UNIT-5

Counters (4 bits): Asynchronous counters: Ring Counter, Decade Counter, Synchronous Counter: Decade counter

D-A Conversion: 4 bit binary weighted and R-2R Ladder converters

A-D Conversion:- successive approximation converters, Counter Type Converter

REFERENCE BOOKS:

1. OP-Amps and Linear Integrated Circuit, R. A. Gayakwad, 4th edition, 2000, Prentice Hall
2. Operational Amplifiers and Linear ICs, David A. Bell, 3rd Edition, 2011, Oxford University Press.
3. Digital Principles and Applications, A.P. Malvino, D.P. Leach and Saha, 7th Ed., 2011, Tata McGraw
4. Fundamentals of Digital Circuits, Anand Kumar, 2nd Edn, 2009, PHI Learning Pvt. Ltd.
5. Digital Circuits and systems, Venugopal, 2011, Tata McGrawHill.
6. Digital Systems: Principles & Applications, R.J. Tocci, N.S. Widmer, 2001, PHI Learning.
7. Thomas L. Floyd, Digital Fundamentals, Pearson Education Asia (1994)
8. R. L. Tokheim, Digital Principles, Schaum's Outline Series, Tata McGraw- Hill (1994)



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BELL 201: LINEAR AND DIGITAL INTEGRATED CIRCUITS LAB

The scheme of practical examination will be as follows-

(i) One experiment 3 HOURS

(ii) Marks

| | |
|------------|-----------|
| Experiment | 15 |
| Viva-voce | 05 |
| Sessional | <u>05</u> |
| Total | <u>25</u> |

1. To design inverting amplifier using Op-amp 741 for DC voltage and calculate the voltage gain.
2. To design non-inverting amplifier using Op-amp 741 for DC voltage and calculate the voltage gain.
3. To investigate the use of an Op-amp as an Integrator.
4. Design a digital to Analog convertor (DAC) of given specifications.
5. Design a Analog to Digital Convertor (ADC) of given specification.
6. Verification of Truth table of basic logic gates.
7. Verification of De Morgan's theorem.
8. Study of half adders and full adders using IC's
9. Study of RS, D and T flip-flops.
10. Study of JK master slave flips flop.

Note:

- Other experiments of equal standard may also be set.



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

SKILL ENHANCEMENT COURSE (SEC) : (Credit: 02 --T+L)

BELSE 201: ARDUINO SOFTWARE

Credits: Theory-02(T+L)

Total Lectures: 45 Hours

Course Outcomes:

At the end of this course, Students will be able to:

Design circuits using-Arduino software and simulate it.

- Introduction to the Arduino Board
- Digital Pins
- Analog Pins
- Power Pins
- Other Pins
- Introduction to Basic, Digital, Analog and Communication Commands.
- Installation
- Implementation of software for circuit designing.

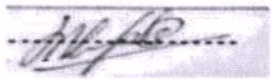



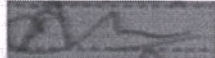


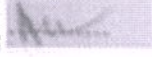


BELSEL 201: ARDUINO SOFTWARE LAB

1. Experiment to glow the LED using Arduino Programming.
2. Determination of resistance value of unknown resistor using Arduino Programming.

References:

1. ARDUINO PROJECT HANDBOOK, Mark Geddes, San Francisco

Name and Signatures

| Departmental Members | |
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| V.C. Nomine  | 1. H.O.D Dr. Jagjeet Kaur Saluja  |
| Subject Expert | 2. Dr. R. S. Singh  |
| Subject Expert:  | 3. Dr. Anita Shukla:  |
| Alumni (member)..... | 4. Mrs. Siteshwari Chandrakar  |
| Prof. from other Dept. Of Sc. Faculty.  | 5. Dr. Abhishek Kumar Misra:  |
| Specialist from Industry  | 6. Dr Kusumanjali Deshmukh  |