

B.Sc. ELECTRONICS

SYLLABUS: 2011

CHOICE BASED CREDIT SYSTEM (CBCS)



St. JOSEPH'S COLLEGE (Autonomous)

Re-accredited with A+ Grade by NAAC

College with Potential for Excellence by UGC

TIRUCHIRAPPALLI - 620 002

B.Sc. ELECTRONICS : COURSE DETAIL - 2011

| SEM | PART | CODE | SUBJECT TITLE | Hours | Credits | |
|-----|------|-------------|--|--|-----------|---|
| I | I | 11UGT110001 | General Tamil-I / Hindi -I / French-I | 4 | 3 | |
| | II | 11UGE120101 | General English – I | 5 | 3 | |
| | III | 11UEL130201 | Electric Circuit Analysis | 5 | 4 | |
| | III | @ | Electronics Practical –I | 3 | - | |
| | III | @ | Work shop Practice – I | 3 | - | |
| | III | 11UEL130401 | Allied Mathematics – I | 6 | 5 | |
| | IV | 11UFC141001 | Value Education - I: Essentials of Ethics, Yoga and Stress Management | 2 | 2 | |
| | IV | 11UCE140801 | Communicative English | - | 5 | |
| | | | Library | 2 | | |
| | | | Total for Semester I | 30 | 22 | |
| | II | I | 11UGT210002 | General Tamil –II/Hindi – II/French – II | 4 | 3 |
| | | II | 11UGE220102 | General English – II | 5 | 3 |
| III | | 11UEL230202 | Electronic Devices | 5 | 4 | |
| III | | 11UEL230203 | Electronics Practical –I | 3 | 4 | |
| III | | 11UEL230204 | Work shop Practice –I | 3 | 4 | |
| III | | 11UEL230402 | Allied Mathematics – II | 6 | 5 | |
| IV | | 11UFC241002 | Value Education – II : Fundamentals of Human Rights | 2 | 1 | |
| IV | | 11UCE240802 | Computer Literacy | 2 | 2 | |
| | | | Total for Semester II | 30 | 26 | |
| III | | I | 11UGT310003 | General Tamil–III/ Hindi–III/ French–III | 4 | 3 |
| | II | 11UGE320103 | General English – III | 5 | 3 | |
| | III | 11UEL330205 | Electronic Circuits | 5 | 4 | |
| | III | @ | Electronics Practical –II | 3 | - | |
| | III | 11UEL330403 | Allied Physics –I | 4 | 4 | |
| | III | @ | Allied Physics Practicals – I | 2 | - | |
| | IV | 11UCE340901 | Environmental Studies | 4 | 2 | |
| | IV | 11UFC34103A | Professional Ethics –I: Social Ethics (OR) | 2 | 2 | |
| | IV | 11UFC34103B | Professional Ethics –I: Religious Doctrine | (2) | (2) | |
| | | | Library | 1 | - | |
| | | | Total for Semester III | 30 | 18 | |

| | | | | | | |
|--------------------------------|-----|--------------|---|---------------------------|------------|---|
| IV | I | 11UG410004 | General Tamil –IV/Hindi – IV/French – IV | 4 | 3 | |
| | II | 11UGE420104 | General English – IV | 5 | 3 | |
| | III | 11UEL430206 | Digital Electronics | 5 | 4 | |
| | III | 11UEL430207 | Electronics Practical –II | 3 | 4 | |
| | III | 11UEL430404 | Allied Physics –II | 4 | 4 | |
| | III | 11UEL430405 | Allied Physics Practicals – I | 2 | 2 | |
| | III | 11UEL430301A | Core Elective–I: Signals and Systems (OR) | 4 | 4 | |
| | III | 11UEL430301B | Programmable logic controller | (4) | (4) | |
| | IV | 11UFC441004A | Professional Ethics –II: Social Ethics (OR) | 2 | 2 | |
| | IV | 11UFC441004B | Professional Ethics –II: Religious Doctrine | (2) | (2) | |
| | | | Library | 3 | | |
| | | | Total for Semester IV | 29 | 26 | |
| V | III | 11UEL530208 | Microprocessors and its application | 5 | 4 | |
| | III | 11UEL530209 | Linear Integrated Circuits | 5 | 4 | |
| | III | 11UEL530210 | Microcontroller and its application | 5 | 4 | |
| | III | 11UEL530211 | Electronics Practical – III | 6 | 4 | |
| | III | 11UEL530302A | Core Elective – II : VLSI design and VHDL programming (OR) | 4 | 4 | |
| | III | 11UEL530302B | Control system | (4) | (4) | |
| | IV | 11UEL540601 | Skill Based Elective – I: DVD troubleshooting and assembling | 2 | 2 | |
| | | | Total for Semester V | 27 | 22 | |
| | VI | III | 11UEL630212 | Power Electronics | 5 | 4 |
| | | III | 11UEL630213 | Communication System | 5 | 4 |
| III | | 11UEL630214 | Sensors, Transducers and Measurement | 5 | 4 | |
| III | | 11UEL630215 | Electronics Practical -IV | 6 | 4 | |
| III | | 11UEL630303A | Core Elective – III Digital Signal Processing (OR) | 4 | 4 | |
| | | 11UEL630303B | Embedded System | (4) | (4) | |
| III | | 11UEL630304 | Project | 3 | 3 | |
| IV | | 11UEL640602 | Skill Based Elective – II PC Assembling | 2 | 2 | |
| | | | Total for Semester VI | 30 | 25 | |
| I-V | | V | 10UEC551101 | SHEPHERD & Gender Studies | | 6 |
| Total Credits and hours | | | | | 145 | |

@ : Practical Examination in the following semester

பருவம் -1
11UGT110001

மணி நேரம் - 4
புள்ளிகள் - 3

பொதுத்தமிழ் - I

நோக்கங்கள்

1. சமூக மாற்றச் சிந்தனைகளை உள்ளடக்கிய தற்கால இலக்கியங்களை அறிமுகம் செய்தல்.
2. புதுக்கவிதை, சிறுகதை, உரைநடை ஆகிய இலக்கியங்களின் நயம் பாராட்டுதல்.
3. சந்திப்பிழையின்றி எழுத மாணவர்களைப் பயிற்றுவித்தல்.

பயன்கள்

1. மாணவர்கள் சமூக மாற்றச்சிந்தனைகளை அறிந்துகொள்வர்.
2. சந்திப்பிழைகளை நீக்கி எழுதும் திறன் பெறுவர்.
3. புத்திலக்கியங்களைப் படைக்கும் திறனையும், திறனாய்வு செய்யும் திறனையும் பெறுவர்.

அலகு-1

(10 மணி நேரம்)

மகாகவி பாரதியார் கவிதைகள்
பாரதிதாசன் கவிதைகள்
உரைநடை—முதல் மூன்று கட்டுரைகள்
(கட்டுரைக்களஞ்சியம்)

அலகு-2

(12மணி நேரம்)

கவிமணி தேசிகவிநாயகம் கவிதைகள்
நாமக்கல்கவிஞர் வெ.இராமலிங்கம் கவிதைகள்
இலக்கணம் -வலிமிகும் இடங்கள்

அலகு-3

(10 மணி நேரம்)

கவிஞர் கண்ணதாசன் கவிதைகள்
இலக்கியவரலாறு- மூன்றாம் பாகம்
சிறுகதை- முதல் ஆறு சிறுகதைகள்

அலகு-4

(14 மணி நேரம்)

பாவலரேறு பெருஞ்சித்திரனார் பாடல்கள்
அப்துல் ரகுமான் கவிதைகள்
இலக்கிய வரலாறு – நான்காம் பாகம்
இலக்கணம் - வலி மிகா இடங்கள்

அலகு-5

(14 மணி நேரம்)

கவிஞர் மேத்தா கவிதைகள்
மொழிபெயர்ப்புக்கவிதைகள்
சிறுகதை- 7 முதல் 12 முடிய உள்ள சிறுகதைகள்
உரைநடை- 4முதல் 6 முடிய உள்ள கட்டுரைகள்
(கட்டுரைக்களஞ்சியம்)

பாடநூல்

1. பொதுத்தமிழ் - செய்யுள் திரட்டு- தமிழ்த்துறை வெளியீடு- 2011-2014
2. சமூகவியல் நோக்கில் தமிழ் இலக்கிய வரலாறு, தமிழ்த்துறை வெளியீடு, தூய வளனார் கல்லூரி, திருச்சிராப்பள்ளி-2
3. உரைநடை நூல் - தமிழ்த்துறை வெளியீடு, 2011-2014
4. சிறுகதைத்தொகுப்பு
(கட்டுரைக்களஞ்சியம்)

மதிப்பெண் பகிர்வு

| பிரிவு | பாகம் -1 | பாகம் -2 | பாகம்-3 |
|---------------|-------------------|-----------------|------------------|
| செய்யுள் | 12 (12 வினாக்கள்) | 8 (2 வினாக்கள்) | 30 (2 வினாக்கள்) |
| இலக்கியவரலாறு | 6 (6 வினாக்கள்) | 8 (2 வினாக்கள்) | 15 (1 வினா) |
| உரைநடை | ----- | ----- | 15 (1வினா) |
| இலக்கணம் | 2 (2 வினாக்கள்) | 4 (1 வினா) | ----- |
| சிறுகதை | ----- | ----- | 15 (1 வினா) |

Semester: I
Code:11UGE120101

Hours :5
Credits: 3

GENERAL ENGLISH – I

Objectives:

1. To enable the students to develop their effective communicative skills in English.
2. To empower the students with fluency and accuracy in the use of English Language.
3. To transform them into globally employable persons with placement skills.

UNIT-I 12 Hrs

Prose Education.
Employment.
Unemployment.

Poem William Shakespeare— “All the World’s a Stage.”

Letter Writing Formal and Informal.

Short Story O Henry – Robe of Peace. (Extensive Reading).

Essential English Grammar – 1-6 units

UNIT-II 12 Hrs

Prose Application.
Planning.
Curriculum Vitae.

Poem Ben Jonson—“On Shakespeare”
Reading Comprehension

Short Story Rudyard Kipling—The Miracle of Puran Bhagat
(Extensive Reading).

Essential English Grammar – 7-12 units.

UNIT-III 11 Hrs

Prose Interview.
Reporting.
General Knowledge.

Poem Robert Herrick—“Gather Ye Rosebuds.”
Note Making

Short Story H.G.Wells—The Truth About Pyecraft (Extensive Reading).

Essential English Grammar – 13-18 units

UNIT-IV 20 Hrs

Prose Review.(Super Toys)
Stress.
No Time.

Poem Oliver Goldsmith—“ The Village Schoolmaster”
Developing story from hints

Short Story John Galsworthy—“Quality” (Extensive Reading).

Essential English Grammar – 19-24 units

UNIT-V 15 Hrs

Prose Killers.
Galloping Growth.
A Short Story.

Poem William Blake—“ From Auguries of Innocence”
Précis Writing

Short Story William Somerset Maugham— Mabel
(Extensive Reading).

Essential English Grammar – 25-30 units

Text Books

1. Krishnaswamy. N, Sriraman T. Current English for Colleges. Hyderabad: Macmillan Indian Ltd,2006.
2. Dahiya SPS Ed. Vision in Verse, An Anthology of Poems. New Delhi: Oxford University Press,2002.
3. Murphy, Raymond. Essential English Grammar. New Delhi: Cambridge University Press,2009.
4. Seshadri, K G Ed. Stories for Colleges.Chennai: Macmillan India Ltd,2003.

SEMESTER - I**Sub Code - 11UEL130201****Hours/Week : 5****Credits : 4****ELECTRIC CIRCUIT ANALYSIS****Objective:**

- To learn the methods to simplify any electrical networks and to analyze the performance of complex networks.

UNIT – I : DC CIRCUIT ANALYSIS

Charge, Current, Voltage and Power – Voltage and Current sources – Ohm's Law – Kirchhoff's Current Law – Kirchhoff's Voltage Law – The single node-pair circuits – Series and Parallel connected independent sources – Resistors in Series and Parallel – Source transformation – Voltage and Current Division – Nodal and Mesh Analysis.

UNIT – II : SINUSOIDAL STEADY STATE ANALYSIS

Sinusoidal Steady State Analysis: Average & RMS values of periodic waveform – Form factor & Peak factor – Characteristics of sinusoids – The complex forcing function – The Phasor – Phasor relationship for R, L and C – Impedance – Admittance – Phasor Diagrams – AC Circuit Power Analysis: Average Power – Reactive power- Apparent Power - Power factor – Power triangle involving R, L & C – Analysis of series and parallel RL, RC & RLC circuit. Frequency Response: Parallel resonance – Series Resonance – Q factor, impedance and bandwidth of the resonant circuit.

UNIT – III: NETWORK THEOREMS

Delta-Wye conversion – Superposition theorem – Thevenin's and Norton's theorem – Reciprocity Theorem – Maximum Power Transfer Theorem – Compensation Theorem – Tellegen's theorem. (Both AC and DC sources)

UNIT – IV: TRANSIENTS

Steady state and Transient response – DC response of an RL circuit – RC circuit – RLC circuit – AC transient response of RL, RC and RLC series

UNIT –V: COUPLED CIRCUITS, DUALITY AND TOPOLOGY

Magnetically coupled circuits: Self Inductance – Mutual inductance – Coefficient of coupling – Dot convention rule – Series and parallel connections of coupled coils – Ideal transformer (Problems in all topics).

Network topology: Graph – Tree – Co-Tree – Incidence matrix – Tie set – Cut set – Duality of network.

BOOK FOR STUDY:

- William H. Hayt, Jr, Jack E. Kemmerly, Steven M. Durbin, "Engineering Circuit Analysis", 6th Edition, Tata McGraw – Hill publishing company Ltd, 2008.
- A. Sudhakar, Shyammohan S Palli, "Circuits & Networks Analysis and Synthesis", 3rd Edition, Tata McGraw – Hill publishing company Ltd, 2008.

BOOKS FOR REFERENCE

- Umesh Sinha, "Circuit Theory", 4th Edition, Satya Prakasan Publications, New Delhi.
- Paranjothi S.R, "Electric Circuit Analysis", New Age International.
- David E. Johnson, Johny R. Johnson, John L. Hilburn, "Electric Circuit Analysis", 2nd Edition, PHI.

| Unit | Book | Sections |
|------|------|---|
| I | 1 | 2,3,2,4,2,5,3,3,3,4,3,6,3,7,3,8,3,9,4,2 – 4.5, 5.3 |
| | 2 | 1.4.1, 1.5 – 1.8, 2.15 |
| II | 1 | 10.2,10.4 – 10.8, 10.11, 11.2 11.3,11.5,11.6 |
| | 2 | 8.1, 8.2, 8.4, 8.5, 8.7 – 8.10, 5.3, 5.4, 6.1 – 6.5 |
| III | 1 | 5.6, 5.2, 5.4, 5.5 |
| | 2 | 3.5, 3.6, 3.9 |
| IV | 2 | 11.1 – 11.7 |
| V | 2 | 10.1, 10.3 – 10.6, 10.8, 10.9, 2.1, 2.2, 2.4, 2.7, 2.8.1, 3.8 |

SEMESTER – I**Hours/Week : 6****Code 11UEL130401****Credits : 5****ALLIED MATHEMATICS-I**

[For I B.Sc. Physics, Chemistry, Computer Science, Electronics, I BCA]

UNIT – I

Partial Fractions - Binomial Series - Summation of series - Finding terms - Coefficient of x^n (simple problems only).

Book 1: Chap 1 - sec 1.1 - 1.2, pp: 1-27.

UNIT – II

Exponential Series - Summation - Logarithmic Series - Summation.

Book 1: Chap 1 - sec 1.3, pp: 28-48.

UNIT – III

Matrices – Rank of a matrix - Solving simultaneous linear equation in three unknowns using Elementary operations method - Eigen values and Eigen vectors - Verification of Cayley Hamilton theorem.

Book 1: Chap 3 - sec 3.2 - 3.4, pp: 137 - 160.

UNIT – IV

Higher Derivatives - Formation of equations involving derivatives - Applications of Leibnitz's theorem.

Book 1: Chap 6 - sec 6.1, pp: 266-281.

UNIT – V

Expansions of $\cos nq$ and $\sin nq$ - Powers of sines and cosines off in terms of functions of multiples of q .

Book 1: Chap 5 - sec 5.1 - 5.4, pp: 220-242.

Text Book:

Ancillary Mathematics, Vol-I, 2009 Edition, S. Narayanan, R. Hanumantha Rao T.K. Manicavachagom Pillay, Kandaswamy.

பருவம் -2
11UGT210002

மணி நேரம் - 4
புள்ளிகள் - 3

பொதுத்தமிழ் - II

நோக்கங்கள்

1. சமய நல்லிணக்க உணர்வை வளர்த்தல்.
2. தமிழ்க் காப்பியங்களில் அழகும், அறிவுணர்வும் ஊட்டும் பகுதிகளைப் படித்துப் புரிந்து கொள்ளுதல்.
3. உரைநடைக் கட்டுரை எழுதும் திறன் பெறுதல்.

பயன்கள்

1. தமிழைத் திருத்தமாகப் படிக்கவும், பேசவும், பிழையின்றி எழுதவும் கூடிய திறன் பெறுவர்.
2. இலக்கியங்களில் படித்தவற்றை முறையாக வாழ்க்கையில் கடைப்பிடிப்பர்.

அலகு : 1

(12 மணி நேரம்)

சிலப்பதிகாரம் – அடைக்கலக் காதை - மதுரைக் காண்டம்
இலக்கிய வரலாறு – சைவம் வளர்த்த தமிழ் முதல் புராணங்கள் முடிய.

அலகு : 2

(12 மணி நேரம்)

மணிமேகலை – சிறைக்கோட்டம் அறக்கோட்டம் ஆக்கிய காதை
பெரியபுராணம் – திருநாளைப்போவார் நாயனார் புராணம்
உரைநடை – 7 முதல் 9 முடிய உள்ள கட்டுரைகள்
(கட்டுரைக்களஞ்சியம்)

அலகு : 3

(12 மணி நேரம்)

கம்பராமாயணம் – வாலி வதைப்படலம்
செம்மொழியான தமிழ்மொழியே:1 – 20 பக்கங்கள்
இலக்கணம் – எழுத்திலக்கணம்

அலகு : 4

(12 மணி நேரம்)

தேம்பாவணி – மகன் நேர்ந்த படலம்
சீறாப்புராணம் – அபீறாகு வதைப்படலம்
உரைநடை – 10 முதல் 12 வரையிலான கட்டுரைகள்
செம்மொழியான தமிழ்மொழியே – 21- 37 பக்கங்கள்

அலகு : 5

(12 மணி நேரம்)

இராவண காவியம் – ஆரியப் படலம்
இலக்கிய வரலாறு – தமிழ் இலக்கண நூல்கள் முதல் சிற்றிலக்கியங்கள் முடிய.
இலக்கணம் – சொல்லிலக்கணம்

பாடநூல்கள்

1. செய்யுள் திரட்டு – தமிழாய்வுத்துறை வெளியீடு, 2011 – 2014.
2. இலக்கிய வரலாறு, தமிழாய்வுத்துறை வெளியீடு, 2010.
3. உரைநடைநூல், தமிழாய்வுத்துறை வெளியீடு, 2011-2014
4. செம்மொழியான தமிழ்மொழியே, சங்கம் வெளியீடு, மதுரை.2010

மதிப்பெண் பகிர்வு

| பிரிவு | பாகம் -1 | பாகம் -2 | பாகம்-3 |
|---------------|-------------------|-----------------|------------------|
| செய்யுள் | 12 (12 வினாக்கள்) | 8 (2 வினாக்கள்) | 30 (2 வினாக்கள்) |
| இலக்கியவரலாறு | 4 (4 வினாக்கள்) | 4 (1 வினா) | 15 (1 வினா) |
| உரைநடை | ----- | ----- | 15 (1வினா) |
| இலக்கணம் | 2 (2 வினாக்கள்) | 4 (1 வினா) | ----- |
| செம்மொழி | 2 (2 வினாக்கள்) | 4 (1 வினா) | 15 (1 வினா) |

Sem: II
Code: 11UGE220102

Hours :5
Credits: 3

GENERAL ENGLISH –II

Objectives:

1. To enable the students to develop their effective communicative skills in English.
2. To empower the students with fluency and accuracy in the use of English Language.
3. To transform them into globally employable persons with placement skills.

UNIT-I 12 Hrs

Prose Environment.
A Dead Planet.
Riddles.

Poem William Wordsworth—Nutting.
Shelley- Ozymandias.
Filling Money Order Chalan and Bank Chalan

Short Story G.K.Chesterton – The Hammer of God (Extensive Reading)

Essential English Grammar: -31-36 Units

UNIT-II 12 Hrs

Prose Qahwah
A Dilemma
Computeracy

Poetry John Keats—La Belle Dame Sans Merci
Robert Browning- The Last Ride Together

Short Story Katherine Mansfield—A Cup of Tea (Extensive Reading)

Dialogue Writing

Essential English Grammar:37-42Units

UNIT-III 11 Hrs

Prose Review (Use Your English)
Entertainment
You and Your English

Poetry Walt Whitman- I Celebrate Myself.
Mathew Arnold—Dover Beach.

Short Story Thomas Wolfe—The Far and the Near (Extensive Reading)

Conversations

Essential English Grammar:43-48Units

UNIT-IV 20 Hrs

Prose War Minus Shooting .
Usage and Abusage.

Poetry Sarojini Naidu—The Gift of India..
Robert Frost—Design .

Short Story R.K. Narayan—Half a Rupee Worth (Extensive Reading)
Manohar Malgonkar—Bacha Lieutenant

Story Telling

Essential English Grammar:49-54Units

UNIT-V 15 Hrs

Prose Who's Who.

Poetry Nissim Ezekiel. The Night of The Scorpion

Short Story Anita Desai—A Devoted Son (Extensive Reading)
Ruskin Bond—The Boy Who Broke the Bank(Extensive Reading)
Report Writing

Letter to the Editor

Essential English Grammar: 55-60Units

Text Books

1. Krishnaswamy. N, Sriraman T. Current English for Colleges. Hyderabad: Macmillan Indian Ltd,2006.
2. Dahiya SPS Ed. Vision in Verse, An Anthology of Poems. New Delhi: Oxford University Press,2002.
3. Murphy, Raymond. Essential English Grammar. New Delhi: Cambridge University Press,2009.
4. Seshadri, K G Ed. Stories for Colleges.Chennai: Macmillan India Ltd,2003

SEMESTER – II**Sub Code – 11UEL230202****Hours/Week : 5****Credits : 4****ELECTRONIC DEVICES****Objective:**

- To learn the principles of working of the semiconductor & display devices.

UNIT – I: DIODES

Introduction to semiconductor diode – Construction – Working – Energy band diagram of PN junction – Current equations – Volt Ampere characteristics – Diode resistance – Transition capacitance – Diffusion capacitance – Temperature characteristics.

Special Diodes: Zener diode – Varactor diode – Tunnel diode – Schottky diode – PIN diode. (Energy band diagram & VI characteristics)

UNIT – II: TRANSISTORS

Introduction to construction of transistor - Current components - Configurations of transistors - Characteristics - Analytical expressions for the characteristics - α , β & γ relationships - Eber's Moll model.

UNIT – III: FET & MOSFET

Introduction to construction of FET – Working of FET – Configurations of FET – Pinch-off voltage – Volt-ampere characteristics – Low Frequency Model of FET.

Construction of MOSFET – Enhancement type – depletion type – Volt-ampere characteristics.

UNIT – IV: POWER DEVICES

Construction of UJT – Intrinsic stand-off ratio – Equivalent circuit – Volt-ampere characteristics.

Construction of SCR – Equivalent transistor model – Working – Volt-ampere characteristics – Characteristics of TRIAC, DIAC & IGBT.

UNIT – V: SPECIAL DEVICES

Construction & working of LED – LCD – Photo diode – Photo transistor – CRT Deflection plates – Electrostatic & electromagnetic focusing

BOOK FOR STUDY

Salivahanan. S, Suresh Kumar .N, Vallavaraj. A, “Electronic Devices and Circuits”, 2nd Edition, TMH, 2008.

BOOKS FOR REFERENCE

- Jacob Milliman, Christos C. Halkins, Satyabranta Jit, “Electronic Devices & Circuits”, 2nd Edition, TMH, 2008.
- David A. Bell, “Electronic devices and circuits”, Prentice Hall of India, 2004.
- Floyd, “Electron devices”, Pearson Asia, 5th Edition, 2001.

| Unit | Book | Sections |
|------|------|---|
| I | 1 | 4.11 – 4.18, 5.2, 5.4, 5.7.5, 5.8, 5.12 |
| II | 1 | 6.1, 6.2, 6.4, 6.5, 6.6, 6.10 |
| III | 1 | 7.1 – 7.6, 7.9 – 7.11 |
| IV | 1 | 17.2, 8.3, 8.4, 8.7, 8.8 |
| V | 1 | 22.3.2, 22.6, 22.7, 3.9, 3.10 |

SEMESTER - II**Sub Code – 11UEL230203****Hours/Week : 3****Credits : 4****ELECTRONICS PRACTICALS –I
(Network and Characteristics Experiment)**

1. Study of voltage division, current division and source transformation
2. Verification of Kirchoff's voltage law.
3. Verification of Kirchoff's Current law.
4. Verification of Thevenin's Theorem.
5. Verification of Norton's theorem.
6. Verification of Superposition theorem.
7. Verification of Compensation theorem.
8. Verification of Reciprocity theorem.
9. Verification of Maximum power transformation theorem.
10. Study of Series resonance circuit.
11. Study of Parallel resonance circuit.
12. Study of Steady state analysis of series RC, LC, and RLC Circuit.
13. Study of transient state analysis of series RC, LC and RLC Circuit.
14. Calculation of RMS voltage, current, reactive power, apparent power, power factor and phase relation for RL and RC circuits
15. Study of Diode characteristics.
16. Study of Zener diode characteristics.
17. Study of Transistor characteristics – CB mode.
18. Study of Transistor characteristics – CE.
19. Study of Transistor characteristics – CC.
20. Study of FET characteristics.
21. Study of MOSFET characteristics.
22. Photo electronic devices (LDR, photo diode, phototransistor and p-i-n diode).
23. Study of SCR characteristics.
24. Study of TRIAC and DIAC characteristics.
25. Study of UJT characteristics.
26. Study of IGBT characteristics.

SEMESTER - II**Sub Code - 11UEL230204****Hours/Week : 3****Credits : 4****WORKSHOP PRACTICE**

1. Component Identification
2. Functions of Multimeters, Component Checking, voltage and current measurements
3. Study of CRO (single trace and dual trace)
4. Study of AFO
5. Study of LCR Meter
6. PCB layout and etching
7. Soldering and de-soldering the components in PCB layout
8. Soldering simple circuits and checking continuity
9. Construction of Power supplies (single power supply)
10. Construction of Power supplies (dual power supply)
11. Cabinet making
12. House wiring – I (Fitting Switches, AC Pin Sockets and Indicator Lamp in Switch Box)
13. House wiring – II (tube light)
14. Hobby circuits – I
15. Hobby circuits – II
16. Hobby circuits – III
17. Engineering Drawing - I
18. Engineering Drawing – II
19. Engineering Drawing – III
20. PCB layout preparation by software (Xpress PCB)

SEMESTER – II
11UEL230402

Hours/Week : 6
Credits : 5

ALLIED MATHEMATICS II

[For I B.Sc. Physics, Chemistry, Computer Science, Electronics, I BCA]

UNIT - I

Integration - Integrals of functions containing linear functions of x - Integrals of functions involving $a^2 + x^2$ - integrals of Rational algebraic functions - Integration of irrational functions.

Book 1: Chap. I sec 6.1, 6.2, 7 (Omit 7.4), 8 case (i) to (iv) only
 Page no: 7-13, 23-31, 39-47.

UNIT – II

Properties of definite integrals - Simple applications - Integration by parts - Bernoulli's formula.

Book 1: Chap. I Sec. 11, 12, 15
 Page no: 61-72, 93, 94.

UNIT – III

Differential equations of first order - Variable separable - Homogeneous equations - Nonhomogeneous equations - Linear equation - Bernoulli's equation.

Book 1: Chap 4: Sec 1-5
 Page no: 205-218.

UNIT – IV

Second order Linear equations with constant co-efficients - Particular integrals for $e^{(kx)}$, $\sin kx$, $\cos kx$, x^n and $e^{(kx)} X$.

Book 2: Chap 3: Sec 1-4, Page no: 42-60.

UNIT – V

Laplace transform - Definition - Some general theorems - Inverse Transform.

Book 1: Chap 7: 7.1, 7.2, 7.3, 7.4, 7.5
 Page no: 289-308.

Text Book:

1. Ancillary Mathematics, Vol-II (2009), S. Narayanan, R. Hanumantha Rao, T.K. Manicavachagom Pillay, Kandaswamy.
2. Ancillary Mathematics Book II: Narayanan, Manicavachagom Pillay.

பருவம் - 3
11UGT310003

மணி நேரம் - 4
புள்ளிகள் - 3

பொதுத் தமிழ் - III

நோக்கங்கள்

1. செம்மொழித் தமிழ்ச்செய்யுள்களான பதினென்மேல் கணக்கு, பதினென்கீழ்க் கணக்குப் பாடல்களைப் படித்துப் பொருள் புரிந்து கொள்ளும் திறன் பெறுதல்
2. பண்டைய இலக்கியங்களில் அமைந்துள்ள சமூகக் கருத்துக்களை உணர்தல்.
3. மரபுக் கவிதை வடிவங்களை அறிதல்.
4. கவிதைகளில் அணிகள் அமைந்துள்ள பாங்கைப்பிரிதல்.
5. புதினம் வழித் தற்காலச் சமுதாயச் சிக்கல்களையும், அதற்கான தீர்வுகளையும் ஆராய்ந்தறிதல்.

பயன்கள்

1. செம்மொழியாம் தமிழ் மொழியின் சிறப்பை அறிந்துகொள்வர்.
2. பண்டைய இலக்கியங்கள் உணர்த்தும் அறக்கருத்துக்களை அறிந்து, மாணவர் ஒழுக்க நெறியில் வாழ்ந்து சமூகத்தை மேம்படுத்துவர்.
3. மாணவர் புதினத்தைக் கற்பதன் மூலம் சமுதாயச் சிக்கல்களை உணர்ந்து அவற்றிற்குத் தீர்வு காண்பர்.

அலகு : 1

(16 மணி நேரம்)

பத்துப்பாட்டு - குறிஞ்சிப்பாட்டு (முழுமையும்)

அலகு : 2

(10 மணி நேரம்)

நற்றிணை, குறுந்தொகை, யாப்பிலக்கணம் (வெண்பா, ஆசிரியப்பா)

அலகு : 3

(10 மணி நேரம்)

இலக்கிய வரலாறு – ‘தமிழ்மொழியின் தொன்மையும் சிறப்பும்’ முதல் ‘சங்கத் தொகை நூல்கள்’ முடிய.

புதினம் – முழுமையும்.

அலகு : 4

(12 மணி நேரம்)

கலித்தொகை, பதிற்றுப்பத்து, புறநானூறு, அணியிலக்கணம்.

அலகு : 5

(12 மணி நேரம்)

திருக்குறள்

இலக்கிய வரலாறு – சங்க இலக்கியங்களின் தனித்தன்மைகள் முதல் இரட்டைக் காப்பியங்கள் முடிய.

பாடநூல்கள்

1. செய்யுள் திரட்டு, தமிழாய்வுத்துறை வெளியீடு (2011 - 2014)
2. சமூகவியல் நோக்கில் தமிழிலக்கிய வரலாறு, தமிழாய்வுத்துறை வெளியீடு, 2010
3. புதினம் (ஒவ்வொரு கல்வியாண்டும் ஒவ்வொரு புதினம்).

மதிப்பெண் பகிர்வு

| பிரிவு | பாகம் -1 | பாகம் -2 | பாகம்-3 |
|---------------|-------------------|-----------------|------------------|
| செய்யுள் | 12 (12 வினாக்கள்) | 8 (2 வினாக்கள்) | 30 (2 வினாக்கள்) |
| இலக்கியவரலாறு | 6 (6 வினாக்கள்) | 8 (2 வினாக்கள்) | 30 (2 வினாக்கள்) |
| புதினம் | ----- | ----- | 15 (1வினா) |
| இலக்கணம் | 2 (2 வினாக்கள்) | 4 (1 வினா) | ----- |

Sem: III

Hours :5

Code: 11UGE320103

Credits: 3

GENERAL ENGLISH -III**Objectives:**

1. To enable the students to complete the pre-reading task to comprehend the local and global issues in the lessons..
2. To enable the students to complete the post-reading task centering on Grammar and Skill Development
3. To empower the students with globally employable skills.

UNIT-I**12 Hrs**

Larry Collins & Dominique Lapierre
 Freedom at Midnight (Extract)
 Alfred Uhry
 Driving Miss Daisy
 Extensive Reading—Robinson Crusoe (Chapters 1-3)
 Essential English Grammar—61-66.

UNIT-II**12 Hrs**

Alfred Lord Tennyson
 Ulysses
 Nathaniel Branden
 Our Urgent Need for Self-esteem
 Extensive Reading—Robinson Crusoe (Chapters 4-6)
 Essential English Grammar—67-72.
 Reader's Mail :The Hindu

UNIT-III**11 Hrs**

Daniel Goleman
 Emotional Intelligence
 Marcel Junod
 The First Atom Bomb.
 Extensive Reading—Robinson Crusoe (Chapters 7-9)
 Essential English Grammar—73-78.
 Job Application.

UNIT-IV**20 Hrs**

E.K.Federov
 Climate Change and Human Strategy.
 Paolo Mauro
 Corruption: Cases, Consequences and Agenda for further Research.
 Extensive Reading—Robinson Crusoe (Chapters 10-12)
 Essential English Grammar—79-84.
 Minutes Writing.

UNIT-V**15 Hrs**

Anne Frank
 The Diary of Young Girl
 A.P.J.Abdul Kalam
 Wings of Fire
 Extensive Reading—Robinson Crusoe (Chapters 13-15)
 Essential English Grammar— 85-90.
 Resume Writing.

Text Books

1. Elango K. *Insights*. Hyderabad: Orient Blackswan Pvt Ltd,2009.
2. Murphy, Raymond. *Essential English Grammar*. New Delhi. Cambridge University Press India Ltd,2009.
3. Defoe, Daniel. *Robinson Crusoe*. Chennai: MacMillan India Ltd,2009.
4. Stevenson R L. *Treasure Island*. Chennai: MacMillan India Ltd,2009.
5. Ram N Ed. *The Hindu*. Tiruchirappalli.

SEMESTER - III**Sub Code - 11UEL330205****Hours/Week : 5****Credits : 4****ELECTRONIC CIRCUITS****Objective:**

- To learn the working principles of amplifier, oscillator and feedback networks.

UNIT – I: RECTIFIERS AND POWER SUPPLIES

Linear mode power supply: Half-wave – Full-wave – Bridge Rectifiers – Analysis for V and ripple voltage with C, CL, L-C and C-L-C filters – Zener Voltage regulator – Switched mode power supplies.

UNIT – II: TRANSISTOR BIASING

Bias Stability – Need for Biasing – Load Line – Thermal runaway – Stability Factors – Methods of biasing circuits for BJT – Biasing the FET – Source bias – Self bias – Voltage divider bias for FET – Use of FET as voltage variable resistor.

UNIT – III: FREQUENCY RESPONSE OF AMPLIFIERS

Single stage amplifier: CE, CB and CC amplifiers – Small Signal analysis of amplifiers (*h* & *re'* parameters) to obtain gain, input impedance and output impedance – FET amplifier: CS, and CD amplifiers – Frequency of amplifier – Bode plot analysis – Transient response – RC Coupled Amplifier Analysis – An introduction to differential amplifiers.

UNIT – IV: FEEDBACK AMPLIFIERS

Concepts of feedback – Types of negative feedback – Method of identifying feedback topology – Nyquist criterion for stability of feedback amplifiers

Barkhausen's Criterion – Mechanism for start of oscillation and stabilization of amplitude – RC phase shift oscillator – Wien's bridge oscillator – Twin-T oscillators – Analysis of LC oscillators: Colpitt's – Hartley – Clapp – Crystal Oscillator circuits

UNIT – V: TUNED & POWER AMPLIFIERS

Tuned Amplifier: Single Tuned – Double Tuned – Stagger tuned – Power amplifiers: Working principle of Class A, Class AB, Class B, Class C, Class D, and Class S amplifiers – efficiency of class A, Band C amplifiers.

BOOK FOR STUDY

- Salivahanan. S, Suresh Kumar .N, Vallavaraj. A, "Electronic Devices and Circuits", 2nd Edition, TMH, 2008.
- Albert Paul Malvino, "Electronic Principles", 7th Edition, TMH

BOOKS FOR REFERENCE

- Jacob Milliman, Christos C. Halkins, Satyabranta Jit, "Electronic Devices & Circuits", 2nd Edition, TMH, 2008.
- David A. Bell, "Electronic devices and circuits", Prentice Hall of India, 2004.
- Floyd, "Electron devices", Pearson Asia 5th Edition, 2001.

| Unit | Book | Sections |
|------|--------|---|
| I | 1 | 18.1, 18.2, 18.2.2, 18.2.3, 18.2.4, 18.3 |
| II | 1 | 6.11, 6.11.1, 6.11.2, 6.12, 7.16, 7.17 |
| III | 1 2 | 9.5 – 9.8, 9.10, 9.11, 9.11.1 – 9.11.5, 9.12, 9.12.1 – 9.12.3, 9.14, 10.5 |
| IV | 1 | 14.2 – 14.6, 15.3, 15.5, 15.6, 15.7, 15.11(i), 15.12 – 15.14 |
| V | 1 | 13.3.1, 13.3.2, 13.6, 12.1 – 12.10, 12.13, 12.14 |

Semester – III
11UPH330403

Hours/Week : 4
Credits : 4

ALLIED PHYSICS – I

UNIT – I: Conducting Materials

Introduction – Classical free electron theory of metals – Quantum theory – Free electron gas – Fermi energy and carrier concentration.

UNIT – II: Magnetic Materials

Introduction – Origin of magnetic moment – Bohr magneton – Diamagnetism, Paramagnetism and Ferromagnetism – Hysteresis – Anti-ferromagnetic materials – Ferrites – Applications.

UNIT – III: Dielectric Materials

Introduction – Basic definitions – Various types of polarization in dielectric materials – Frequency and temperature dependence of polarization – Internal field or local field – Clausius-Mosotti equation – Dielectric losses – Dielectric breakdown – Applications of dielectric materials – Ferro electricity.

UNIT – IV: Superconducting Materials

Introduction – Meissner effect – Transition temperature – Isotope effect – Types of superconductors – BCS theory – High-TC superconductors – Applications of superconductors.

UNIT – V: Modern Engineering Materials

Metallic glasses – Shape memory alloys – Nanomaterials – Carbon nano tubes

BOOK FOR STUDY

1. Engineering Physics – D.K. Bhattacharya & A. Bhaskaran, Oxford University Press, 2010

| UNIT | SECTION |
|----------|--------------|
| Unit – 1 | 6.1 – 6.5 |
| Unit – 2 | 8.1 – 8.8 |
| Unit – 3 | 10.1 – 10.10 |
| Unit – 4 | 9.1 – 9.8 |
| Unit – 5 | 11.1 – 11.4 |

பருவம் - 4
11UGT410004

மணி நேரம் - 4
புள்ளிகள் - 3

பொதுத் தமிழ் - 4

நோக்கங்கள்

1. நாடகத்தின் நோக்கம், அதன் போக்கு, உத்திகள், பாத்திரப் பாங்கு, உரையாடல் முறை, கற்பனைத் திறம் போன்றவற்றை வெளிப்படுத்துதல்.
2. புதிய நாடகங்களைப் படைக்கும் திறனை மாணவர்களிடையே உருவாக்குதல்.

பயன்கள்

1. நாடகவழி அழகியல் உணர்வுகளை வளர்த்துக் கொள்வர்.
2. நாடகங்களைச் சமூகப் பயன்பாட்டிற்கு ஏற்ப உருவாக்கும் திறன் பெறுவர்.

அலகு : 1 (12 மணி நேரம்)
மனோன்மணியம், பாயிரம், அங்கம் - 1, களம் 1 - 5 வரை.

அலகு : 2 (12 மணி நேரம்)
மனோன்மணியம், அங்கம் - 2, களம் 1 - 3 வரை.
உரைநடை நாடகம் - ஈரோடு தமிழன்பன் - ஈர நெருப்பு
(முதல் மூன்று நாடகங்கள்)

அலகு : 3 (12 மணி நேரம்)
மனோன்மணியம், அங்கம் - 3, களம் 1 - 4 வரை.

அலகு : 4 (12 மணி நேரம்)
மனோன்மணியம், அங்கம் - 4, களம் 1 - 5 வரை.

அலகு : 5 (12 மணி நேரம்)
மனோன்மணியம், அங்கம் - 5, களம் 1 - 3 வரை.
உரைநடை நாடகம் - ஈரோடு தமிழன்பன் - ஈர நெருப்பு,
(4, 5, 6 ஆம் நாடகங்கள்)

பாடநூல்கள்

1. சுந்தரனார், பெ. மனோன்மணியம், தமிழாய்வுத்துறை (பதிப்பு), தூய வளனார் கல்லூரி, திருச்சிராப்பள்ளி-2. (அங்கம் - 3 இல்களம் - 4 நீங்கலாக)
2. உரைநடை நாடகம் - ஈரோடு தமிழன்பன் - ஈர நெருப்பு, அய்யா நிலையம், நாஞ்சிக் கோட்டை சாலை, தஞ்சாவூர் - 613 006.

மதிப்பெண் பகிர்வு

| பிரிவு | பாகம் -1 | பாகம் -2 | பாகம்-3 |
|---------------|-------------------|------------------|------------------|
| மனோன்மணியம் | 20 (20 வினாக்கள்) | 20 (5 வினாக்கள்) | 60 (4 வினாக்கள்) |
| உரைநடை நாடகம் | ----- | ----- | 15 (1 வினா) |

Sem: IV
Code: 11UGE420104

Hours :5
Credits: 3

GENERAL ENGLISH -IV

Objectives:

1. To enable the students to complete the pre-reading task to comprehend the local and global issues in the lessons..
2. To enable the students to complete the post-reading task centering on Skill Development and Grammar..
3. To empower the students with globally employable soft skills.

UNIT-I

12 Hrs

Life Stories

F.G.Herod
Mother Teresa
R.K.Narayan
Swami and Friends
Treasure Island (1-4)
91—95.

Extensive Reading
Essential English Grammar
Film Review (The Hindu).

UNIT –II

12 Hrs

Imogen Grosberg
See Off the Shine
George Orwell
The Porting Spirit
Treasure Island (5-8)
96-100.

Extensive Reading
Essential English Grammar
Article Writing on Current Issues.

UNIT-III

11 Hrs

Philip Agre
Building an Internet Culture
Satyajit Ray
Odds Against Us
Treasure Island (9-12)
101-105.

Extensive Reading
Essential English Grammar
Mock Interviews

UNIT-IV

20Hrs

Jerzy Kosinski
TV as Babysitter.
E.F.Scumacher
Technology With Human Face.
Treasure Island (13-17)
106-110.

Extensive Reading
Essential English Grammar
Mock Group Dynamics

UNIT-V

15 Hrs

Aluizio Borem, Fabrico
R.Santos & David E.Bower
Advent of Biology
Mark Ratner & Daniel Ratner
Nanotechnology
Treasure Island (18-22)
111-114.

Extensive Reading
Essential English Grammar
Presentation Skills

Text Books

1. Elango K. *Insights*. Hyderabad: Orient Blackswan Pvt Ltd,2009.
2. Murphy, Raymond. *Essential English Grammar*. New Delhi. Cambridge University Press India Ltd,2009.
3. Defoe, Daniel. *Robinson Crusoe*. Chennai: MacMillan India Ltd,2009.
4. Stevenson R L. *Treasure Island*. Chennai: MacMillan India Ltd,2009.
5. Ram N Ed. *The Hindu*. Tiruchirappalli.

SEMESTER - IV
Sub Code - 11UEL430206

Hours/Week : 5
Credits : 4

DIGITAL ELECTRONICS

Objective:

- To learn basic functioning of digital components.
- To learn the design procedure and methods of analysis of any digital circuits

UNIT – I : NUMBER SYSTEMS, LOGIC GATES AND BOOLEAN ALGEBRA

Number System: Binary, Decimal, Octal, Hexadecimal – Conversion – Complements – BCD codes – Gray codes – Alphanumeric codes – ASCII – Error detection and correction codes

Logic Gates : Basic gates – AND, OR, NOT gates – Universal Gates – NAND, NOR gates – Exclusive-OR – Exclusive-NOR – Boolean operation and expression – Laws and rules of Boolean algebra – Demorgan's theorem

UNIT-II:MINIMIZATION TECHNIQUE AND DIGITAL INTEGRATED CIRCUITS

Boolean Expressions – K- map – SOP – POS – Minimization Technique: Quine Mcluskey method only – Implementation using universal gates.

Digital ICs: SSI, MSI, LSI and VLSI devices- TTL, ECL, MOSFET circuits

UNIT – III : COMBINATIONAL LOGIC

Design Procedure – Adders – Subtractors – Decimal Adder – Multiplexer – Demultiplexer – Decoder – 4-bit decoder – BCD-to-seven segment Decoder/driver – Encoder – Parity Generators and Checkers- Code Converters: Binary-to- Gray converters – Gray -to-Binary converters

UNIT - IV: SEQUENTIAL CIRCUIT

Flip-flops: S-R, J-K, T, D – triggering of flip-flops – Master-slave flip-flop – Counters: Asynchronous counter – 4-bit binary Up/down counter –

Synchronous counter – 4 bit Up/down counter – Design of synchronous counters – Shift registers.

UNIT – V: MEMORY DEVICES AND PROGRAMMABLE LOGIC

Introduction – RAM organization – Memory decoding – ROM organization – PROM – EPROM – EEPROM – EAPROM – Programmable logic devices: Programmable Logic Array (PLA) – Programmable Array Logic (PAL) – Sequential Programmable devices.

BOOKS FOR STUDY:

1. Morris Mano, Michael D. Ciletti "Digital Design", 4th Edition, Prentice Hall of India Pvt. Ltd., New Delhi, Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2008.
2. Thomas L. Floyd, "Digital Fundamentals, 8th Edition, Pearson Education, Inc, New Delhi.

BOOKS FOR REFERENCE:

1. Donald P Leach, Albert Paul Malvino, Goutam Saha, "Digital Principles And Applications", 6th Edition, Tata McGraw- Hill publishing Company Ltd. New Delhi, 9th reprint 2008
2. Salivahanan. S, Arivahagan .S, "Digital Circuits and Design", 3rd Edition, Vikas publishing house Pvt. Ltd., 2009.

| Unit | Book | Sections |
|------|------|---|
| I | 2 | 2.2, 2.3 – 2.5, 2.83 – 2.12, 3.1 – 3.6, 4.1, 4.2, 4.3 |
| II | 1 | 3.2, 3.3, 3.5, 3.6, 3.7, 3.10, 10.2, 10.5, 10.6, 10.7 |
| | 2 | 11.1 |
| III | 1 | 4.5, 4.6, 4.9 – 4.11 |
| | 2 | 6.5, 6.7, 6.9, 6.10 |
| IV | 2 | 7.1, 7.2, 7.3, 8.1, 8.2, 8.3, 8.4, 9.1– 9.5 |
| V | 1 | 7.1, 7.2, 7.3, 7.5, 7.6, 7.7, 7.8 |

SEMESTER – IV**Hours/Week : 3****Sub Code - 11UEL430207****Credits : 4****ELECTRONICS PRACTICALS –II****(Semiconductor circuits and Digital Experiment)****(Simulation or Construction using pSpice & MODEL SIM)**

1. Study of transistor biasing, calculation of Q point and DC load line analysis {Fixed Bias and Voltage Divider for both npn and pnp}
2. Study of FET biasing, calculation of Q point and DC load line analysis {Switching and Self Bias}
3. Study of MOSFET biasing, calculation of Q point and DC load line analysis
4. Half wave rectifier with and without filter.
5. Regulated power supply (Transistor & Zener diode).
6. Passive Filter circuits – low, high and band pass.
7. Voltage Multiplier Circuits.
8. RC coupled transistor amplifier.
9. FET amplifier
10. Construction and study of differential amplifier based on transistor.
11. Power amplifier – Transistor Emitter follower.
12. Hartley oscillator – Transistor.
13. Phase shift oscillator – Transistor.
14. Colpitt's oscillator – Transistor.
15. Construction of AND & NOT gates based on diode, transistor, FET {ON/OFF state voltage, current calculation}
16. Construction of all the gates based on MOSFET {ON/OFF state voltage, current calculation}
17. Encoders and Decoders.

18. Multiplexers and Demultiplexers.
19. Shift registers.
20. Asynchronous counters.
21. Synchronous counters.
22. Basic gates and Verification of Boolean laws.
23. Adders and Subtractors.
24. Flip-flops using gates.
25. Parallel Binary adders and Subtractors.
26. BCD adders and BCD Subtractors.
27. K Map simplification.
28. Quine Mcluskey method of simplification.

SEMESTER – IV
11UPH430404

Hours/Week : 4
Credits : 4

ALLIED PHYSICS – II

UNIT – I Quantum Physics

Introduction – Black body radiation – Compton effect – Matter waves – Heisenberg's Uncertainty principle – Schrodinger's wave equation – The electron microscope

UNIT – II Lasers

Introduction – Principle of spontaneous emission and stimulated emission – Population inversion – Types of lasers – Industrial applications – Medical application – Holography

UNIT – III Ultrasonics

Introduction – Production of ultrasonic waves – Detection of ultrasonic waves – Properties of ultrasonic waves – Cavitation – Acoustic grating – Industrial applications – SONAR – Non-destructive testing – Medical application

UNIT – IV Fibre Optics and Applications

Introduction – Propagation of light in optical fibres – Numerical aperture and acceptance angle – Types of optical fibres – Double crucible technique of fiber drawing – Splicing – Power losses in optical fibres – Fibre optic communication systems – Light sources – Detectors – Fibre optic sensors – Endoscope.

UNIT V: Electrochemical Power Sources

Basic principles, chemical and electrical energies - inter conversion - charging and discharging - requirements for a good power source - Types of power sources. Primary Batteries: Description of primary cells - alkaline, manganese cells - silver oxide - zinc cells - lithium primary cells - applications. Secondary Batteries: Importance applications - charge discharge efficiency - cycle life - energy density - lead acid batteries for electric vehicles. Fuel Cells: Basic principles - Hydrogen, oxygen fuel cells - gas diffusion electrodes for fuel cells - alkaline fuel cells.

BOOK FOR STUDY

1. Engineering Physics – D.K. Bhattacharya & A. Bhaskaran, Oxford University Press, 2010
2. Hamann C.H. Hamnett A., and Vielstich W., Electrochemistry.
3. Hibbert D.B., Introduction to electrochemistry.

| UNIT | SECTION |
|----------|-----------------|
| Unit – 1 | 4.1 – 4.7 |
| Unit – 2 | 2.1 – 2.7 |
| Unit – 3 | 1.1 – 1.10 |
| Unit – 4 | 3.1 – 3.12 |
| Unit – 5 | Course Material |

Semester – 3 & 4

11UEL430405

Hours/Week : 2

Credits : 2

Allied : PHYSICS PRACTICAL

Any 16 of the following

1. Spectrometer – Refractive index of a prism
2. P.O Box – Temperature coefficient – Thermistor
3. Carey Foster's Bridge - R and ρ .
4. Potentiometer – Ammeter Calibration
5. Potentiometer – Calibration of Voltmeter
6. Potentiometer - Resistance of a coil of wire R and ρ .
7. BG – Figure of merit & Resistance of the Galvanometer
8. BG – Determination of C
9. Conversion of a Galvanometer into voltmeter
10. Conversion of a Galvanometer into Ammeter
11. Study of RTD
12. Study of Optical Transducers: Thermal Sensors
13. Study of Optical Transducers : Light Sensors
14. Study of fundamental physical Properties of LASER beams
15. Resistance of a Thermistor- Multimeter
16. EMF of a Thermocouple – Multimeter

SEMESTER –IV**Hours/Week : 4****Sub Code - 11UEL430301A****Credits : 4****CORE ELECTIVE – I: SIGNALS AND SYSTEMS****Objective:**

- To acquire the basics of Signals, Systems and Transformations.

UNIT – I: INTRODUCTION TO SIGNAL AND SYSTEM

Signals: Definition – Classification of signals – Basic operations on signals – Types of signals. Systems: Definition – Classification of systems – Properties of systems.

UNIT – II: REPRESENTATION OF PERIODIC SIGNALS BY FOURIER SERIES AND BY SAMPLES

The Response of LTI Systems to Complex Exponentials – Continuous Time Periodic Signals – Convergence of Fourier series – Properties of CTFS.

Discrete Time Periodic Signals – Properties of DTFS – Representation of continuous time signals by its samples – Sampling Theorem, Impulse – Train Sampling, Sampling with a zero order hold – Reconstruction of a signal from its samples using interpolation – The effect of under sampling: Aliasing – Sampling of discrete time signals – Discrete time decimation & Interpolation

UNIT – III: FOURIER TRANSFORM

Continuous Time Fourier Transform (CTFT) for A periodic and Periodic Signals – Properties – Discrete Time Fourier Transform (DTFT) for A periodic and Periodic Signals – Properties – Parseval's Relations for CTFT and DTFT.

UNIT – IV: LINEAR TIME INVARIANT SYSTEM

Introduction – Discrete Time Linear Time Invariant Systems – Representation of Discrete Time Signals in Terms of Impulses – The Convolution Sum – Continuous-Time Linear Time Invariant Systems – Representation of Continuous Signals in Terms of Impulses – The Convolution Integral – Properties of Linear Time Invariant Systems – The

Unit Step Response of Linear Time Invariant System – System Characterization by Linear Constant Coefficient Differential Equations and Difference Equations.

UNIT V: LAPLACE AND Z TRANSFORMS

Laplace Transform – Region of Convergence – Inverse Laplace Transform – Properties: Linearity, Time Shifting, Time Scaling, Conjugation, Convolution Property – Z Transform – Region of Convergence – Inverse Z-Transform – Properties: Linearity, Time Shifting, Time Scaling, Conjugation, Convolution Property.

BOOK FOR STUDY

- Alan V. Oppenheim, Alan S. Willsky and Hamid Nawab S., "Signals and Systems", 2nd Edition, PHI, 2008.
- Poornachandra S., "Signals and System", Vijay Nicole Imprints Pvt. Ltd., 2004

BOOK FOR REFERENCE

- Haykin, Simon and Barry Van Veen, "Signals and System", 2nd Edition, Wiley, 2003.
- Ramesh Babu P, Ananda Natarajan R., "Signals and System", 3rd Edition, Scitech Publication Private Limited, 2007.
- B. P. Lathi, "Linear Systems & Signals", Oxford University Press, 2007.
- Zieman and Tranter – "Signals and linear systems", 2nd Edition, Maxwell McMillan, 2001.

| Unit | Book | Sections |
|------|--------|---|
| I | 2 | 1.1 – 1.4, 2.1 – 2.9, 3.4, 4.3 |
| II | 1 2 | 3.2 – 3.7, 7.1 – 7.3, 7.5 (Relevant problems only – Chapter 5 & 6) |
| III | 1 2 | 4.0 – 4.3, 5.0 – 5.3 (Relevant problems only – Chapter 7 & 8) |
| IV | 1 2 | 2.0 – 2.4 (Relevant problems only – Chapter 3 & 4) |
| V | 1 2 | 9.1 – 9.3, 9.5, 10.1 – 10.3, 10.5 (Relevant problems only – Chapter 10 & 11) |

SEMESTER –IV**Hours/Week : 4****Sub Code - 11UEL430301B****Credits : 4****CORE ELECTIVE – I: PROGRAMMABLE LOGIC CONTROLLER****Objective:**

- To learn the concepts of PLC
- To Deal with Ladder Logic programming and Simulation in IDE using OMRON and KEYENCE
- To focuses on how PLCs work and gives students practical information about programming, and understanding the various hardware details of PLC systems

UNIT–I: INTRODUCTION TO PLC, LADDER DIAGRAM FUNDAMENTALS

Introduction to PLC – PLC Vs Microcontroller – Basic Components and their Symbols – Control Transformers – Fuses – Switches – Relays – Time Delay Relays – Fundamentals of Ladder Diagram – Basic diagram framework – Wiring Reference Designators – Boolean Logic & Relay Logic – AND-OR & OR-AND – Ground Test – The Latch – Two handed Anti-Tie Down, Anti-Repeat – Combined Circuit – Machine Control Terminology. PLC Vs Relay comparison

UNIT – II : PROGRAMMABLE LOGIC CONTROLLER & FUNDAMENTAL PROGRAMMING

PLC Configurations – System Block Diagram – Update – Solve the Ladder – Physical Components Vs Program components –Internal Relays - Basics of PLC Programming-Developing Fundamental PLC Wiring Diagrams and Ladder Programs-Simple Programs.

UNIT - III: ADVANCED PROGRAMMING TECHNIQUES AND OVERVIEW OF MNEMONIC PROGRAMMING CODE

Ladder Program execution Sequence -- Counters – industrial examples – Timers – Master control Relays and control Zones – AND Ladder Rung – Entering Normally Closed Contacts – OR Ladder Rung – Simple

Branches – Complex Branches-Complex Branches-Case studies-Industrial problems and Ladder logic solutions

UNIT - IV: WIRING TECHNIQUES, ANALOG I/O & SENSORS

PLC Power Connection – input wiring – Inputs having a single common – Isolated inputs – Output wiring – Relay outputs – Solid state outputs – Analog (A/D) inputs – Analog (D/A) output – Sensor Output classification – Connecting Discrete sensors to PLC inputs – Proximity sensors – Optical Proximity Sensors.

UNIT – V : WORKING IN OMRON & KEYENCE IDE WITH LADDER LOGIC

Introduction to OMRON & KEYENCE – Creating a project – Ladder Programming – Compiling and Executing – Ladder Programs – Logic Gate functions (AND, OR, NOT, NAND, NOR, XOR) – Using Timers (ON delay timer, OFF delay timer, one shot pulse, flashing pulse), Counters – Using Calendar functions

BOOK FOR STUDY

1. John R. Hackworth, Frederick D. Hackworth, Jr., “Programmable Logic Controllers, Programming Methods and Applications”, New Delhi: Pearson Education, 3rd edition.

BOOK FOR REFERENCE

1. John. W .Webb, Renaldo A. Rein, “Programmable Logic Controller Principles and Application”, Prentice Hall India, 5th Edition.
2. Frankpetruzella, “Programmable Logic Controllers”, Tata McGraw Hill, 2nd edition.

| UNIT | BOOK | SECTIONS |
|------|------|---|
| 1 | 1 | Material prepared by the department (for 1 st two topics), 1.1 – 1.3 |
| 2 | 1 | 2.1 - 2.5, 3.1,3.3 |
| 3 | 1 | 4.1, 4.8, 4.10, 4.11, 5.1, 5.2, 5.3, 5.4, 5.5 |
| 4 | 1 | 6.1 – 6.7, 7.1, 7.2, 8.1 – 8.3, 8.7 |
| 5 | - | Material prepared by the department |

SEMESTER – V**Hours/Week : 5****Sub Code - 11UEL530208****Credits : 4****MICROPROCESSOR AND ITS APPLICATIONS****Objective:**

- To learn the architecture, programming and interfacing of 8085 and 8086 microprocessors in detail and learn briefly about advance processor.

UNIT – I : ARCHITECTURE OF INTEL 8085

Architecture of 8085 – Pin description and functions – Instruction and Data flow – Machine cycle – Timing diagram for op-code fetch cycle, memory, I/O Read and write cycles –Interrupt structure and its operation.

UNIT – II : ASSEMBLY PROGRAMMING WITH 8085

8085 addressing modes – Instruction set classification and format – Stack and subroutine – Assembly language programming.

UNIT – III : INTEL 8086 ARCHITECTURE

Intel 8086 architecture – Pin description and function overview – Minimal & maximum mode – Bus activities during read/write operation – Interrupts structure and its operation.

UNIT – IV : INTEL 8086 PROGRAMMING AND ADVANCED PROCESSORS

Instruction set – Addressing modes – Assembly level language programming (ALP) – Comparative study of 286, 386,486 & Pentium processors – Memory Protection and Virtual Memory Concepts.

UNIT – V : PERIPHERAL INTERFACES

Address space partitioning – Memory and I/O interfacing – PPI 8255 – UART 8251 –8253 Timer – 8259 interrupt controller – 8237 programmable DMA – 8279 keyboard and display interface controller – Applications Stepper motor and traffic controller using 8085 microprocessor

BOOK FOR STUDY

- Ram.B, "Fundamentals of microprocessor and microcomputers", 4th Edition, Dhanpat Rai & Sons.
- Douglas V. HALL, "Microprocessor and Interfacing", 2nd Edition.
- Barry B. Brey, "THE INTEL MICROPROCESSORS", 8th Edition, Imprint of PEARSON.

BOOK FOR REFERENCE

- Ramesh Goankar, "Microprocessors and its Application", 3rd Edition.

| UNIT | BOOK | SECTION |
|------|------|---|
| I | 1 | 3.1–3.3.5 |
| II | 1 | 4.1–4.6.5 |
| III | 3 | 9.1, 9.6, 9.3–9.4 |
| III | 2 | 2.12, 8.1–8.39 |
| IV | 3 | 3, 4, 5, 6 (instruction set & addressing modes), 3.1–3.19, 15.2–15.41, 16.2 |
| V | 1 | 7.2, 7.3, 7.6, 7.7, 7.10, 7.11, 7.9, 7.8, 7.12.5, |

SEMESTER - V**Hours/Week : 5****Sub Code - 11UEL530209****Credits : 4****LINEAR INTEGRATED CIRCUITS****Objective:**

- To learn the principles of operations and applications of Operational amplifier.

UNIT-I: INTEGRATED CIRCUIT FABRICATION AND DIFFERENTIAL AMPLIFIER

Classification – IC chip size and circuit complexity – Fundamentals of Monolithic IC technology – Development of IC – Package types – Basic planar process – Fabrication of a typical circuit – Active and Passive components for ICs – Differential amplifier – Types of configuration – DC and AC analysis.

UNIT-II: OP-AMP THEORY & APPLICATIONS

Op-Amp – Block diagram – Symbol – Ideal Characteristics of an Op-Amp – DC analysis: Bias & offset currents – Offset voltages – CMRR – AC analysis: Slew rate – Frequency response – Basic application: Inverting amplifier – Non-inverting amplifier – Summing amplifier – Subtractors – Integrator – Differentiator – V-I converter – I-V converter – Instrumentation amplifier.

UNIT- III : COMPARATORS AND ITS APPLICATIONS

Comparator – Op-amp as comparator – Zero crossing detector – High-speed comparator – Comparator characteristics – Comparator applications: Schmitt trigger – Window detector – V/F and F/V converters – Peak detector – Clippers and Clampers – Positive and Negative clippers – Small-signal Half wave rectifiers – Positive and Negative clampers – Sample and Hold circuits.

UNIT-IV: WAVEFORM GENERATORS AND FILTERS

Oscillator- Phase shift oscillator – Wien's bridge oscillator – Square wave generator – Triangular wave – Saw tooth waveform generator – Active

filter – First order Low-Pass Butter worth filter – First order High-Pass Butter worth filter – Band pass filters – Band reject filter.

UNIT-V: TIMER AND D/A, A/D CONVERTERS

555 Timer – Functional block diagram – Monostable Multivibrators – Astable Multivibrator – VCO – PLL – D/A converters – Binary weighted resistors method – R-2R ladder network method – A/D converters – Successive approximation A/D converter – Flash converter.

BOOKS FOR STUDY

- Ramakant A. Gayakwad, "Op-amps & Linear Integrated Circuits", 3rd Edition, Prentice Hall India.
- Roy D. Choudhury, Shail Jain, "Linear Integrated Circuits", 2002 Reprint, New, Age International (P) Limited.

BOOK FOR REFERENCE

- William D. Stanley, "Operational Amplifier with Linear Integrated Circuits", Pearson Education, 2004.
- Robert F Coughlin, Fredrick, F. Drisold, "Op-amp and linear ICs", 4th Edition, Pearson education, 2002.
- Albert Paul Malvino, "Electronic Principles", 7th Edition, TMH

| Unit | Book | Sections |
|------|------|---|
| I | 1 | 1.1 – 1.7, 2.9, 2.10 |
| | 2 | 1.1 - 1.7 |
| II | 1 | 2.2, 2.3, 2.5, 3.3, 5.2 – 5.4, 5.11, 6.10, 6.2, 7.5, 7.6 – 7.10, 7.12 |
| III | 1 | 9.1 – 9.5, 9.8, 9.9, 9.10, 9.12, 9.14, 9.15 |
| IV | 1 | 8.11 – 8.13, 8.15 – 8.17, 8.2, 8.3, 8.5, 8.8, 8.9 |
| V | 1 | 10.4, 10.5, 10.5.1, 8.18, 9.11 |
| | 2 | 10.3.1 |

SEMESTER - V**Hours/Week : 5****Sub Code - 11UEL530210****Credits : 4****MICROCONTROLLERS AND ITS APPLICATIONS****Objective:**

- To acquire the knowledge about microcontrollers and programming for various applications

UNIT- I: INTRODUCTION TO 8051 MICROCONTROLLER

Introduction to Microcontroller – Comparison of Microcontrollers and Microprocessor – overview of 8051– Pin description of 8051 – Registers – Program counters – ROM & RAM space – Stack and PSW – SFR.

UNIT - II: ON-CHIP PERIPHERALS OF 8051

Counters/Timers – Counter programming – Basics of serial communication – RS232 and MAX 232 IC connection – Serial communication registers – Serial communication – Interrupts – Interrupts registers – Internal and external interrupts programming.

UNIT- III: 8051 ASSEMBLY LANGUAGE PROGRAMMING

8051 addressing modes: Immediate – Register – Direct – Indirect – Instruction set: Arithmetic and logical operations – Call and jump instructions – Bit manipulation instructions – Simple assembly language programs – Data types and directives.

UNIT – IV: EMBEDDED C PROGRAMMING WITH C51 COMPILER OF KEIL IDE

Introduction to embedded C – C51 Compiler basics – Compiler related differences from ANSI C – 8051 memory configurations – Local memory model specification – Variables and constants – Simple embedded C programs.

UNIT – V: APPLICATIONS OF MICROCONTROLLER

Matrix keyboard – LCD – ADC – DAC – Temperature monitoring system – Traffic light control system – Stepper motor.

BOOK FOR SUTDY

- Mazidi and Mazidi, “The 8051 Microcontroller and Embedded Systems”, PHI, 2000.
- Hitex (UK) Ltd. University of Warwick Science Park Coventry “C51 Primer - An Introduction to the Use of the Keil C51 Compiler on the 8051 Family”.

BOOK FOR REFERENCES

- A.V. Deshmuk, “Microcontrollers (Theory & Applications)”, TMH, 2005.
- John B. Peatman, “Design with PIC Microcontrollers”, Pearson Education, 2005.

| UNIT | BOOK NUMBER | CHAPTERS | SECTIONS |
|------|-------------|-------------|------------------------------------|
| I | 1 | 1,2 | 1.1,1.2,2.1-2.7, 5.2, |
| II | 1 | 9, 10, 11 | 9.1,9.2,10.1-10.3,11.1-11.5 |
| III | 1 | 2, 3, 5, 6, | 3.1-3.3, 5.1-5.3, 6.1-6.4, 2.2-2.5 |
| IV | E-Book | | |
| V | 1 | 12,13 | 12.1,12.2, 13.1, 13.2, 13.3, |

SEMESTER – V**Hours/Week : 6****Sub Code - 11UEL530211****Credits : 4**

ELECTRONICS PRACTICALS –III
{Operational Amplifier, Communication, Power and
Instrumentation, Microprocessor}

1. Measurement of OP AMP parameters {Gain, input offset voltage, input offset current, bias current, CMRR, output voltage & slew rate}
2. OP AMP basic operation {Inverting, Non Inverting, Differential, Unity gain and Summing amplifiers}
3. OP AMP based Integrator, Differentiator and Peak Detector
4. Voltage to Current and Current to Voltage converters
5. Study of active filters using p-Spice
6. Study of 555 applications using p-Spice {Square wave, saw tooth & VCO}
7. Comparators – Inverting, Non Inverting, Zero Cross and Window Detector
8. Solving simultaneous equation
9. Design of instrumentation amplifier
10. Full Wave Control rectifier using SCR, TRIAC & UJT
11. Construction and study of step up and step down choppers
12. PWM based motor speed control using IGBT
13. Construction and study of voltage fed inverters using IGBT/SCR
14. Construction and study of static circuit breakers
15. Study of AM & FM
16. Study of PAM, PWM, PPM and PCM
17. Study of Transmission Line Characteristics

18. Study of Klystron Oscillator – Microwave
19. Construction and study of Balanced Modulator
20. Study of ASK & FSK
21. Fiber optic communication {NA, Losses, receiver sensitivity}
22. Study of Sensors – I {Thermal & Optical}
23. Study of Sensors – I {LVDT, Hall Effect, Strain Gauge, Flow and Level}
24. Microprocessor 8085- Programming I {Data transfer and rotate operations}
25. Microprocessor 8085- Programming II {addition, subtraction, multiplication and division}
26. Microprocessor 8085- Programming III { Code conversion - Gray to Binary, Binary to BCD Binary to Gray, BCD to Binary etc}
27. Microprocessor 8085- Programming IV {largest, smallest, sorting in ascending order and descending order}
28. Microprocessor 8085- Programming V {Using user routines in Monitor program}.

SEMESTER - V**Hours/Week : 4****Sub Code - 11UEL530302A****Credits : 4****CORE ELECTIVE – II: VLSI design and VHDL programming****Objective:**

- To learn the basics of VLSI technology and VHDL programming

UNIT – I: SEMICONDUCTOR DEVICES FOR VLSI TECHNOLOGY

Basic MOS transistor – enhancement and depletion mode transistor action – NMOS fabrication – CMOS fabrication – BICMOS technology – pass transistor – nMOS inverter, CMOS and BICMOS inverter – latch-up in CMOS & BICMOS circuits - MOS layer – stick diagram – design rules and layout diagram – Lambda based design rules – contact cuts – Double metal MOS process rules – CMOS lambda based design rules- symbolic diagram.

UNIT – II: SCALING AND TESTING FOR VLSI SYSTEM

Basic circuit concepts – sheet resistance – capacitance – delays – driving large capacitive loads – propagation delays – wiring capacitance - Scaling factor for device parameter factors – limitation of scaling - switch logic — Pass transistors and transmission gates - gate logic – the inverter - CMOS logic – Pseudo nMOS logic – Dynamic CMOS logic – Clocked CMOS – CMOS domino logic – n-p CMOS logic - real world VLSI design – Design styles and philosophy – The interface with the fabrication house – cad tools for design and simulation – aspects of design tools – Graphical entry layout – Design verification prior to fabrication - DRC – circuit extractors - test and test ability – System partitioning.

UNIT – III: DESIGN STYLES IN VHDL

Behavioral Modeling: Entity declaration – architecture body – process statement – variable assignment statement – signal assignment statement – wait, if, case, null, loop, exit, next, assertion statement – more on signal assignment - other sequential statements – multiple process – postponed processes – Dataflow Modeling: concurrent signal assignment – concurrent Vs sequential signal assignment - delta delay revisited – multiple drivers –

conditional signal assignment – selected signal assignment – Structural Modeling: Component declaration – component instantiation

UNIT IV: GENERICS, SUBPROGRAM AND PACKAGES

Identifiers – data objects – data types – operators- generics – sub programs – package declaration – package body – design file – design libraries – implicit visibility – explicit visibility – attributes – writing a test bench – state machine modeling – interfacing state machines

UNIT – V: CIRCUIT DESIGN AND SIMULATION USING QUARTUS-II IDE

Architecture of CPLD and FPGA – Survey of CPLD and FPGA - Introduction to Quartus II IDE- creating project – loading programs – compiling – functional and timing simulation –Using DE1 kit- Features of DE1kit - implementing the design in DE1 – interfacing an LCD with DE1 – interfacing seven segments – interfacing ADC0808 with DE1 kit – interfacing DE1 with switches

BOOKS FOR STUDY:

- Douglas A. Pucknell & Kamran Eshraghian, "Basic VLSI Design", 3rd edition, Prentice hall of India pvt Ltd, New Delhi.
- A VHDL Primer by J.Bhasker, 3rd edition, PHI learning private limited, 2009, New Delhi.

BOOK FOR REFERENCE:

- Clive "Max" Maxfield, "Design Warriors Guide to FPGAs", Elsevier, 2004.
- Eugene D.Fabricius "Introduction to VLSI Design" McGraw Hill, 2002.
- Randall L.Geiger, Phillip E.Allen and Noel R.Strader "VLSI Design Techniques for Analog and Digital Circuits" McGraw Hill, 2002.
- Neil H.E.Weste and Kamran Eshraghian-"Principles of CMOS VLSI Design"-(2nd ed), 2004.
- Douglas L.Perry, "VHDL programming by example", 4th edition, Tata McGraw hill. New Delhi.
- Z.Nawabi, "VHDL Analysis and Modeling of Digital Systems" – McGraw Hill, 1998.
- M.J.S.Smith, "Application Specific Integrated Circuits", Addison Wesley, 1997

| UNIT | BOOK | SECTIONS |
|------|------|--|
| 1 | 1 | 1.1 – 1.11, 2.5-2.10, 2.12.3- 2.14, 3.1-3.3.4, 3.8 |
| 2 | 1 | 4.1-4.11, 5.1-5.6, 6.1-6.3.4.5, 10.8-10.13.4.2 |
| 3 | 2 | Chapter 4, 5.1 – 5.6, 6.2, 6.3 |
| 4 | 2 | Chapter 3, 7.1, 8.1, Chapter 9, 10.7, 11.2, 12.8, 12.9 |
| 5 | | Material Prepared by the Department of Electronics |

SEMESTER – V**Hours/Week : 4****Sub Code - 11UEL530302B****Credits : 4****CORE ELECTIVE – II: CONTROL SYSTEM****Objective:**

- To design a control system module and to analyze

UNIT – I: MATHEMATICAL MODELS OF CONTROL SYSTEMS AND COMPONENTS

Control system – Examples of control system – Block diagram reduction techniques – Signal flow graph using Mason's gain formula – Mathematical models: Mechanical system – electrical system – Electrical analogous of mechanical translational systems (two notes) – Electrical analogous of mechanical rotational systems (Force voltage & current). Components of Automatic control system – Potentiometer – Synchros – Controllers – Tacho generators – Modulator and Demodulator.

UNIT – II: TIME RESPONSE ANALYSIS

Time response – Test signals – Transfer function of a system – Laplace transform review Response of first order system for unit step input – Second order system response: Under damped – over damped – over damped – critically damped. Time domain specifications: Rise time – Time constant – MPO – Settling time.

UNIT – III: CONTROLLERS & ERRORS

Response of 2nd order systems with P, PI & PID controllers – Comparison of the responses – Steady state error constants – Steady state error when input is unit step, unit ramp and unit parabolic signal – Generalized error coefficients – Correlation between static and dynamic error coefficients.

UNIT – IV: FREQUENCY RESPONSE ANALYSIS

Review of Fourier transform – Frequency domain specifications – Estimation of frequency domain specifications for II order system – Correlation between time and frequency response – Frequency response plots: Bode plot – Nichols plot – M & N circles Nichols chart

UNIT – V: CONCEPTS OF STABILITY AND ROOT LOCUS

Definitions of stability – Location of roots on the S-plane for stability – Routh Hurwitz criterion – Mathematical preliminaries for Nyquist stability criterion – Relative stability – Estimation of range of system gain – Root locus construction – Root locus for systems with dead time or transportation lag. Steps for designing a lead – lag compensator.

BOOK FOR STUDY

- A. Nagoor Gani, "Control system", 1st Edition, RBA publications, 2006.

BOOKS FOR REFERENCE

- R. Anandanatarajan & P. Ramesh Babu, "Control Systems Engineering", 2nd Edition, Scitech Publications, 2010.
- M. Gopal, "Control system principles and design", TMH, 1998.
- B. C. Kuo, "Automatic Control Systems", 7th Edition, PHI, 1995.

| UNIT | BOOK | CHAPTERS | SECTIONS |
|------|------|----------|--------------------|
| 1 | 1 | 1 | 1.1-1.6,1.9-1.12 |
| 2 | 1 | 3 | 3.1-3.7 |
| 3 | 1 | 3 | 3.8,3.10-3.15,3.17 |
| 4 | 1 | 4 | 4.1-4.10 |
| 5 | 1 | 5 | 5.1-5.4,5.6-5.8, |

SEMESTER – V

Hours/Week : 2

Sub Code - 11UEL540601

Credits : 2

**SKILL BASED ELECTIVE – I: DVD TROUBLESHOOTING
AND ASSEMBLING**

Objective:

- To learn the fundamental concepts of assembling and troubleshooting DVD player.

UNIT – I: CDROM & DVD

Introduction to optical technology – Principles of CD & DVD – Structure of CD & DVD – Read operation – Writing operation – Comparison of CD & DVD.

UNIT- II : ASSEMBLING MATERIALS

Block diagram of DVD player – Mother board – Power board – Display board – mechanism – Lens drivers – Game card – RF card – BT board – Power amplifier.

UNIT- III: TROUBLESHOOTING TECHNIQUES

Importance of Earth – Earth testing – Usage of multimeter – Case studies – Symptoms and solutions – DC Single and Dual Power Supply.

BOOK FOR STUDY

Material prepared by the department of electronics.

SEMESTER - VI**Hours/Week : 5****Sub Code - 11UEL630212****Credits : 4****POWER ELECTRONICS****Objectives:**

- To learn the operative principles of power electronic devices and their applications.

UNIT – I: POWER SEMICONDUCTOR DEVICES AND CHARACTERISTICS

Power semiconductor devices - basic structure - Power diode – Power transistors – Power MOSFET – IGBT – physics of device operation and steady state characteristics.

Thyristor: Principle of operation –two transistor analogy – Protection against high di/dt and high dv/dt – turn on and turn off methods – gate triggering circuits – series and parallel operation of thyristors – methods to ensure proper current and voltage sharing- string efficiency.

UNIT – II : PHASE CONTROLLED RECTIFIERS

Principles of phase control – Single phase half wave circuit with R, RL and RLE load – freewheeling- Single-phase full wave controlled converters - single phase semi converters- estimation of load voltage, load current under continuous current conduction.

Three phase half controlled and fully controlled converter circuits - waveform and average load voltage for continuous current operation.

UNIT - III : CHOPPERS, AC VOLTAGE CONTROLLERS AND DUAL CONVERTERS

Chopper: Principle of chopper operations – Control strategies – step up and step down choppers-quadrant operation-estimation of load voltage and load current for continuous current operation.

AC voltage controllers: Principle of phase control & Integral cycle control - Single phase AC voltage controller with R,RL load –Two stage sequence control of Voltage controllers for R Load.

Dual-converters: Principles of operations – Ideal Dual converter – Practical dual converter

UNIT – IV : INVERTERS AND DUAL CONVERTERS

Inverters: Classification of inverters- Voltage source inverters – single phase half bridge and full bridge inverters –Three phase voltage source inverters for 1200 and 1800 conduction mode-current source inverters – single phase CSI with ideal switches –Single phase capacitor commutated CSI with R load – series Inverter – Parallel inverter.

Cyclo-converters: Principles of operations – Single phase to single phase circuit step-up cyclo-converters – Single phase to single phase step-down converters.

UNIT – V: VOLTAGE CONTROL OF INVERTERS AND SOME APPLICATIONS

Voltage control– External control of ac output voltage- external control of dc input voltage – Internal control of Inverters- Pulse width modulated inverters

Applications-Switched mode power supply – UPS- Static switches – Static circuit breakers – solid state relays.

BOOK FOR STUDY

- Dr. Bimbhra, “Power Electronics”, Khanna publishers, 4th edition, 2006.

BOOK FOR REFERENCES

- Rashid , M H “Power Electronics” Pearson education
- MD singh “Power Electronics” Tata McGraw Hill, New Delhi.

| UNIT | BOOK | CONTENTS |
|------|------|--|
| I | 1 | 2.2,2.3,2.5,2.6,2.7 4.1,4.2,4.4,4.10 |
| II | 1 | 6.1,6.1.1-6.1.3,6.7.1.1-6.7.1.2, |
| III | 1 | 7.1,7.2,7.3,7.4 9.1,9.2,9.3.1,9.3.2,9.4.1 6.10,6.10.1-6.10.2 |
| IV | 1 | 8.1,8.2,8.4,8.8,8.8.1,8.8.2,8.9,8.10 10.1,10.1.1,10.1.2 |
| V | 1 | 8.5.1,8.5.2,8.5.3,8.6,11.1,11.2,11.4,11.6 |

SEMESTER – VI**Hours/Week : 5****Sub Code - 11UEL630213****Credits : 4****COMMUNICATION SYSTEM****Objective:**

- To learn the various analog modulation techniques
- To get expertise on digital communication system based on digital modulation and error coding techniques

UNIT – I : AMPLITUDE MODULATION

Modulation – Types of modulation (AM, FM and PM) – Mathematical expression for AM wave – Side frequencies – Modulation index – power relationship – component phasor of AM signal – spectrum of AM wave.

Generation of AM waves – Linear modulation – collector, base and emitter modulation – Square law modulator – Balanced modulator – SSB – SC generation – VSB. Demodulation of AM waves – Envelope and synchronous detector.

UNIT – II : FREQUENCY AND PHASE MODULATION

Angle modulation – Phase and frequency modulation – Mathematical representation of FM and PM – Frequency spectrum of FM- Bandwidth of FM: Bessel's identity – Carson's rule – spectrum of Narrow Band and Wide Band FM. Generation of FM – Direct and indirect method – Relationship between FM and PM – Pre-emphasis and de-emphasis in FM. Demodulation of FM waves – Slope detector – Balanced slope detector – Foster – Seeley discriminator – Ratio detector – Amplitude limiter.

UNIT – III : TRANSMITTER AND RECEIVERS

Block schematic study of transmitters – AM transmitter – High level and low level AM transmitters – SSB-SC transmitter – FM transmitter – Direct and indirect FM transmitters. Block schematic study of receivers – Types – Superheterodyne receiver – Double conversion receiver – Choice of IF frequencies – Tracking – Alignment - AGC – AFC – Characteristics of receivers – communication receivers.

UNIT – IV : PULSE MODULATION

Sampling process – PAM – other forms of pulse modulation – Bandwidth – Noise trade off – Quantization – PCM – Noise considerations in PCM systems – TDM – Digital multiplexers – Virtues, limitation and modification of PCM modulation – Linear prediction – Differential pulse code modulation - delta modulation – Adaptive Delta Modulation

UNIT – V : BASEBAND PULSE TRANSMISSION

Matched filter – Error Rate due to noise – Inter-symbol Interference – Nyquist's criterion for distortion less base band binary transmission – Correlative level coding – Base band M array PAM transmission – Adaptive equalization – Eye patterns

BOOKS FOR STUDY:

1. Kennedy and George Davis, "Electronic Communication Systems", 4th Edition, 1999.
2. Dennis Roddy and John Coolen, "Electronic Communications", 4th Edition, PHI, 1997
3. Simon Hawkins, John Wiley, "Communication systems", 4th Edition, 2001

| UNIT | BOOK | SECTIONS |
|------|--------|---------------------------|
| I | 2 | CHAPTER 2,4 |
| II | 1 | CHAPTER 4.1 |
| III | 1 2 | CHAPTER 5.1 CHAPTER 11 |
| IV | 3 | 3.1 – 3.15 |
| V | 3 | 4.1– 4.7, 4.10, 4.11 |

BOOKS FOR REFERENCE:

1. R.P. Singh and S.D. Sapre, "Communication Systems Analog and Digital", Tata McGraw Hill, 1995.
2. Anokh Singh, "Principles of communication Engineering", S. Chand and Co., Ltd., 1994.
3. Taub and Schilling, "Principles of communication", 2nd Edition, McGraw Hill, 1989.
4. B.P.Lathi, "Modern Digital and Analog Communication Systems", 3rd Edition, Oxford Series, 1998
5. Bernard Sklar, Pearson education, "Digital communications Fundamentals and applications", 2nd Edition, 2001
6. Sam K. Shanmugam, John Wiley, "Analog and Digital Communication".
7. John G. Proakis, "Digital Communication", McGraw Hill, 3rd Edition, 1995.

SEMESTER - VI **Hours/Week : 5**
Sub Code - 11UEL630214 **Credits : 4**

SENSORS, TRANSDUCERS & MEASUREMENTS

Objective:

- To expose the fundamentals of instrumentation and the working principle of sensors and transducers.

UNIT – I : INTRODUCTION TO MEASUREMENTS AND SENSING FUNDAMENTALS

Measurements – Significance – Concept of Direct and Indirect Measuring Methods –Static and Dynamic Characteristics of Sensors – Mechanical, Thermal and Electrical Dynamic Models of Sensor Elements – Positions of Sensors in a Data Acquisition System - Advantages of Sensors – Classifications of Transducers – Primary and Secondary Transducers – Characteristics of Transducers

UNIT – II : TRANSDUCERS AND PRIMARY SENSING ELEMENTS

Transducers – electric transducers – classification of transducers – characteristics and choice of transducers – factors influencing the choice of transducers – Resistive transducers - strain gauges – resistance thermometers – Thermistors – Thermocouples – Principle of LVDT – capacitive transducers – Principle of piezo electric transducers – Principle of hall effect transducers – Magneto resistors

UNIT – III: MEASUREMENT OF NON-ELECTRICAL QUANTITIES

Measurement of pressure: using electrical transducers as secondary transducers – Low pressure: Pirani gauges – Measurement of linear velocity (moving magnet type) – Measurement of angular velocity (D.C. Tachometer generators and Digital methods) – Measurement of vibrations – Seismic transducers – Measurement of liquid level – Measurement of thickness – Measurement of Humidity – Gas analyzer.

UNIT – IV : ELECTRONIC INSTRUMENTATION

DC Ammeter – Multirange ammeter – Ayrton Shunt – Basic Meter as DC voltmeter – DC Voltmeter – Multirange Voltmeter – Loading – Transistor Voltmeter – Micro Voltmeter – AC Voltmeter using rectifiers – Series

Ohmmeter – Shunt Type Ohmmeter – Multimeter – Oscilloscopes – Basic principles – Block diagram of oscilloscopes – Vertical Amplifier – Horizontal deflecting system – delay line triggered sweep.

UNIT – V : BIOMEDICAL INSTRUMENTATION

Resting Potential – Action Potential – Human Physiological Systems – Electrocardiogram (ECG) – ECG Measurement Techniques – Defibrillators – Pacemakers - Electroencephalography (EEG) – Medical Imaging Techniques - Computer Tomography (CT) – Magnetic Resonance Imaging (MRI) – Endoscopy – Applications of Lasers in Medical Instrumentation.

BOOKS FOR STUDY

- A.K. Sawhney, "Electrical and Electronics Measurements and Instrumentation", Dhanpat Rai and company, 2001.
- H.S. Kalsi, "Electronics Instrumentation", 2nd Edition, TMH, 2004
- Dr. M. Arumugam, "Biomedical Instrumentation", 2nd Edition, Anuradha Publications

BOOK FOR REFERENCE

- Jacob Fraden, "Handbook of Modern sensors – Physics, Designs and applications", 3rd Edition, Springer, 2004.
- Donald P. Eckman, "Industrial Instrumentation" - CBS Publishers, 2004.
- D.Patrabnabis, "Principles of Industrial Instrumentation", 2nd Edition, Tata McGraw-Hill, 2000.
- V.N.Bindal, "Transducers for Ultrasonic Flaw detection", Narosa Publishing House, 1999.
- Leslie Cromwell, Fred J. Werbell and Eruch A. Pfeiffer – "Biomedical Instrumentation and Measurements", 2nd Edition, PHI, 2005.

| UNIT | BOOK | SECTIONS |
|------|------|---|
| 1 | 1 | 1.1- 1.3, 2.3.2.6, 2.7, 2.10, 2.11, 2.13, 2.15, 2.17, 2.18, 2.19, 4.1.4.4 - 4.6, 25.8, 25.9 |
| 2 | 1 | 25.6 – 25.11, 25.16, 25.19, 25.20, (25.20.1, 25.20.2, 25.20.3), 25.21, 25.24, 25.28 – 25.31 |
| 3 | 1 | 29.17, 29.16.2, 29.21.1, 29.22.1, 29.22, 29.24, 29.25, 29.41, 29.43, 29.44, 29.47 |
| 4 | 2 | 3.1 – 3.5, 4.2 – 4.8, 4.12, 4.21 – 4.25, 7.2 – 7.4, 7.6, 7.7, 7.10 |
| 5 | 3 | 4.31, 5.5, 5.2, 10.7, 10.4 |

SEMESTER – VI
Sub Code - 11UEL630215

Hours/Week : 6
Credits : 4

ELECTRONICS PRACTICALS –IV
{Microprocessor interfacing, Microcontrollers VLSI & DSP}

1. Microprocessor Interfacing – Input and Output using 8255 PPI
2. Microprocessor Interfacing – 8253
3. Microprocessor Interfacing – Traffic Controller.
4. Microprocessor Interfacing – Stepper Motor Controller.
5. Writing Keil C program and to study its equivalent disassembly codes in ASM
6. Microcontroller program I {Data transfer}
7. Microcontroller program II {Arithmetic and Logical}
8. Microcontroller program III {Code conversion}
9. Interfacing microcontroller with LED for pattern generation
10. Interfacing matrix keypad with a microcontroller
11. Study of Timers in 8051 microcontroller
12. Study of Counters in 8051 microcontroller
13. Study of interrupts in 8051 microcontroller
14. Study of serial communication in 8051 microcontroller
15. Interfacing ADC with 8051 microcontroller
16. Interfacing LCD with 8051 microcontroller
17. Interfacing RTC DS1307 with 8051 microcontroller
18. Interfacing printer with 8051 microcontroller
19. Frequency measurement using 8051
20. Implementing Full adder, Full subtractor, Multiplier, divider and ALU in FPGA

21. Implementing clock divider, pulse counter (for delay program) shift register and barrel shifter
22. Implementing soft-core processor in FPGA (NIOS-II, Microblaze, Picoblaze, Mico8)
23. Designing standalone CPLD system for interfacing stepper module using XC9572XC CPLD
24. MATLAB Programming I: Waveform/signal generation (sine wave, square wave, saw tooth wave, AM wave, unit impulse, unit step, Ramp signal and exponential)
25. MATLAB Programming I: Linear convolution, circular convolution, autocorrelation and cross correlation
26. MATLAB Programming I: Discrete Fourier and inverse discrete Fourier, fast Fourier and inverse fast Fourier transform
27. DSP programming I
28. DSP programming II
29. Study of IIR filter
30. Study of FIR filter

SEMESTER - VI **Hours/Week : 4**
Sub Code - 11UEL630303A **Credits : 4**

CORE ELECTIVE – III: DIGITAL SIGNAL PROCESSING

Objective:

- To impart the algorithms of Signal Processing.

UNIT – I : DISCRETE TRANSFORMS

Introduction to Digital Signal Processing – Discrete Transforms – Discrete-Time Fourier Transform (DTFT), Discrete Convolutions – Linear, Circular and Sectioned Convolution – Discrete Fourier Transform – Properties – Frequency Analysis of Signals using DFT – Decimation-in-Time – FFT algorithms – Inverse FFT

UNIT – II : FINITE IMPULSE RESPONSE (FIR) FILTERS

Symmetric and anti-symmetric FIR filters – Design of linear-phase FIR filters using windows: Rectangular – Blackman – Hamming – Hanning – Design of linear-phase FIR filters by frequency-sampling method – Optimum equi-ripple linear-phase FIR filter – Comparison of design methods for linear-phase FIR filter.

UNIT – III : INFINITE IMPULSE RESPONSE (IIR) FILTERS

IIR filter design by approximation of derivatives – Impulse invariance method – Bilinear transformation – Characteristics of analog filters: Butterworth – Chebyshev – Elliptic – Frequency transformation in the analog and digital domain.

UNIT – IV: ARCHITECTURE OF FIXED POINT PDSP

Multiplier and multiplier accumulator (MAC) – Modified bus structure and memory access schemes – Multiple access memory – Multi ported memory – VLIW architecture – Pipelining – Special addressing modes in PDSP's – On-chip peripheral – Architecture of TMS 320 C5X.

UNIT – V: ASSEMBLY LANGUAGE INSTRUCTION AND PROGRAMMING

Syntax – Addressing modes – Load / Store instruction – Addition/ Subtraction instruction – Move Instruction – Multiplication instruction – NORM instruction – Program control instruction – Peripheral control – Program for familiarization of the addressing modes – Program for familiarization of the arithmetic instruction – Real time signal processing program.

BOOKS FOR STUDY

- Ramesh Babu P., "Digital Signal Processing", 4th Edition, Scitech Publication Pvt. Ltd, 2007.
- Venkataramani B, Bhaskar M., "Digital signal processors - Architecture, Programming and Applications", 1st Reprint, TATA McGraw Hill, 2003.

BOOK FOR REFERENCE

- John G. Proakis, Dimitris G. Manolakis, "Digital Signal Processing Principles, Algorithm and Applications", 4th Edition, PHI, 2007.
- Alan V. Oppenheim, Ronald W. Schaffer, "Digital Signal Processing", 2nd Edition, PHI, 2004.
- Salivahanan S, Vallavaraj A, Gnanapriya C, "Digital Signal Processing", Tata McGraw Hill Publishing, 2003.
- Poornachandra S., "Signals and System", Vijay Nicole imprints Pvt. Ltd., 2004.

| Unit | Book | Sections |
|------|------|--------------------------|
| I | 1 | 3.4,3.6 – 3.9, 4.1 - 4.4 |
| II | 1 | 6.1, 6.2, 6.6, 6.9, 6.10 |
| III | 1 | 5.1 – 5.13 |
| IV | 2 | 2.1-2.8,3.1-3.14 |
| V | 2 | 4.1- 4.9,6.2- 6.4 |

SEMESTER - VI**Hours/Week : 5****Sub Code - 11UEL630303B****Credits : 4****EMBEDDED SYSTEM****Objective:**

- To learn about different processors, devices and RTOS

UNIT – I : EMBEDDED SYSTEMS INTRODUCTION: PROCESSOR, ARCHITECTURE AND MEMORY ORGANIZATION

Embedded system – Processor embedded into a system – Embedded hardware units and devices in a system – Embedded software in a system – Design process in embedded system – Formalization of system design – Classification of embedded system – Introduction to advanced architectures – Processor and memory organization – Instruction level and parallelism – Performance metrics – Memory types – Memory maps and address – Processor selection – Memory selection

UNIT – II: DEVICES AND COMMUNICATION BUS

I/O types and examples – Serial communication device – Parallel device ports – Sophisticated interfacing features in device ports – Wireless devices – Timer counting devices – Watch dog timers – Real time clock – Networked embedded system – Serial bus communication protocol – Internet enabled system – Network protocol – Wireless and mobile system protocol – Programmed IO busy – Wait approach with out interrupt service mechanism – ISR concept – Interrupt source – Interrupt servicing mechanism – DMA – Device driver programming

UNIT – III: MODELING AND INTERPROCESS COMMUNICATION

Program models – DFG models – State machine programming models for event controlled program flow – Modeling of multiprocessor systems – UML modeling – Multiple process in application – Multi thread in application – Task – Task state – Task and data – Concept of semaphores – Shared data – Inter process communication – Signal function – Semaphores function – Message queue function – Mailbox function – Pipe function – Socket function

UNIT – IV: FUNDAMENTALS OF REAL TIME OPERATING SYSTEMS (QING LI)

Characteristics of RTOS & its types: key characteristics of RTOS – Concurrency Vs parallelism – Scheduling algorithm (round-robin – Pre-emptive priority) – Inter Process Communication (IPC): Tasks – Tasks states – Operation – Task structure – Semaphores (binary counting & mutex) – Message queues – Pipes – Event – Signal – Conditional variables – Pseudo codes for IPC objects – Critical session – Deadlocks and its avoidance – Timing management : Real time clock – PIT – Timer ISR – Software Timer.

UNIT- V : SPECIFIC REAL TIME OPERATING SYSTEMS

Basic types and function of RTOSES – Study of Micro COS-II – Window CE – Linux 2.6x and RT Linux – Case study of digital camera hardware and software architecture – Case study for sending application layer bytes streams on a TCP/IP networks using RTOS VX works – Embedded system in automobile – Case study of embedded system for an adaptive cruise control (ACC) system in car.

BOOKS FOR STUDY

- Qing Li, "Real time Concepts for Embedded Systems", CMP Books, 2003.
- Rajkamal, "Embedded Systems Architecture, Programming and Design", TATA McGraw-Hill, First reprint Oct. 2003

BOOK FOR REFERENCE

- Steve Heath, "Embedded Systems Design", 2nd Edition, 2003, Newnes.
- David E.Simon, "An Embedded Software Primer", Pearson Education Asia, First Indian Reprint 2000.
- Frank Vahid and Tony Givargis, "Embedded Systems Design – A unified Hardware / Software Introduction", John Wiley, 2002.

| UNIT | BOOK | SECTIONS |
|------|------|---|
| I | 2 | 1.1-1.4, 1.8 -1.9, 1.11, 2.3-2.9 |
| II | 2 | 3.1- 3.10, 3.12, 3.13, 4.1-4.4, 4.6, 4.8, 4.9 |
| III | 2 | 6.1- 6.5, 7.1-7.15 |
| IV | 1 | 4.1-4.8,5.1-5.7,7.1-7.8,8.1-8.3,11.2,11.3,11.5,11.7 |
| V | 2 | 9.1,9.2,10.1,10.3,11.2,11.3,12.2, 12.3 |

SEMESTER – VI

Sub Code - 11UEL640602

Hours/Week : 2

Credits : 2

SKILL BASED ELECTIVE – II: PC ASSEMBLING**Objective:**

- To develop the skill of assembling and maintaining the personal computer.

UNIT – I : MOTHERBOARD

Motherboard design- motherboard connectors-onboard connectors-back panel connector-front panel connectors-processors

UNIT – II : PORTS AND CONNECTORS

Mother board ports-serial ports- parallel ports- USB-IEEE-wireless ports-video connectors VGA -SCSI connectors

UNIT – III : BIOS

BIOS function- BIOS activities- BIOS startup screen- system configuration summary-standard setting-advance features-security and passwords- formatting PC (material)

BOOK FOR STUDY

- Ron Glister, "PC upgrades and repair", Dream tech press Edition, 2003, New Delhi.

| UNIT | CHAPTER | PAGES |
|------|---------|-------------------------|
| I | 1, 12 | 4-6,310-315,42-47 |
| II | 12 | 316 - 333 |
| III | 4 | 88,93-99,102-106 |
| III | 15 | 408-420,422-423,433-434 |

SKILL BASED ELECTIVES**BOTANY**

11UBO540601

Mushroom Culture

11UBO640602

Herbal Technology

BUSINESS ADMINISTRATION

11UBU540601

Personality Development

11UBU640602

Managerial Skills

CHEMISTRY

11UCH540601

Food and Nutrition

11UCH640602

Everyday Chemistry

COMMERCE

11UCO540601A

Accounting for Executives

11UCO540601B

Soft Skills for Managers

11UCO640602A

Total Quality Management

11UCO640602B

Fundamentals of Accounting Packages

COMMERCE (CA)

11UCC540601

Soft Skills

11UCC640602

Basics of Accounting

COMPUTER APPLICATIONS (Dept of IT)

11UBC540601A

Fundamentals of IT

11UBC540601B

Internet Concepts

11UBC640602A

Visual Programming

11UBC640602B

Flash

COMPUTER SCIENCE

11UCS540601A

Office Automation

11UCS540601B

Internet Concepts

11UCS640602A

Fundamentals of Computer Networks

11UCS640602B

E-Commerce

ECONOMICS

| | |
|-------------|------------------------|
| 11UEC540601 | Security Analysis |
| 11UEC640602 | Economics of Insurance |

ELECTRONICS

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|-------------|------------------------------------|
| 11UEL540601 | DVD Troubleshooting and Assembling |
| 11UEL640602 | PC Assembling |

ENGLISH LITERATURE

| | |
|-------------|--------------------------|
| 11UEN540601 | Business English Writing |
| 11UEN640602 | Media Skills |

HISTORY

| | |
|-------------|--------------------------------------|
| 11UHS540601 | Indian History for Competitive Exams |
| 11UHS640602 | Tourism and Travel Management |

MATHEMATICS

| | |
|-------------|-----------------------------------|
| 11UMA540601 | Mathematics for Competitive Exams |
| 11UMA640602 | MATLAB |

PHYSICS

| | |
|--------------|----------------------|
| 11UPH540601 | Cell Phone Servicing |
| 11UPH640602A | Electrical Wiring |
| 11UPH640602B | Videography |

STATISTICS

| | |
|-------------|-------------------------------------|
| 11UST540601 | Data Analysis for Competitive Exams |
| 11UST640602 | Statistics for Management |

TAMIL

| | |
|-------------|-----------------------------------|
| 11UTA540601 | தமிழ் இலக்கியத்தில் மனித உரிமைகள் |
| 11UTA640602 | மைய அரசுப் பணித் தேர்வுத்தமிழ் |