Sri Ramakrishna Mission Vidyalaya College of Arts and Science Coimbatore – 641020

(An Autonomous College Re-Accredited with "A" grade by NAAC and Affiliated to Bharathiyar University, Coimbatore)

B.Voc., Degree course (Three years)

Technology in Electrical and Electronic Devices

(An UGC sponsored DDU-KAUSHAL KENDRA Programme)

SYLLABUS

(ACADEMIC YEAR 2020-2021 Onwards)

Sri Ramakrishna Mission Vidyalaya College of Arts and Science
(Autonomous)

DDU KAUSHAL Kendra

For students admitted from the academic year 2020-2021 onwards

COURSE OF STUDY:

- Syllabus is framed for B.VOC (Technology in Electrical and Electronic Devices) according to UGC norms and National Vocational Education Quality Framework
- There are 2 components. They are General components of 24 credits and Skill components of 36 credits.
- One credit is equal to 15 hours for theory and 30 hours for practical. Practical could be either in the campus or in the working place of the Industry.

ELIGIBILITY:

- Candidates who have successfully completed their Higher Secondary (10+2) will be eligible for admission.

PROGRAMME OUTCOMES:

The Department of Technology in Electrical and Electronic Devices provides the practical learning environment for the students which aim to meet out the industrial requirements in the field of Electrical and Electronics by providing more practical exposures and on job trainings.

The program Educational Objectives are as follows:

PO1: Provide graduates with the fundamental knowledge in science and mathematics required to understand the principles of Engineering.

PO2: Develop creative and innovative thinking ability of the students which are required for industry.

PO3: Create a technically skilled employee by imparting theoretical, practical and on job training to students.

PO4: Imparting the leadership qualities required for team work, production planning, decision making and industrial safety, so that they are work ready at exit point of the programme.

PO5: Create well disciplined and responsible citizens for the overall welfare of our nation.

PROGRAMME SPECIFIC OUTCOMES:

PSO1: Ability to apply the knowledge of basic Engineering principles in the field of Electrical and Electronics.

PSO2: Ability to design a system to meet out the desired needs of realistic constraints.

PSO3: Ability to troubleshoot and solve the problems in the area of Electronics.

PSO4: Ability to Coordinate with Multidisciplinary teams, allocate work and manage team to ensure that production deadlines and quality standards of an industry.

PSO5: Ability to use techniques, Skills and modern engineering tools required to develop new product with updated features and improved performance.

SCHEME OF EXAMINATION

SEMESTER – I

Course code	Part	Course Title	Lecture/ Practical Hrs	Exam Hrs	Credits	Marks		
						Int	Ext	Total
GENERAL EDUCATION COMPONENT								
20KUG1TA1	I	Tamil I	60	2	4	50	50	100
20KUG1EN1	II	Basic English	60	2	4	50	50	100
20KUG1AL1	III	Allied I: Mathematics- I	60	2	4	50	50	100
Sub Total (A)			**180**	**06**	**12**	**150**	**150**	**300**
VOCATIONAL EDUCATION COMPONENT								
20KUT1C01	III	Core I: Basics of Electrical and Electronic Devices	60	2	4	50	50	100
20KUT1C02	III	Core II: Supervise assembly line activities	60	2	4	50	50	100
Sub Total (B)			**120**	**04**	**08**	**100**	**100**	**200**
Total (A +B)			**300**	**10**	**20**	**250**	**250**	**500**

SEMESTER – II

Course code	Part	Course Title	Lecture/ Practical Hrs	Exam Hrs	Credits	Marks		
						Int	Ext	Total
GENERAL EDUCATION COMPONENT								
20KUG2TA2	I	Tamil II	60	2	4	50	50	100
20KUG2EN2	II	Professional English	60	2	4	50	50	100
20KUG2AL2	III	Allied II: Office Automation	60	2	4	50	50	100
Sub Total (A)			**180**	**06**	**12**	**150**	**150**	**300**
VOCATIONAL EDUCATION COMPONENT								
20KUT2C03	III	Core III: Linear Integrated Circuits	60	2	4	50	50	100
20KUTE2P1	III	Practical I: Electrical and Electronic Devices Lab	120	3	4	50	50	100
20KUTE2I1	III	Internship Training-I	1200	3	20	100	300	400
Sub Total (B)			**1380**	**08**	**28**	**200**	**400**	**600**
Total (A +B)			**1560**	**14**	**40**	**350**	**550**	**900**

SEMESTER – III

Course code	Part	Course Title	Lecture/ Practical Hrs	Exam Hrs	Credits	Marks		
						Int	Ext	Total
GENERAL EDUCATION COMPONENT								
20KUG3EN3	II	Technical Communication	60	2	4	50	50	100
20KUG3AL3	III	Allied III: Mathematics-II	60	2	4	50	50	100
20KUG3ENS	IV	Environmental studies	60	2	4	50	50	100
Sub Total (A)			**180**	**06**	**12**	**150**	**150**	**300**
VOCATIONAL EDUCATION COMPONENT								
20KUT3C04	III	Core IV: Digital Electronics	60	2	4	50	50	100
20KUT3C05	III	Core V: Production planning and Control	60	2	4	50	50	100
Sub Total (B)			**120**	**04**	**08**	**100**	**100**	**200**
Total (A +B)			**300**	**10**	**20**	**250**	**250**	**500**

SEMESTER – IV

Course code	Part	Course Title	Lecture/ Practical Hrs	Exam Hrs	Credits	Marks		
						Int	Ext	Total
GENERAL EDUCATION COMPONENT								
20KUT4C06	III	Core VI: Technical Drawing	60	2	4	50	50	100
20KUG4EA1/ 20KUG4EB1	III	**Open Elective – I**	60	2	4	50	50	100
20KUG4VAD	IV	Value Education-Indian Cultural Heritage	60	2	4	50	50	100
Sub Total (A)			**180**	**06**	**12**	**150**	**150**	**300**
VOCATIONAL EDUCATION COMPONENT								
20KUT4C07	III	Core VII: Programmable Logic Controller	60	2	4	50	50	100
20KUTE4P2	III	Practical II: Digital Electronics and Programmable Logic Controller Lab	120	3	4	50	50	100
20KUTE4I2	III	Internship Training-II	1200	3	20	100	300	400
Sub Total (B)			**1380**	**08**	**28**	**200**	**400**	**600**
Total (A +B)			**1560**	**14**	**40**	**350**	**550**	**900**

SEMESTER – V

Course code	Part	Course Title	Lecture/ Practical Hrs	Exam Hrs	Credits	Marks		
						Int	Ext	Total
GENERAL EDUCATION COMPONENT								
20KUG5EA2/ 20KUG5EB2	II	**Open Elective – II**	60	2	4	50	50	100
20KUG5AL4	III	Allied IV: Mathematics – III	60	2	4	50	50	100
20KUT5C08	III	Core VIII: Organizational Behavior	60	2	4	50	50	100
Sub Total (A)			**180**	**06**	**12**	**150**	**150**	**300**
VOCATIONAL EDUCATION COMPONENT								
20KUT5C09	III	Core IX: Microprocessor and Microcontroller	60	2	4	50	50	100
20KUT5C10	III	Core X: Develop Hardware product for Manufacturing	60	2	4	50	50	100
Sub Total (B)			**120**	**04**	**08**	**100**	**100**	**200**
Total (A +B)			**300**	**10**	**20**	**250**	**250**	**500**

SEMESTER – VI

Course code	Part	Course Title	Lecture/ Practical Hrs	Exam Hrs	Credits	Marks		
						Int	Ext	Total
GENERAL EDUCATION COMPONENT								
20KUG6EA3/ 20KUG6EB3	III	**Open Elective – III**	60	2	4	50	50	100
20KUT6C11	III	Core X: Safety Engineering	60	2	4	50	50	100
20KUG6EA4/ 20KUG6EB4	III	**Open Elective – IV**	60	2	4	50	50	100
Sub Total (A)			**180**	**06**	**12**	**150**	**150**	**300**
VOCATIONAL EDUCATION COMPONENT								
20KUTE6P3	III	Practical III: Microprocessor and Microcontroller Lab	120	3	4	50	50	100
20KUTE6PR	III	Project	120	3	4	50	50	100
20KUTE6I3	III	Internship Training-III	1200	3	20	100	300	400
Sub Total (B)			**1440**	**09**	**28**	**200**	**400**	**600**
Total (A +B)			**1620**	**15**	**40**	**350**	**550**	**900**

COURSE	CREDITS	MARKS
Tamil	8	200
English	12	300
Part III: Core & Elective	132	3000
Environmental Studies	4	100
Indian Cultural heritage	4	100
Total	**180**	**4200**

Open Elective - I

1. Principles of management (20KUG4EA1)
2. Personality Development and Human Behaviour (20KUG4EB1)

Open Elective - II

1. Total Quality Management (20KUG5EA2)
2. Business Organization (20KUG5EB2)

Open Elective - III

1. Professional Ethics and Human values (20KUG6EA3)
2. Indian Values (20KUG6EB3)

Open Elective - IV

1. Entrepreneurship Development (20KUG6EA4)
2. Human Resource Management (20KUG6EB4)

TAMIL-I

Course code	20KUG1TA1	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	I

நோக்கம்:

1. இக்கால இலக்கியங்களை அறிமுகப்படுத்துதல்
2. புதுக்கவிதை இலக்கணம், வரையறைகளைக் கற்பித்தல்
3. தற்கால புதுக்கவிஞர்களை அடையாளப்படுத்தி, புதுக்கவிதைகளின் போக்குகளை சுட்டிக்காட்டுதல்
4. பயன்பாட்டுடைய தற்காலத் தமிழைக் கற்றல்

மாணவர் பெறும் திறன்:

Course Outcomes (CO)

CO1	பிழையின்றி சுயமாக பேசவும், எழுதவும் பயிற்சி பெறல்	**K3**
CO2	அரசுத் துறை சார்ந்த பணிகளுக்கு (போட்டித் தேர்வு) தயார்படுத்திக்கொள்ளுதல்	**K2 &K3**
CO3	மரபு, புதுக்கவிதைகளை அறிந்துகொள்ளல்	**K2**
CO4	மாணவர்கள் தங்களின் படைப்பாற்றலை வெளிப்படுத்திக்கொள்ளும் வாய்ப்பினை பெறுதல்.	**K2 &K3**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	L	L	L	M	L		L	L	L	M	S
CO2	L	L	L	M	L		L	L	L	M	S
CO3	L	L	L	M	L		L	L	L	M	S
CO4	L	L	L	M	L		L	L	L	M	S

S – Strong; M – Medium; L - Low

அலகு I மரபுக்கவிதை

1. பாரதியார் - கண்ணன் என் தாய்
2. கண்ணதாசன் - தத்துவப் பாடல்கள் - அவன் தான் இறைவன்
3. பட்டுக்கோட்டை கல்யாணசுந்தரம் - செய்யும் தொழிலே தெய்வம்

அலகு II புதுக்கவிதை - I

1. கவிஞர் வாலி - தூக்கத்தில் ஒரு துவந்த யுத்தம் - (நிஜகோவிந்தம்)
2. வைரமுத்து - அவன் கலைமகளுக்குப் பாடஞ் சொல்லுகிறான் (திருத்தி எழுதிய தீர்ப்புகள்)
3. சௌந்திரா கைலாசம் - தெய்வீகம் - வளம்பெற வரம் தருவாள் (சௌந்திரா கைலாசம் கவிதைகள்)

அலகு III

1. சேதுபதி - இந்திய மாணவர் - (கனவுப்பிரதேசங்களில்)
2. ந. பிச்சமூர்த்தி - அக்னி (பிச்சமூர்த்தி கவிதைகள்)

அலகு IV - பயன்பாட்டுத் தமிழ்

1. விண்ணப்பக் கடிதம் எழுதப் பயிற்சி
2. வல்லினம் மிகும் இடங்கள்
3. வல்லினம் மிகா இடங்கள்
4. பிழை நீக்கி எழுதுதல்

அலகு V இலக்கிய வரலாறு - I

1. சிறுகதையின் இலக்கியத் தோற்றமும் வளர்சியும்
2. புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும்.

* * * * *

BASIC ENGLISH

Course code	20KUG1EN1	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical	--	Sem	I

Objectives:

- To enable the student to understand the main aspects of English grammar.
- To make him speak and write correct English without any grammatical error.

Course Outcomes (CO)

CO1	Overcome his mother tongue influence gradually.	**K1& K3**
CO2	Develop confidence to face the competitive exams and interviews.	**K2 &K3**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	M	L	L	S	L		M	M	L	M	M
CO2	M	M	L	S	M		M	M	S	S	M

S – Strong; M – Medium; L - Low

UNIT-I

Noun, Pronoun, Adjective, Verb, Adverb, Preposition, Conjunction, Interjection

UNIT-II

Verbs and classification: Main Verb, auxiliary verb, transitive verb, intransitive verb and phrasal verb. Tenses: simple present, present continuous, present perfect, present perfect continuous. Past: Simple past, past continuous, past perfect, past perfect continuous. Future: simple future, future continuous, future perfect, future perfect continuous. Voices: Active and Passive voice.

UNIT-III

Infinitives, Participles, Gerunds and Question Tags, WH questions.

UNIT-IV

Sentence construction, types of sentences: Declarative sentence, interrogative sentence, imperative sentence, exclamatory sentence, affirmative and Negative sentences.

UNIT-V

Linkers, Spotting Errors, Concord.

Books for Study:

- V. Syamala , *Effective English Communication for you*- Emerald Publishers – 2nd Edition -2002
- Pillai, Radhakrishna G, *English Grammar and Composition,* Emerald Publishers, Chennai ,2005

Books for Reference:

- N.Krishnasamy –*Creative English for Communication*- Macmillan India Limited, 2000

MATHEMATICS – I

Course code	20KUG1AL1	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical	--	Sem	I

Objectives:

To enhance the fundamental knowledge of the students in basic Mathematics such as

- Set theory
- Sequence and series
- Algebraic equations
- Matrices.

Course Outcomes (CO)

CO1	Analyze Mathematical techniques and applications.	**K4**
CO2	Solve the problems arise in engineering.	**K2 &K3**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	M	L	M		S	M	M	L	L
CO2	S	S	S	M	M		S	M	M	L	L

S – Strong; M – Medium; L - Low

UNIT - I

Set and Functions: Introduction – Properties of operations on sets – De Morgan's laws – verification examples – Venn diagrams – formula for $n(AUBUC)$ – Functions.

UNIT – II

Sequences and series of real numbers: Introduction – Sequences – Arithmetic Progression (A.P) – Geometric Progression (G.P) – Series.

UNIT – III

Algebra: Solving Linear Equations – Polynomials – Synthetic division – Greatest Common Divisor (GCD) – Least Common Multiple (LCM) – Rational Expressions – Square root – Quadratic equations.

UNIT – IV

Matrices-I: Introduction – Types of Matrices – Additional and subtraction – Multiplication – Matrix equation.

UNIT – V

Matrices-II: Inverse of a matrix – Rank of a matrix – Solution of simultaneous linear equations.

Books for Study:

- *Basic Mathematics*, Science Series Rupa, Rupa Publications.
- PA. Navnitham, *Business Mathematics and Statistics*, Jai Publishers, 2012.

BASICS OF ELECTRICAL AND ELECTRONIC DEVICES

Course code	20KUT1C01	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	I

OBJECTIVES:

- Basic concepts of AC and DC circuits, series and Parallel connections
- Basic concepts of AC and DC machines.
- Construction, working, Characteristics and specifications of Electronic devices.

Course Outcomes (CO)

CO1	Remembering the fundamentals of Electricity	**K1**
CO2	Understand the construction, characteristics and Application of DC Machines	**K2**
CO3	Understand the construction, characteristics and Application of AC Machines	**K2**
CO4	Understand and analyze the Characteristics and specification of Electronic Devices.	**K2 &K4**
CO5	Understand and analyze the construction and working of basic Electronic circuits.	**K2 &K4**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	M	M		S	M	S	L	L
CO2	S	S	S	M	M		S	M	S	L	L
CO3	S	S	S	M	M		S	M	S	L	L
CO4	S	S	S	M	M		S	M	S	L	L
CO5	S	S	S	M	M		S	M	S	L	L

S – Strong; M – Medium; L - Low

UNIT I: FUNDAMENTALS OF ELECTRICITY

Definition and Units of Voltage, Current, Potential Difference, Power, Energy, Resistance, Conductance, Resistivity - Concepts of open and short circuit - Ohm's Law –Kirchoff's Current and Voltage law (Definition only) - Series circuits - Parallel circuits – Series Parallel Circuits – Simple problems on Ohm's law. AC and DC circuits-sources and its applications - Definition of cycle, frequency, time period, amplitude, peak value, average value and rms value – Define peak factor and form factor - Concept of phase , phase difference and phase angle – Single phase and 3 phase (Definition) - Meaning of lagging and leading sine wave - Advantages of three phase over single phase

UNIT II: D.C. MACHINES

DC Generator – construction- Working principle - characteristics–types- Applications DC motor- construction- Working principle - characteristics–types- Applications Necessity of starter - 3 point starter, 4 point starter

UNIT III: A.C.MACHINES AND TRANSFORMERS

Single phase Induction motor - construction & principle of operation-Types Three phase induction motors – Squirrel cage and slip ring Induction motors (construction and working principle only)Alternator- construction – Principle of operation- Necessity of starters – DOL and star/delta, auto transformer –application.

Single Phase transformer: Working Principle and Construction of transformer – Applications – Step up and Step down transformer (Definition only)

UNIT IV: ELECTRONICS DEVICES

Types of materials – Conductor, semiconductor, insulator

DIODES: Working principle and characteristics of PN junction diode – Zener diode – Varactor diode – its specification.

TRANSISTOR: Working principle and characteristics of BJT- FET-UJT - types and specification.

POWER ELECTRONIC DEVICES: Working principle and characteristics of SCR-DIAC-TRIAC – IGBT - types and specification.

OPTOELECTRONIC DEVICES: Working principle and characteristics of LDR-LED-Photo Transistor – Photo Diode – Thermister- types and specification.

UNIT V: ELECTRONIC CIRCUITS

RECTIFIER: Construction, working and output waveform of half wave rectifier – Full wave rectifier – Bridge rectifier – its Application.

WAVE SHAPING CIRCUIT: Clipper – clamper – voltage doubler – multivibrator and its types.

REGULATED POWER SUPPLY: Need of RPS – Block diagram of RPS – Transistorized RPS – short circuit protection.

Books for Study:

- B.L.Theraja , *Fundamentals of Electrical Engineering and Electronics*, S.Chand and Co., New Delhi, First Multicolor illustrative Edition, 2006
- Salivahanan, N.Sureshkumar and A.Vallavaraj ,*Electronic Devices and Circuits*, Tata McGraw Hill Publishing Company, New Delhi, 2nd Edition, 2011

Books for Reference:

- Dr.M.Arumugam, Dr.N.Premkumaran ,*Electric Circuit Theory,* Khanna Publishers, New Delhi, 5th edition, 1979
- K.Bhattacharya, Principal, TTTI, Chandigar ,*Electrical machines*, Tata McGraw Hill Publishing Company, New Delhi
- Philip Kiameh,*Electrical Equipment Handbook: Troubleshooting & Maintenance*, The Mc Graw-Hill, Company,Inc – 1996

E-Resource:

https://www.e-booksdirectory.com/details.php?ebook=11841

SUPERVISE ASSEMBLY LINE ACTIVITIES

Course code	20KUT1C02	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	I

OBJECTIVES:

- Understand responsibilities of Supervisor
- Understand the concept of Production Planning.
- Safety Guidelines for Handling Electronic Assemblies
- Improve productivity by Time management

Course Outcomes (CO)

CO1	Understand the responsibilities of supervisor.	**K2**
CO2	Understand the skills required for the supervisor.	**K2**
CO3	Apply the Safety Guidelines for Handling Electronic Assemblies and to achieve productivity	**K3**
CO4	Apply safety procedures by understanding the importance of Electrical Safety.	**K3**
CO5	Understand and Analyze the importance of time management.	**K2 &K4**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	M	L	L	S	M		L	S	M	S	S
CO2	S	M	M	S	S		L	S	S	S	S
CO3	S	M	S	S	S		M	S	M	S	M
CO4	S	M	S	S	S		M	S	M	S	M
CO5	M	M	L	S	S		L	S	L	S	S

S – Strong; M – Medium; L - Low

UNIT I: SUPERVISOR RESPONSIBILITIES

Introduction – Responsibilities to the middle and top management - Responsibilities to the Co workers - Responsibilities to the other supervisor - Responsibilities to the staff – Responsibilities in Labor matter.

UNIT II: SUPERVISORY SKILLS

Communication with others – planning process – Technical competence – Team work and sharing of Knowledge – Training and development of workers – maintain workers discipline and productivity – Department administration – duty routine activities.

UNIT III: HANDLING ELECTRONIC ASSEMBLIES

EOS/ESD PREVENTION: Electrical Overstress (EOS) – Electrostatic Discharge (ESD) – Working cables – Protective materials – EOS/ESD safe workstation.

HANDLING CONSIDERATION: Guidelines – physical damage – contamination – Electronic Assemblies- After soldering – gloves & finger cots.

UNIT IV: ELECTRICAL SAFETY

Theory of Electricity – Hazards of Electricity – Effects of Electricity on Human body – common workplace circuits – Electrical protective devices – Grounding.

UNIT V: TIME MANAGEMENT

Introduction – Goal setting – tools for prioritization –managing interruptions – managing procrastination – scheduling.

Books for Study:

- Pannerselvam, *Production and Operations Management*, PHI – Second edition-2010
- S.Anil Kumar & N.Suresh, *Production and Operation management*, New Age International Publication- 2nd Edition-2015

Books for Reference:

- Training manual on supervisory skills – WOPAC training and service center, cebu, Phillipines.
- Acceptability of. Assemblies – developed by IPC (IPC-A-610D)

E-Resource:

- Successful Time management – www.bookboon.com
- https://issuu.com/oskrfloreschoperena/docs/s._anil_kumar__n._suresh-production

TAMIL-II

Course code	20KUG2TA2	Credits	04	Year	I
No. of Lecture	60	No. of Practical	--	Sem	II

நோக்கம் :

1. பக்தி இலக்கிய அறிமுகம்
2. சைவ, வைணவ பக்திப் பனுவல்கள் அறிமுகம்
3. சிற்றிலக்கிய வகையறிதல்
4. திருமுறைகள், பிரபந்தங்கள் வரலாறு அறிதல்

மாணவர் பெறும் திறன்:

Course Outcomes (CO)

CO1	பக்தி இலக்கிய காலத்தின் சமயம், பண்பாடு, பக்தி நெறி அறிதல்	**K2**
CO2	அரசுப் போட்டித் தேர்வுகளுக்குத் தயார்படுத்திக் கொள்ளுதல்	**K2 &K3**
CO3	பக்தி இலக்கியங்களின் வழி சைவ, வைணவம் தமிழுக்கு செய்த தொண்டினை அறிதல்	**K2**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	L	L	L	M	L		L	L	L	M	S
CO2	L	L	L	M	L		L	L	L	M	S
CO3	L	L	L	M	L		L	L	L	M	S

S – Strong; M – Medium; L – Low

அலகு I சைவ இலக்கியங்கள்

1. திருஞானசம்பந்தர் - திருநீற்றுப் பதிகம் - (“மந்திரமாவது நீறு …” எனத் தொடங்கும் பதிகம்)
2. திருநாவுக்கரசர் - திருஅங்கமாலை - (“ தலையே நீ வணங்காய்” எனத் தொடங்கும் பதிகம்)

அலகு II வைணவ இலக்கியங்கள்

1. ஆண்டாள் - நாச்சியார் திருமொழி - 6 ஆம் திருமொழி (வாரணமாயிரம் எனத் தொடங்கும் 10 பாடல்கள்)
2. நம்மாழ்வார் - திருவாய் மொழி - (“முனியே நான்முகனே” எனத் தொடங்கும் 10 பாடல்கள்)

அலகு III சிற்றிலக்கியங்கள் - பிற்கால இலக்கியம்

1. குமர குருபரர் - மதுரை மீனாட்சியம்மை பிள்ளைத் தமிழ்
    1. தாலப் பருவம் - (31)
       (“முதுசொற் புலவர் தெளித்த” எனத் தொடங்கும் பாடல்)
    2. அம்புலிப் பருவம் (72)
       (“ஏடகத்தெழுதாத” எனத் தொடங்கும் பாடல்)
2. தாயுமானவர் - எந்நாட்கண்ணி - (தெய்வ வணக்கம் - 11 கண்ணிகள்)

அலகு IV இலக்கிய வரலாறு - II

பன்னிரு திருமுறைகள்

அலகு V இலக்கிய வரலாறு – III

பன்னிரு ஆழ்வார்கள்

PROFESSIONAL ENGLISH

Course code	20KUG2EN2	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	II

OBJECTIVES:

- Preparing the student to be competent in verbal and non-verbal communicative skills.
- To enable him to overcome his all linguistic barriers systematically.
- To acquire the desirable proficiency in English language.

Course Outcomes (CO)

CO1	Enable to achieve good communication skills.	**K3**
CO2	Enable to face interviews successfully.	**K2 &K3**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	M	L	L	S	L		M	M	L	M	M
CO2	M	M	L	S	M		M	M	S	S	M

S – Strong; M – Medium; L - Low

UNIT- I

Formal and Informal Communication. Language for debate and discussion, Students' classroom language. Teacher's classroom language.

Situational English: welcome and thankfulness, making an appointment, asking about educational qualifications, at the post office, a customer at a bank, other situational conversations, visiting a doctor, travelling in a bus, hiring a taxi, at the railway station, reservation for air tickets, meeting after long interval, shopping, outing, watching television, looking for a room in a hotel, and going to the theatre.

UNIT –II

Public speaking skills, extempore, group discussion, job interview, mock sessions and current affairs.

UNIT –III

Writing paragraph, writing stories, picture comprehension, note writing, and note making.

UNIT –IV

Drafting an e-mail, report writing, writing letters, application, and resume preparation.

UNIT –V

Life Skills:

a. Career planning
b. Motivation
c. Motivated goal setting
d. Team work skills
e. Time management skills.

Books for Study:

- T.M. Farhathullah: *English Practice Book for Undergraduates*. Emerald Publishers.
- S. Raghavan : *A Textbook for Communication and Life Skills Practical* .Jey Publications.

OFFICE AUTOMATION

Course code	20KUG2AL2	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical	--	Sem	II

Objectives:

- To develop the basic computer operating skill of the student
- To enable the students to create and maintain their records in computer.
- To create the knowledge for accessing Internet.

Course Outcomes (CO)

CO1	Create basic knowledge for using computer in all fields.	**K1**
CO2	Develop their presentation skills through accessing internet.	**K2 &K3**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	M	M	M	L	M		M	S	S	L	L
CO2	M	M	M	L	M		M	S	S	L	L

S – Strong; M – Medium; L - Low

UNIT-I

BASIC COMPUTER SKILLS: Identifying Major Computer Components - How Computers Work - Turning on the Computer and Logging On - OPERATING SYSTEMS AND SOFTWARE – INTERNET.

UNIT-II

WORD: Introduction to Word Processing: Basic features – Full-Featured word processors – starting word – menus and toolbars – creating, editing and saving a word document – using word help – opening a document – moving multiple text selections simultaneously – link documents – creating table – working with graphics – mail merging – previewing and printing document.

UNIT-III

EXCEL: electronic spreadsheets – spreadsheet packages – starting excel – navigating in a workbook – create, name and save a new workbook – data entry-manual and automatic – correcting mistakes-spelling checker, undo and redo changes.

UNIT-IV

POWERPOINT: Presentation basics – presentation packages – starting PowerPoint – menus and toolbars – opening and saving an existing presentation – presentation using auto content wizard – presentation using design template – creating and saving a presentation using blank presentation.

UNIT-V

MS ACCESS: Use of MS Access – Controls – Customization – database design – filtering and sorting - conversation – database basics – import and export – forms – reports.

Books for Study:

- Alexis Leon, Mathews Leon, ***Introduction to Computers with MS-Office,*** Tata McGraw Hill Publication, 2003.
- Archana Kumar, *Computer Basics with Office Automation*, Dreamtech press, 2019.

Books for Reference:

- Dr. R. Deepalakshmi, *Computer Fundamentals and Office Automation*, Charulatha publications Pvt. Ltd., First Edition,2019.

LINEAR INTEGRATED CIRCUITS

Course code	20KUT2C03	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	II

OBJECTIVES:

- Fundamentals of Op-amp.
- Applications of Op-amp.
- Working and application of Timer IC

Course Outcomes (CO)

CO1	Understand the characteristics of Op-amp IC741	**K2**
CO2	Understand and analyze the applications of IC741	**K2 &K3**
CO3	Understand different types of A to D and D to A converters.	**K2**
CO4	Understand the characteristics and application of timer Ic's	**K2& K3**
CO5	Developing competencies to analyze Linear integrated circuits by understanding the fundamentals of OP-amp and Timer IC's.	**K3 &K4**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	M	M	S		S	M	M	L	L
CO2	S	S	M	M	S		S	M	S	L	L
CO3	S	S	M	M	S		S	M	M	L	L
CO4	S	S	M	M	S		S	S	S	L	L
CO5	S	S	S	M	S		S	S	S	L	L

S – Strong; M – Medium; L - Low

UNIT I: OPERATIONAL AMPLIFIER

Introduction to Op-amp (IC 741) – Schematic symbol for opamp – pin diagram of IC 741 – Block diagram of an opamp – Characteristics of an Ideal opamp- Simple Equivalent circuit of an opamp –op amp parameters – CMRR –Slew rate - virtual ground.

UNIT II: OPAMP APPLICATIONS

Inverting Amplifier, Non Inverting amplifier – Differential Amplifier – scale changer as a Multiplier and Divider - Summing amplifier (Simple problems)- Voltage follower - comparator - zero crossing detector - Integrator – Differentiator – Voltage to current converter – current to voltage converter –Instrumentation amplifier.

UNIT III: DIGITAL TO ANALOG CONVERTER

Basics of D/A conversion – weighted Resistor D/A Converter – R-2R Ladder D/A Converter –Specifications of DAC-Accuracy, Resolution, Monotonocity, Settling time.

UNIT IV: ANALOG TO DIGITAL CONVERTER

Basics of A/D conversion – sampling –Sample and hold circuit –quantization – Types of A/D converter – Block diagram of Flash, Successive approximation, Ramp, Dual Slope

ADC – Specifications of ADC – Accuracy, Resolution, conversion time –Functional Block diagram of IC ADC 0808.

Unit V: IC555 TIMER, IC VOLTAGE REGULATORS AND THEIR APPLICATIONS.

IC 555 Timer: Pin diagram of IC 555 – Functional Block diagram of IC555 – Applications –Astable multivibrator – monostable multivibrator – Schmitt trigger – sequence Timer

IC voltage regulators: Linear fixed voltage regulator - Positive voltage regulator using IC 78xx, negative voltage regulator using IC 79xx – Adjustable voltage Regulator LM 317.

General purpose regulator using LM 723 – Pin diagram of LM 723- Low voltage and High voltage regulator using LM 723.

Books for Study:

- D.Roychoudhury & Shail.B. Jain, *Linear Integrated circuits*, New age International Publishers – IV Edition - 2018
- Ramakant A. Gayakwad, *Op-Amps and Linear Integrated Circuits,* Pearson Education India, 4th Edition, 2015

Books for Reference:

- K.R. Botkar, *Integrated circuits*, Khanna Pulbisher's – 2004
- James Fiore, Mohawk Valley Community College, *Operational Amplifiers & Linear Integrated Circuits: Theory and Application,* 3rd Edition, 2018

E-Resource:

https://open.umn.edu/opentextbooks/textbooks/operational-amplifiers-linear-integrated-circuits-theory-and-application-3e

ELECTRICAL AND ELECTRONIC DEVICES LAB

Course code	20KUTE2P1	Credits	04	Year	I
No. of Lecture Hours	--	No. of Practical Hours	120	Sem	II

Course Outcomes (CO)

CO1	Analyze the characteristics of various Electrical machines	**K3 &K4**
CO2	Analyze the characteristics of various Electronic Devices	**K3 &K4**
CO3	Identify and analyze the waveforms of Electronic circuits.	**K3 &K4**
CO4	Analyze linear integrated circuits such as IC 741, and IC 555.	**K3 &K4**

K1 - Remember; K2 - Understand; K3 - Apply; K4 – Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	L	S		S	M	S	L	L
CO2	S	S	S	L	S		S	M	S	L	L
CO3	S	S	S	L	S		S	M	S	L	L
CO4	S	S	S	L	S		S	M	S	L	L

S – Strong; M – Medium; L - Low

ELECTRICAL MACHINES:

1. Load test on DC Shunt Generator and estimate of regulation.
2. Load test on DC Shunt Motor.
3. Load test on the given single phase transformer
4. Load test on single phase capacitor start Induction motor.

ELECTRONIC DEVICES AND CIRCUITS:

1. Identification of
   i. resistors and its color coding
   ii. inductors and its color coding
   iii. capacitors and its color coding
2. Practicing soldering techniques in DOT board.
3. Analysis the V-I Characteristic of PN junction Diode in both forward and Reverse biasing.
4. Construct the voltage regulator by using Zener Diode.
5. Construct the simple switching circuit using NPN and PNP transistor.
6. Characteristics of SCR.
7. Connect the DIAC and determine its Cut in voltage.
8. Characteristic of LED and LDR.
9. Solder the Bridge Rectifier circuit in DOT board and trace the output waveforms with and without filter.
10. Construct the Diode clipper and trace their output waveform.
11. Construct the Diode Clamper circuit and trace their output waveform.

LINEAR INTEGRATED CIRCUITS:

1. Construct and test Inverting and Non-Inverting Amplifier using operational Amplifier
2. Construct the Scale changer and summing amplifier circuit and test their output by using operational Amplifier.
3. Construct the Astable Multivibrator using IC555 timer.
4. Construct the Monostable Multivibrator using IC555 timer.
5. Construct digital to analog converter(R-2R ladder type).

INTERNSHIP TRAINING-I

Course code	20KUTE2I1	Credits	20	Year	I
No. of Lecture	--	No. of Practical	1200	Sem	II

OBJECTIVES:

- To Understand production requirement
- To Understand quality and safety standards as per company's norms
- To gain practical knowledge
- To develop Self confidence
- To develop a good relationship with their co-workers.

Course Outcomes (CO)

CO1	Exposed to an organization overview.	**K2**
CO2	Get awareness about general safety requirements in the industry.	**K2 &K3**
CO3	Understand and follow the rules and regulations of Industry.	**K2 &K3**
CO4	Handling of Equipments, Tools and instruments used in industry.	**K3**
CO5	Practical exposure to handle abnormal & unusual conditions in industry.	**K3 &K4**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S		S	S	S	S	S
CO2	S	S	S	S	S		S	S	S	S	S
CO3	S	S	S	S	S		S	S	S	S	S
CO4	S	S	S	S	S		S	S	S	S	S
CO5	S	S	S	S	S		S	S	S	S	S

S – Strong; M – Medium; L – Low

Students should undergo internship training in an esteemed Electrical and Electronic concern to gain hands on practice and practical industrial exposure. Students are expected to submit their daily work report at the time of examination

TECHNICAL COMMUNICATION

Course code	20KUG3EN3	Credits	4	Year	II
No. of Lecture Hours	60	No. of Practical Hours	-	Sem	III

Objectives:

- To make him acquire the language skills (Listening, Speaking, Reading and Writing) in English.
- To make him require group discussion and public speaking skills.

Course Outcomes (CO)

CO1	Overcome inhibition in speaking in a forum.	**K3**
CO2	Enable to face the day to day life and official requirements.	**K2 &K3**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	M	L	L	S	L		M	M	L	M	M
CO2	M	M	L	S	M		M	M	S	S	M

S – Strong; M – Medium; L - Low

UNIT-I (LISTENING)

1) Types of Listening
2) Implications of effective Listening

UNIT-II (SPEAKING)

1) Speaker, speech planning process.
2) Speech making process and speech effectiveness
3) Group Communication

UNIT-III (READING)

1) Reading Comprehension.
2) Improving comprehension skills
3) Techniques for good comprehension.

UNIT-IV (WRITING)

1) Sentence Construction
2) Techniques for Paragraph Development
3) Story Writing, Precis Writing

UNIT-V

1) Curriculum Vitae
2) Agenda, Minutes, Notices
3) Memo

Books for Study:

- Sangeeth Sharma & Meenakshi Raman, *Technical Communication Principles and Practice, O*xford, Second edition, 2011
- Rudolph. F. Verderber, Kathaleen S. Verderber , *The Challenge of Effective Speaking*, Thomas Wadsworth,14th edition, 2008

Books for Reference:

- V. Syamala , *Effective English Communication for you*- Emerald Publishers – 2nd Edition -2002

MATHEMATICS – II

Course code	20KUG3AL3	Credits	4	Year	II
No. of Lecture	60	No. of Practical	-	Sem	III

Objectives:

- To gain the basic knowledge about the Interest rate, solution of linear equations, differential and integral calculus.
- To provide the basic knowledge in trigonometry.

Course Outcomes (CO)

CO1	Apply the basic Mathematical calculations in business problems.	**K3**
CO2	Understand the concepts of trigonometric functions.	**K2**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	M	L	L	S	L		S	M	M	L	L
CO2	M	M	L	S	M		S	M	S	L	L

S – Strong; M – Medium; L - Low

Unit I:

Simple and Compound Interest – Discounting of Bills – True Discount – Banker's Gain.

Unit II:

Variables, Constants and Functions - Limits of Algebraic functions – Simple Differentiation of Algebraic functions – Meaning of Derivative – Evaluation of first and second order derivatives

Unit III:

Elementary Integral Calculus – Determining indefinite and definite integral of simple functions – Integration by parts

Unit - IV

Expansions of $cosn\theta, sinn\theta$ and $tann\theta$ - Expansion of s□□□ and c□□□ in a series of ascending powers of □.

Unit - V

Hyperbolic functions - Relation between Hyperbolic functions - Inverse Hyperbolic functions - Real and Imaginary parts - Logarithm of complex numbers.

Books for Study:

- PA. Navnitham, *Business Mathematics and Statistics*, Jai Publishers, 2012.
- S. Narayanan, R. Hanumantha Rao, Manickavachagam Pillai and P. Kandaswamy, S.Viswanathan, *Ancillary Mathematics* (Volume I), Printers & Publishers Pvt Ltd., 2007.

Books for Reference:

- G.C.Sharma, Madhu Jain, *Algebra and Trigonometry*, Galgotia Publications Pvt Ltd, First Edition, 2003.

ENVIRONMENTAL STUDIES

Course code	20KUG3ENS	Credits	04	Year	II
No. of Lecture Hours	60	No. of Practical	--	Sem	III

Objectives:

- To create the awareness among students regarding Environment.
- To understand the causes of pollution and prevention methods

Course Outcomes (CO)

CO1	Got awareness about the environment.	**K1 &K2**
CO2	Understand the need to protect our environment from pollution and develop the unpolluted society.	**K2 &K3**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	M	M	L	M	L		L	M	M	M	S
CO2	M	M	L	M	L		L	M	M	M	S

S – Strong; M – Medium; L - Low

UNIT-I

The Multidisciplinary nature of environmental studies-Definition, scope and importance. Need for public awareness-Natural Resources: Renewable and non-renewable resources:

Natural resources and associated problems.

a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effective on forests and tribal people.
b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts, over water, dams benefits and problems.

UNIT-II

Ecosystems-Concept of an ecosystem.-Structure and function of an ecosystem.-Producers, consumers and decomposers.-Energy flow in the ecosystem.-Ecological succession.-Food chains, food webs and ecological pyramids.

UNIT-III

Biodiversity and its conservation-Introduction – Definition: genetic, species and ecosystem diversity.- Biogeographically classification of India-Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.- Biodiversity at global, National and local levels-India as a mega-diversity nation-Hot-spots of biodiversity-Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts.-Endangered and endemic species of India-Conversation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT-IV

Environment Pollution: Causes, effects and control measures of: Air pollution-Water pollution-Soil pollution-Marine pollution-Noise pollution-Thermal pollution-Nuclear hazards.

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes.

UNIT-V

Social Issues and the environment.-From Unsustainable to Sustainable development-Urban problems related to energy-Water conservation, rain water harvesting watershed management.-Resettlement and rehabilitation of people; its problems and concerns.

Case studies: Environment ethics: Issues and possible solutions.

Books for Study:

- *ENVIRONMENTAL STUDIES* – **Publication:** Published by Bharathiar University.

Books for Reference:

- Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. *Environmental Encyclopedia*, Jaico Publ. House, Mumabai, 2001
- Agarwal, K.C., *Environmental Biology*, Nidi Publ. Ltd. Bikaner, 2001.

DIGITAL ELECTRONICS

Course code	20KUT3C04	Credits	04	Year	II
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	III

OBJECTIVES:

- Understand concepts of Number systems and codes
- Fundamentals of Digital Electronics.
- Understand the Digital logic circuits
- Basics of memories

Course Outcomes (CO)

CO1	Understand various types of number systems, binary arithmetic and codes.	**K2**
CO2	Remembering truth table, symbol and equation of various logic gates	**K1**
CO3	Analyze combinational Logic circuits and sequential Logic circuits	**K3**
CO4	Understand the circuit and working of Registers and digital memories.	**K2**
CO5	Developing competencies to design Digital logic circuits by understanding the fundamentals of Logic gates and Flip flops.	**K3 &K4**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	M	S	M	M	M		S	M	M	L	L
CO2	S	S	S	M	S		S	S	S	M	L
CO3	S	S	S	M	S		S	S	S	M	L
CO4	S	S	S	M	S		S	S	S	M	L
CO5	S	S	S	M	S		S	S	S	M	L

S – Strong; M – Medium; L - Low

UNIT I : NUMBER SYSTEMS AND CODES

Number systems: Types - Decimal – Binary – Octal – Hexadecimal – BCD – Conversion from one number system to other.

Binary Arithmetic: Binary addition- Subtraction- 1's complement and 2's complement – Signed binary numbers- Binary addition and subtraction using1's complement and 2's complement- 9's complement and 10's complement.

CODES: Types- Binary codes, Excess 3 code, Gray code – conversion from one code to another code.

UNIT II: BOOLEAN ALGEBRA AND LOGIC GATES

Logic gates: Positive and Negative logic System - Definition, Truth table, Symbol and Logical equations of AND – OR - NOT – EXOR - EXNOR (Only 2-inputs) gates – Universal gates - NAND - NOR – Symbol and truth table .

Boolean Algebra : Basic laws of Boolean algebra – Demorgan's Theorem and proofs – Duality theorem - Simplification of logical equations using Boolean laws - De-Morgan's theorem – Four variable Karnaugh map

UNIT III: COMBINATIONAL LOGIC CIRCUITS

Half Adder and full adder- Truth table, Logic diagram – Half subtractor and Full subtractor - Truth table, Logic diagram Parity bit – Use of a parity bit – Odd parity and Even parity

Multiplexer - De multiplexer – Encoder – Decoder (Definition and Basic Circuits only) – Comparator Circuit for two three bit words.

UNIT IV: SEQUENTIAL LOGIC CIRCUITS

Flip flops: Basic principle of operation - S-R, D flip-flop – Operation and truth table - Race Condition – JK flip flop – T flip flop – Toggling - Edge Triggered Flip-flop –J-K Master Slave flip flop.

Counters: Asynchronous counter - 4 bit Asynchronous Counter – Mod N Counter - Decade counter - Synchronous counter - 4 bit Synchronous binary counter – Up and Down Counter - Applications of Counters

UNIT V: REGISTERS AND DIGITAL MEMORIES

Shift register - Block diagram representation and waveforms of Serial – in Serial - out, Serial – in Parallel – out, Parallel-in Serial – out, Parallel - in Parallel – out – Applications of Shift Registers.

MEMORIES – Classification of Semiconductor memories**-** Static Memory – Dynamic Memory – Static Memory organization in terms of address lines, control lines and data lines – Expanding memory (say 8k to 16k) – SDRAM – DDR RAM.

Books for Study:

- R.P. Jain, *Modern Digital Electronics*, TMH, 4th Edition, 2009.
- Albert Paul Malvino and Donald P. Leach, *Digital Principles and applications,*TMH, 5th Edition, 1994.

Books for Reference:

- A.Anand Kumar, *Fundamentals of Digital Circuits*, PHI, 3rd Edition, 2014.
- Anil. K. Maini, *Digital Electronics: Principles, Devices and Applications,* Wiley, First Edition, 2007

E-Resource:

https://www.researchgate.net/publication/264005171_Digital_Electronics

PRODUCTION PLANNING AND CONTROL

Course code	20KUT3C05	Credits	04	Year	II
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	III

OBJECTIVES:

- To understand the concepts of Production and operation Management
- To understand Production and man power planning
- To understand the concept of Purchasing and inventory control

Course Outcomes (CO)

CO1	Understand the objectives of Production and operation managements systems.	**K2**
CO2	Originate a procurement chart based on production plan for future months	**K2 &K3**
CO3	Understand the importance of man power planning.	**K2**
CO4	Understand purchasing management and inventory control	**K2**
CO5	Analyze the production plan based on the product demand data.	**K4**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	M	S	M	S	S		M	M	S	S	S
CO2	M	S	M	S	S		M	S	S	S	M
CO3	L	M	M	S	S		M	S	S	S	S
CO4	L	M	L	S	S		M	S	M	S	M
CO5	M	M	M	S	S		M	S	S	S	S

S – Strong; M – Medium; L - Low

UNIT I: PRODUCTION AND OPERATION MANAGEMENT

Introduction – Production system – objective of Production Management – Operating system – Objectives of operation management – Managing Global operations – Scope of production and Operation management.

UNIT II: PRODUCTION PLANNING

Introduction – need and objectives of PPC – Phases of PPC – Functions of PPC – Operation planning and scheduling systems – Aggregate planning – Master Production Schedule (MPS) – Material Requirement Planning (MRP) – Capacity planning – Routing – Scheduling – Scheduling Methodology.

UNIT III: MAN POWER PLANNING

Introduction- Meaning of man power planning-Importance of man power planning-Need of man power planning-Process of policy formulation-Responsibility of manpower planning- Job Analysis.

UNIT IV: PURCHASING MANAGEMENT

Introduction – Procurement process –purchasing organization – sourcing – strategies – purchasing portfolio models – supplier segmentation – supplier selection with focus on choice of evaluation criteria – supplier selection using ISO standards – Supplier development with quality focus.

UNIT V: MAINTENANCE AND INVENTORY CONTROL

Introduction – objectives – types of maintenance – maintenance planning - Maintenance Scheduling – Maintenance schedule techniques – Total Productive Maintenance.

Meaning of Inventory – Reasons for keeping inventory – meaning & objectives of inventory control – Benefits and techniques of inventory control – inventory model.

Books for Study:

- Pannerselvam, *Production and Operations Management*, PHI – Second edition, 2010
- S.Anil Kumar & N.Suresh, *Production and Operation management*, New Age International Publication, 2nd edition, 2015

Books for Reference:

- P.C. Tripathi, *Personal Management and Industrial Relations*, Sultan Chand & Sons, New Delhi, 1978 (Reprint – 2004).
- Lars Bedes, Sofia Eklund, Nojan Najafi, *Purchasing management,* CHALMERS-Department of Technology Management and Economics

E-Resource:

- Ebook for production and operation management – www.todaylibrary.com

TECHNICAL DRAWING

Course code	20KUT4C06	Credits	4	Year	II
No. of Lecture Hours	60	No. of Practical Hours	-	Sem	IV

Objectives:

- To develop in students, graphic skills for communication of concepts, ideas and design of engineering products.
- To expose them to existing national standards related to technical drawings.

Course Outcomes (CO)

CO1	Apply the Skill in the Geometric construction.	**K3**
CO2	Understand and Develop the Orthographic and Isometric projections.	**K2 &K3**
CO3	Remember the symbols widely used in Electrical and Electronics circuits.	**K1**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	M	S	M	L	M		M	S	M	L	L
CO2	M	S	M	L	M		M	S	M	L	L
CO3	S	S	M	L	S		M	S	M	L	L

S – Strong; M – Medium; L - Low

Unit I - Geometrical construction

Triangle (Equilateral triangle, Right angle triangle, Isosceles triangle, Acute triangle) -Rectangle, Rhombus, Trapezium, Circles -Regular Polygons (Square, Pentagon, Hexagon, Heptagon, Octagon)-Parabola (Tangent method, Offset method)-Ellipse (Parallelogram method, Four centre method, Concentric circles method)-Hyperbola-Cycloids -Involutes -Helix -Spiral curves.

Unit II-Projections

Orthographic (first angle and third angle) (10 simple exercises each) - Isometric (5 simple exercises) - Oblique (2D and 3D wire frame models) (3 simple exercises) - Blue print reading (Missing views - Missing Lines - Missing dimensions)

Unit III- Sectional View

Types of sectional view (Full section, Half section, Aligned section, Offset Section, Revolved Section, Removed section) - Detailing view.

Unit IV -Electrical and Electronics Symbols

Symbols of – DC armatures – alternators – field winding shunt, series and compound – relays – contactors – fuses – main switch – electric bell – earth – aerial – DPST – DPDT – TPST – Network link – ammeters – voltmeters – wattmeter – energy meters – frequency meters – power factor meters – timers – buzzers – transformers – auto transformers- Incandescent lamp- Fluorescent Lamp -Signal lamp- Push button- Fire alarm – Siren- Water Heater- Ceiling Fan- Exhaust Fan –

Resistors – inductors – capacitors - diodes – transistors – FET – SCR – UJT – DIAC – TRIAC – MOSFET'S - LOGIC GATES – AND – OR – NOT – NAND – NOR – EXOR

Unit V- Introduction to AutoCAD

History of AutoCAD-Applications- Advantages over manual drafting - hardware requirements – software requirements – window desktop – AutoCAD screen interface – menus – toolbars - How to start AutoCAD – command groups – How to execute command – types of coordinate systems – absolute-relative-polar- Simple sketches (lines and curves)

Books for Study:

- Gopalakrishnan K.R., "Engineering Drawing" (Vol I & II combined), Subhas stores, Bangalore, 27th Edition, 2017
- Shah M.B., and Rana.B.C., " Engineering Drawing", Pearson, 2nd edition, 2009.

Books for Reference:

- Venugopal.K, *Engineering Drawing and Graphics,* New age International Publishers, 5th Edition, 2004
- N.D.Bhatt, *Engineering Drawing,* Charotar Publication,2014

Open Elective - I

1. **Principles of management**
2. **Personality Development and Human Behaviour**

Open Elective I- PRINCIPLES OF MANAGEMENT

Course code	20KUG4EA1	Credits	4	Year	II
No. of Lecture Hours	60	No. of Practical Hours	-	Sem	IV

Objectives:

- Study the evolution of Management, to study the functions and principles of management and to learn the application of the principles in an organization.

Course Outcomes (CO)

CO1	Understand the basic managerial functions of an organization	**K1**
CO2	Develop the leadership qualities and planning attitude	**K2 &K3**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	L	L	L	S	M		L	M	M	S	S
CO2	M	M	M	S	M		L	S	S	S	S

S – Strong; M – Medium; L - Low

UNIT I: INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS

Definition of Management – Science or Art – Manager – managerial roles and skills – Evolution of Management – Scientific, human relations , system and contingency approaches – Types of Business organization – Sole proprietorship, partnership, company-public and private sector enterprises –Current trends and issues in Management.

UNITII: PLANNING

Nature and purpose of planning – planning process – types of planning – objectives – setting objectives – policies – Planning Tools and Techniques – Decision making steps and process.

UNIT III: ORGANISING

Formal and informal organization – organization chart – organization structure – types – Line and staff authority – departmentalization – delegation of authority – centralization and decentralization – Human Resource Management – HR Planning, Recruitment, selection, Training and Development, Performance Management.

UNIT IV: DIRECTING

Meaning, Principles and Functions- Motivation – motivation theories – motivational techniques – job satisfaction – job enrichment – leadership – types and theories of leadership – communication – process of communication – barrier in communication – effective communication – communication and IT.

UNIT V: CONTROLLING

System and process of controlling – budgetary and non-budgetary control techniques – use of computers and IT in Management control – Productivity problems and management – direct and preventive control – reporting.

Books for Study:

- Stephen P. Robbins & Mary Coulter, " *Management*", Prentice Hall (India) Pvt. Ltd., 10th Edition, 2009.
- JAF Stoner, Freeman R.E and Daniel R Gilbert "*Management*", Pearson Education, 6th Edition, 2004.

Books for Reference:

- Parag Diwan, *Management Principles and Practices,* Excel Books, first edition, 2002
- Prasad L M , *PRINCIPLES AND PRACTICE OF MANAGEMENT,* Sultan Chand & Sons-New Delhi, first edition, 2019

Open Elective I - PERSONALITY DEVELOPMENT AND HUMAN BEHAVIOUR

Course code	20KUG4EB1	Credits	4	Year	III
No. of Lecture	60	No. of Practical	-	Sem	VI

Objectives:

- To update the knowledge of schools of psychology and recent trends of psychology.
- To be familiarized with the developmental changes in various development stages across the life span.
- To equip the knowledge of personality, intelligence, motivation, perception, learning and attitude.
- To understand the importance of developmental stages of psychology and Health Psychology in social work practice and be able to know the real life situations.

Course Outcomes (CO)

CO1	Enhance the knowledge in the field of psychology.	**K1 &K2**
CO2	Importance of personality, intelligence, motivation, perception, learning and attitude in day to day life.	**K2 &K3**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	L	L	L	S	M		L	S	M	S	S
CO2	L	L	L	S	M		L	S	M	S	S

S – Strong; M – Medium; L - Low

UNIT – I

Psychology: Definition - **Schools of Psychology:** Structuralism, Functionalism and Gestalt - **Recent trends:** Biological, Psychodynamics, Cognitive, Behavioural, Humanistic – Branches of psychology, Application of Psychology in Social Work.

UNIT – II

Evolution of human life: Conception – Stages of Prenatal development a) Period of Ovum, b) Period of embryo, c) Period of Fetus – Birth and its types - Pre and Post natal care **Human growth and development**: Developmental tasks, Hazardous, Physical, Social, Emotional and Cognitive development of Infancy, Babyhood, Childhood, Puberty, Adolescence, Adult, Middle age, Old age (Applicable wherever relevant).

UNIT – III

Personality: Definition and Characteristics - **Major approaches to personality:** Trait, Learning, Biological, Humanistic, Freudian and Neo Freudian - Assessment of personality - Influence of Heredity and Environment in one's personality development

Intelligence: Definition - **Theories of intelligence:** Unitary, Multi-faction, Two factor, Group factor, Hierarchical – Types of intelligence **-** Measurement of intelligence – Classification of I.Q – Mentally retarded – Gifted - **Motivation**: Definition, Human needs and motivation – Interaction of motivation – **Theories of motivation:** Instinct, Drive reduction, Arousal, Incentive, Cognitive, Maslow's Hierarchy.

UNIT – IV

Perception: Definition, Characteristics, Perceptual processes, Factors influencing perception, Depth perception and Motion perception, Perceptual illusion, Subliminal perception and Extra sensory perception - **Learning**: Concept and **types of learning:** Cognitive, Sensory, Motion and Verbal learning – **Theories:** Trial and error, Classical conditioning, Operant conditioning, Insightful – Transfer of learning - **Attitude:** Definition, Nature, Components of attitude and their Consistency, Prejudice, Process of attitude change.

UNIT – V

Health Psychology: Stress, Factors influencing stress, Stress reduction strategies (Coping, relaxation, Meditation, Group, Music, exercise and relationship therapies) – Defense mechanisms – A brief idea on major psychiatric illness – Significance of mental health – Role of social workers in promoting mental health.

Books for Study:

- Feldman Robert. S, Understanding *Psychology*, New Delhi: Tata Mc Graw Hill, 6th edition, 2004.
- Mangal. S.K. *General Psychology*. New Delhi: Sterling Publishers Pvt.Ltd
- Pathak Shalini, *Human Development*. New Delh:,Sonali Publications,2007.

Books for Reference:

- Pankajam. G,*Know your Child*. New Delhi: Concept publishing Co, 2005.
- Sharma. K.K, *Principles of Developmental Psychology*. Jaipur, Sublime Publications, 2003.

PROGRAMMABLE LOGIC CONTROLLER

Course code	20KUT4C07	Credits	04	Year	II
No. of Lecture	60	No. of Practical	--	Sem	IV

OBJECTIVES:

- Understand the concept of PLC
- Understand the Ladder logic of PLC .
- Understand the PLC instruction
- Understand the application of PLC

Course Outcomes (CO)

CO1	Remembering general block diagram and connectivity of PLC	**K1**
CO2	Understand the various Classification PLC programming standards	**K2**
CO3	Understand input, output, timer and counter instructions	**K2**
CO4	Understand the Arithmetic and Logical Instructions	**K2**
CO5	Understand and Write the PLC Ladder logic program for various Applications.	**K2 &K3**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	L	M		M	S	M	L	L
CO2	S	S	S	L	M		M	S	S	L	L
CO3	S	S	S	L	M		M	S	S	L	L
CO4	S	S	S	L	M		M	S	S	L	L
CO5	S	S	S	L	S		M	S	S	L	L

S – Strong; M – Medium; L - Low

UNIT I: INTRODUCTION TO PLC

Definition – Requirements of PLC – Advantages over relay logic – Block diagram – parts – operation – description & connectivity – communication – memory – PLC scanning – I/O interfacing.

UNIT II: PLC PROGRAMMING

Hand held programming terminals pcs & PLC programming – industrial computer – 1EC 1131 Programming standards – ladder diagram (LD) – functional block diagram (FBD) – instructional list structural text (ST) – sequential functional chart - Conventional wiring diagram versus PLC ladder logic – logic fuctions – AND logic, OR logic two input & three inputs with truth table – not logic exclusive OR logic combinational logic – priority logic elements.

UNIT III: PLC INSTRUCTIONS – I

Normally open (or) Examine ON – Normally closed (or) Examine OFF – one shot instruction – Latch output coil unlatch coil- ON delay timer instruction (TON) – OFF delay timer instruction (TOFF) – Retentive timer instruction (RTO) – Counter up instruction (CTU) – Counter down instruction (CTU) – Reset instruction (RES)

UNIT IV: PLC INSTRUCTIONS – II

Equal (EQU) – Not equal (NEQ) – Less than (LES) – Less than or equal (LEQ) – Greater than (GRT) – Greater than or equal (GEQ) – Masked comparison for equal (MEQ) – Limit test (LIM)

Add (ADD) – Subtract (SUB) – Multiply (MUL) – Divide (DIV) – Clear (CLR) – Square root (SQR) -AND – OR – EX-OR – NOT

UNIT V: APPLICATIONS OF PLC

Ladder logic diagram for DOL starter – star/Delta Starter – fluid filling operation – traffic light control –two speed motor control circuit using ladder logic – Automatic rotor resistance starter control using ladder logic.

Books for Study:

- Gary Dunning, *Introduction to Programmable Logic Controller*, Delmar Publications, 2nd edition, 2002
- Frank.D.Peteruzella, *Programmable Logic Controllers,* Mc GrawHill, 5th Edition, 2019.

Books for Reference:

- Colin D. Simpson, *Programmable Logic Controllers*, Prentice Hall, 1993.
- Elvin Perez Adrover, *Introduction to PLCs: A beginner's guide to Programmable Logic Controllers*, 2012.

DIGITAL ELECTRONICS AND PROGRAMMABLE LOGIC CONTROLLER LAB

Course code	20KUTE4P2	Credits	04	Year	II
No. of Lecture Hours	--	No. of Practical Hours	120	Sem	IV

Course Outcomes (CO)

CO1	Identify the IC no's, Truth table of logic gates	**K1**
CO2	Analyze the various combinational logic circuits	**K3 &K4**
CO3	Analyze the various sequential logic circuits	**K3 &K4**
CO4	Understand and Write the Ladder Diagram of Programmable Logic Controller	**K2 &K3**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	L	S		S	S	S	L	L
CO2	S	S	S	L	S		S	S	S	L	L
CO3	S	S	S	L	S		S	S	S	L	L
CO4	S	S	S	L	S		S	S	S	L	L

S – Strong; M – Medium; L - Low

DIGITAL ELECTRONICS:

1. Verify the truth table of the following logic gates AND, OR, NAND, NOT, NOR – using 74XX ICs and bread board.
2. Verification of De-Morgan's theorem.
3. A) Construct the EX-OR Gate by using 2 NOT Gate, 2 AND Gate and 1 OR Gate.
   b) Realization of combinational logic function using AND, OR and NOT gates. Verify the result.
4. Construct the Half adder and full adder using 7408, 7486 and 7432 ICs and verify its truth table.
5. Construct a Half subtractor and Full subtractor and verify the truth table using 74xx ICs.
6. Construct the 4 to 1 multiplexer using logic gates and verify the truth table.
7. Construct the 1 to 4 demultiplexer using logic gates and verify the truth table

8. Design and implementation of encoder and decoder using logic gates and verify the truth table.
9. Construction and verification of truth table for RS, D, T, JK, flip-flop.
10. Construct and verify the performance of a 4 bit binary counter using 7473 ICs

PROGRAMMABLE LOGIC CONTROLLER:

11. Developing the Ladder diagram for the truth table of Logic Gates.
12. Develop ladder logic program for DOL Starter and test by using PLC kit.
13. Develop ladder program for Automatic Star-Delta Starter and test by using PLC kit
14. Develop ladder program for two speed pole changing motor and test by using PLC Kit
15. Develop ladder program for Traffic light system and test by using PLC kit

INTERNSHIP TRAINING-II

Course code	20KUTE4I2	Credits	20	Year	II
No. of Lecture	--	No. of Practical	1200	Sem	IV

OBJECTIVES:

- To Derive a procurement chart based on production plan for future months
- To Coordinate with the procurement team
- To Complete documentation
- To develop a good relationship with their co-workers

Course Outcomes (CO)

CO1	Prepare procurement schedule	**K2 &K3**
CO2	Prepare Production plan	**K2 &K3**
CO3	Gain self confidence and able to co-ordinate with others	**K3 &K4**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S		S	S	S	S	S
CO2	S	S	S	S	S		S	S	S	S	S
CO3	S	S	S	S	S		S	S	S	S	S

S – Strong; M – Medium; L - Low

Students should undergo internship training in an esteemed Electrical and Electronic concern to gain hands on practice and practical industrial exposure.Students are expected to submit their daily work report at the time of examination.

Open Elective II

1. **TOTAL QUALITY MANAGEMENT**
2. **BUSINESS ORGANIZATION**

Open Elective II- TOTAL QUALITY MANAGEMENT

Course code	20KUG5EA2	Credits	04	Year	III
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	V

Objectives:

- To facilitate the understanding of Quality Management principles and process.

Course Outcomes (CO)

CO1	Gain the knowledge of Quality management principles and Techniques.	**K1**
CO2	Understand the importance of the Quality and apply in industry.	**K2 &K3**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	L	M	L	S	S		L	M	M	S	S
CO2	L	M	L	S	S		L	M	M	S	S

S – Strong; M – Medium; L - Low

Unit - I INTRODUCTION

Introduction - Need for quality - Evolution of quality - Definitions of quality - Dimensions of product and service quality - Basic concepts of TQM - TQM Framework - Quality statements - Customer focus - Customer orientation, Customer satisfaction, Customer complaints, and Customer retention - Costs of quality.

Unit - II TQM PRINCIPLES

Leadership- Employee involvement - Motivation, Empowerment, Team and Teamwork, Recognition and Reward, Performance appraisal - Continuous process improvement - PDSA cycle, 5s, Kaizen - Supplier partnership - Partnering, Supplier selection, Supplier Rating.

Unit - III TQM TOOLS & TECHNIQUES I

The seven traditional tools of quality - New management tools - Six-sigma: Concepts, methodology, applications to manufacturing, service sector including IT

Unit - IV TQM TOOLS & TECHNIQUES II

Control Charts - Process Capability - Quality Function Development (QFD) - Taguchi quality loss function - TPM - Concepts, improvement needs - Performance measures.

Unit - V QUALITY SYSTEMS

Need for ISO 9000 - ISO 9001:2015, ISO 29990:2010 Quality System - Elements, Documentation, Quality Auditing - QS 9000 - ISO 14000 - Concepts, Requirements and Benefits - TQM Implementation in manufacturing and service sectors.

Books for Study:

- Dale H.Besterfiled, et at., "*Total Quality Management*", Pearson Education Asia, Third Edition, Indian Reprint (2006).
- Janakiraman,B and Gopal, R.K, "*Total Quality Management - Text and Cases*", Prentice Hall (India) Pvt. L, First Edition, 2006

Books for Reference:

- William M. Lindsay, James R. Evans , "*The Management and Control of Quality*", South Western College Publication; 6th edition, 2005.
- John S Oakland, "*TQM: Text with Cases*", A Butterworth-Heinemann Title; 3rd edition, 2003.

E-Resource:

http://www.uop.edu.pk/ocontents/Total%20Quality%20Management%20by%20Dale%20H.%20Besterfield,%20Carol%20BesterfieldMichna,%20Glen%20H.%20Besterfield,%20Mary%20BesterfieldSacre,%20Hemant%20Urdhwareshe,%20Rashmi%20Urdhwarshe%20(z-lib.org).pdf

Open Elective II- BUSINESS ORGANIZATION

Course code	20KUG5EB2	Credits	04	Year	III
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	V

Objectives:

- To understand the different types of business organizations.
- To understand the process of formation of business organization.

Course Outcomes (CO)

CO1	Understand the concept of business.	**K2**
CO2	Gain knowledge to start and run a business effectively in the modern society.	**K2 &K3**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	L	M	L	S	S		L	M	M	S	S
CO2	L	M	L	S	S		L	M	M	S	S

S – Strong; M – Medium; L - Low

Unit-I

Business: Concept- Objectives - Characteristics - Types and Qualities of a good Businessman. Business Organization**:** Concept- Characteristics of an ideal form of Business organization.

Unit-II

Forms of Business Organisation : Sole Trader, Partnership, Joint Stock Companies, Cooperative Organisation and Public Utilities - Merits and Demerits - Memorandum of Association and Articles of Association.

Unit-III

Company Management-Shareholders: Powers, Duties, Responsibilities and Functions- Composition of Board- Board of Directors: Functions -Chief Executive-Managing Director- Legal Restrictions-Provisions in the Companies Act.

Unit-IV

Methods of raising funds: Need and importance of ST & LT finance - Issue of Shares, issue of Debentures- Public deposits - assistance from Govt. and Industrial Financial Institutions borrowings from banks

Unit-V

Rationalisation: Definition- Objectives - Measures -Advantages-Automation-Business Combination: Concept– objectives - Causes - Types – Forms.

Books for Study:

- Y.K. Bhushan, *Fundamentals of Business organization and Management*, Sultan Chand & Sons, 19th edition, 2013.
- R. C. Bhatia, *Business Organisation and Management*, ANE Books, 2012

Books for Reference:

- P.N.Reddy, Principles of Business Organization and Management, S.Chand (G/L) & Company Ltd, 2010.
- KathiresanRatha, Business Organisation– Prasanna Publications. 2006.

MATHEMATICS – III

Course code	20KUG5AL4	Credits	04	Year	III
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	V

Objectives:

- To understand the concepts of solving numerical algebraic equations and transcendental equations.
- To use interpolation and numerical differentiation.
- To provide the basic concepts of Measures of central tendencies and dispersion.

Course Outcomes (CO)

CO1	Solve numerical algebraic equation and transcendental equations.	**K2 &K3**
CO2	Able to solve the real world problems.	**K2 &K3**
CO3	Understand Mathematical techniques and applications.	**K2 &K3**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	M	L	L	L	L		S	M	M	L	L
CO2	M	M	L	L	M		S	M	M	L	L
CO3	M	M	S	L	M		S	M	M	L	L

S – Strong; M – Medium; L - Low

Unit - I

THE SOLUTION OF NUMERICAL, ALGEBRAIC AND TRANSCENDENTAL EQUATIONS: Introduction - The Bisection method -Iteration method - The Method of False Position- Newton's Iteration method.

Unit - II

INTERPOLATION: Introduction - Linear Interpolation - Gregory Newton Forward Interpolation Formula - Gregory Newton Backward Interpolation Formula - Equidistant terms with one or more missing values.

Unit - III

NUMERICAL DIFFERENTIATION: Newton's Forward Difference Formula to compute the Derivatives - Newton's Backward Difference Formula to compute the derivatives - Derivatives using Striling's formula.

Unit - IV

MEASURES OF CENTRAL TENDENCIES: Arithmetic Mean, Median and Mode, Geometric mean, Harmonic mean.

Unit - V

MEASURES OF DISPERSION: Range, Mean deviation, Quartile deviation, Standard deviation, Co-efficient of variation.

Books for Study:

- P.Kandasamy, K.Thilakavathy, K.Gunavathy, *Numerical methods,* 2003 Edition.
- RSN. Pillai &Bhagavathi, *Statistics*, Sultan Chand Publishers, reprint 2002.

Books for Reference:

- M.K.Venkataraman, *Numerical methods for Science and Engineering,* The National publishing company, Fifth Edition,1999.
- P.Navanitham, *Business Mathematics and statistics*, Jain publishers, 2008

CORE VIII: ORGANIZATIONAL BEHAVIOUR

Course code	20KUT5C08	Credits	04	Year	III
No. of Lecture Hours	60	No. of Practical	--	Sem	V

Objectives:

- To develop a sound theoretical knowledge and understanding of organizational behavior.
- To know how the people at work in an organization could be motivated to work together in harmony.
- To orient the student about leadership and perspective of organizational behavior.

Course Outcomes (CO)

CO1	Understand the values and importance to behave in an organization.	**K2**
CO2	Develop the skill of harmony to work together in the organization.	**K2 &K3**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	L	L	L	S	M		L	M	L	S	S
CO2	L	L	L	S	M		L	M	L	S	S

S – Strong; M – Medium; L - Low

UNIT – I

Organizational Behavior: Concept, Historical background, Approaches and Models of OB - Challenges and Opportunities for OB **–Behavioral Science foundation:** Sociology, Psychology & Anthropology.

UNIT – II

Individual Dimension of OB: Personality: Self–esteem, Self-efficacy, perception, values – **Attitude:** Job satisfaction, job involvement, Organizational commitment – **Work Motivation:** Theories (Content, process) – **Job Design:** Job rotation, Job enlargement, Job enrichment– **Learning Theories:** Behaviorist, Cognitive and Social learning, Principles of learning - Punishment & Reinforcement.

UNIT – III

Dynamics of OB: Groups & Teams - Conflict & Negotiation - Stress & Stress management – **Leadership:** Types (Charismatic, Transformational and Substitute), Approaches (Managerial grid approaches, Likert's four system approaches), Skills - Emotional intelligence and managerial test.

UNIT – IV

Perspective of OB: Use and Types of Information Technology in Communication (MIS, Telecommunication, E-mail & Voice messaging) – **Non Verbal Communication:** Body Language & Paralanguage - **Decision making:** Group decision making, Delphi technique, Nominal group technique – Organizational Design – **Organizational culture and climate:** Definition and Characteristics.

UNIT – V

Organizational Change and Development: **Change:** Concept, Planned change, Resistance to change, Merges and Acquisitions - A**nalysis:** Tools, techniques - **Development:** Concept, ESOP (Employee Stock Ownership Plan), Downsizing, Smart sizing

Books for Study:

- Amrik Singh Sudan & Kumar N,*Management Process and Organizational Behaviour,* Anmol Publications, Delhi, 2003.
- Don Hellriegel, John W.Slocum, Richard W.Woodman, *Organizational Behaviour,* South-Western College Publication, 8th Edition, 1997.

Books for Reference:

- Jit S. Chandan, *Organisational Behaviour,* Vikas Publishing House, 3rd Edition, 1999
- Mishra M.N, *Organizational Behaviour,* Vikas Publishing House, First Edition, 2001

MICROPROCESSOR AND MICROCONTROLLER

Course code	20KUT5C09	Credits	04	Year	III
No. of Lecture	60	No. of Practical	--	Sem	V

OBJECTIVES:

- Understand the Architecture and instruction set of 8085 microprocessor.
- Understand the Architecture and instruction set of 8051 microcontroller.
- Understand the concept of interfacing applications

Course Outcomes (CO)

CO1	Understand the architecture, addressing modes and instructions of 8085 Microprocessor.	**K2**
CO2	Understand the architecture, pin diagram of 8051 Microprocessor.	**K2**
CO3	Understand Addressing Modes, Data transfer and Logical instruction of 8051 Microcontroller	**K2**
CO4	Understand Arithmetic and Branching instruction of 8051 Microcontroller	**K2**
CO5	Analyse various interfacing application of 8051 Microcontroller.	**K3 &K4**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	L	S		S	S	S	L	L
CO2	S	S	S	L	S		S	S	S	L	L
CO3	S	S	S	L	S		S	S	S	L	L
CO4	S	S	S	L	S		S	S	S	L	L
CO5	S	S	S	L	S		S	S	S	L	L

S – Strong; M – Medium; L - Low

UNIT I: 8085 MICROPROCESSOR

Introduction – terms related to microprocessor – Architecture of 8085 Microprocessor Pin-out diagram of 8085 – features – of 8085 Instruction formats – Addressing mode – instruction set – Different types of instructions.

UNIT II: 8051MICROCONTROLLER

8051 Architecture – Introduction – The 8051 Oscillator and Clock –Program Counter and Data Pointer –CPU Registers – PSW – Memory Organization – Stack – Special Function Registers –– Timers – Serial Data – Input / Output – Interrupts Structure – Timer Flag Interrupt – External Interrupt – Reset – Interrupt Control – Interrupt Priority – Interrupt Destinations –Pin Configuration of 8051 and their functions.

UNIT III: INSTRUCTIONS I

Addressing modes – Immediate Addressing modes, Register addressing modes, direct addressing modes, indirect addressing modes - Data transfer instructions – Push and Pop Opcode - Logical operations – SFR Bit addresses. Bit level Boolean operations - Rotate and Swap operations.

UNIT IV: INSTRUCTIONS II

Arithmetic instructions flags – Addition - unsigned and signed addition – Subtraction - unsigned and signed subtraction – Multiplication - Division – Detailed Arithmetic – Jump and Call Instructions – Interrupts and Returns

UNIT V: INTERFACING APPLICATIONS

Introduction – interfacing 8051 with 8255 – ADC/DAC interfacing – simple keypad interface – seven segment LED display interfacing – LCD display interfacing – interfacing sensors – interfacing of stepper motor – DC motor interfacing – interfacing traffic light controller

Books for Study:

- R. Theagarajan, *Microprocessor and Microcontroller*, SciTech Publication-2nd edition
- N.Senthil Kumar, M.Saravanan, S.Jeevananthan, *Microprocessors and Microcontrollers*, Oxford University Press, 2010

Books for Reference:

- Kenneth Ayala, *8051 Microcontroller: Architecture, Programming and Applications,* Delmar Cengage Learning, 2nd edition, 1996.
- Sunil Mathur, Microprocessor 8085 and its Interfacing, PHI, 2nd edition, 2011.

DEVELOP HARDWARE PRODUCT FOR MANUFACTURING

Course code	20KUT5C10	Credits	04	Year	III
No. of Lecture	60	No. of Practical	--	Sem	V

OBJECTIVES:

- To understand the concepts of Supplier selection based on material requirement
- To understand the importance of capacity, facility and process planning
- To Understand the working of Electronic testing equipments
- To Test Electronic components
- To Understand the troubleshooting procedure
- To Understand the Quality concern

Course Outcomes (CO)

CO1	Identify Material requirement and selection of supplier	**K1 &K2**
CO2	Understand various planning and work study	**K2**
CO3	Recognize the requirements for developing the hardware product	**K2 &K3**
CO4	Understand the basic troubleshooting procedure in Electronic Equipments	**K2**
CO5	Analyze Quality control and waste management	**K3 &K4**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	M	M	M	S	M		L	M	M	S	S
CO2	M	M	M	S	M		L	M	M	S	S
CO3	S	S	S	L	S		S	S	S	L	L
CO4	S	S	S	L	S		S	S	S	L	L
CO5	S	M	M	S	S		M	S	S	S	S

S – Strong; M – Medium; L - Low

UNIT I: MATERIAL REQUIREMENT AND SUPPLIER SELECTION

Introduction – material requirement planning and control – techniques of material planning – purchasing – objective and parameters of purchasing – purchasing procedure – selection of suppliers – special purchasing systems.

UNIT II: CAPACITY , FACILITY, PROCESS PLANNING AND WORK STUDY

Capacity planning – importance – capacity measurement – planning process for manufacturing and service industry

Facility planning – location facilities – location flexibility – facility design process and techniques – locational break even analysis

Process planning – procedure – characteristics of production process systems – process from selection with PLC

Work study – significance – methods, evolution of normal/standard time – job design and rating.

UNIT III: ELECTRONIC TESTING EQUIPMENTS

Multimeters – Oscilloscope – Digital Oscilloscope – Logic Analyser – Signature analyser – Signal generators – universal bridges – power supplies

UNIT IV: FUNDAMENTALS OF TROUBLESHOOTING PROCEDURES

Making of an Electronic Equipments – Reading drawings and diagrams – Equipment failures – Causes of Equipment failures – Nature of faults – Fault finding aids – Troubleshooting techniques – Approaching components for test – Grounding systems in Electronic equipment – Temperature- sensitive intermittent problems – Corrective actions.

UNIT V: QUALITY CONTROL AND WASTE MANAGEMENT IN INDUSTRY

Types of Quality control – steps in Quality control – objectives and benefits of Quality control – Seven steps for Quality control – causes of variation in Quality control – Statistical process control – Quality circle – TQM

Pollution control – Polluting agents – E-Waste management - Recycling of water – Recovery techniques – Air pollution – Environmental standards – Safety precautions for the personnel.

Books for Study:

- Pannerselvam, *Production and Operations Management*, PHI – Second edition-2010
- S.Anil Kumar & N.Suresh, *Production and Operation management*, New Age International Publication- 2nd Edition-2015

Books for Reference:

- PCB design , Fabrication, Assembly & Testing – Dr. Khandpur- Tata Mc Graw Hill – 2005
- Philip Kiameh,*Electrical Equipment Handbook: Troubleshooting & Maintenance*, The Mc Graw-Hill, Company,Inc – 1996

E-Resource:

- Ebook for production and operation management – www.todaylibrary.com

Open Elective III

1. **PROFESSIONAL ETHICS AND HUMAN VALUES**
2. **INDIAN VALUES**

Open Elective III - PROFESSIONAL ETHICS AND HUMAN VALUES

Course code	20KUG6EA3	Credits	4	Year	III
No. of Lecture Hours	60	No. of Practical Hours	-	Sem	VI

Objectives:

- To understand what morality is and how it connects to professional ethics.
- To understand the features of moral reasoning, moral explanations and the role of moral theories.
- To develop a case resolution model for resolving moral dilemmas faced by professionals.

Course Outcomes (CO)

CO1	Create awareness of Ethics and moral values.	**K1 &K2**
CO2	Understand the importance of Ethics and code of conduct in business.	**K2 &K3**
CO3	Understand social responsibility in business and importance of human values	**K2 &K3**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	L	L	L	S	M		L	L	L	S	S
CO2	L	L	L	S	M		L	L	L	S	S
CO3	L	L	L	S	M		L	L	L	S	S

S – Strong; M – Medium; L - Low

Unit I:Business Ethics

Conceptual approach – Emerging issues – Importance of Ethics – Understanding Ethics – Ethical decision making – Moral problem

Unit II: Managing Ethical Organization

Elements of ethical organization – Manager's role in influencing ethical climate - Codes of ethics – Codes of Contact – Ethical leadership – Ethical organization.

Unit III:Business ethics in Profession

Ethical concern in Human Resource Management (HRM) – Ethical issue in marketing and advertising – Marketing ethics – Ethics in production management – work ethics.

Unit IV:Corporate Governance and social responsibility:

Corporate Governance – Company management – Factors for success – Social responsibility towards stakeholders – Social responsibility of business.

Unit V:Human Values

Wisdom Management – A person of character – Knowledge Management – Understanding success – Stress management

Books for Study:

- R.Subramanian, *Professional Ethics includes Human Values*, Oxford Publication, 2nd edition, 2013.
- M.Govindarajan, S.Natarajan, V.S. Senthilkumar, *Professional Ethics includes Human Values*, PHI Publication, First edition, 2013.

Books for Reference:

- S.K Bhatia, *Business Ethics and Global Values*, Regal Publication, New Delhi, 2008
- Mike W. Martin, *Ethics in Engineering*, McGraw Hill Education, 4th edition, 2017.

Open Elective III - INDIAN VALUES

Course code	20KUG6EB3	Credits	4	Year	III
No. of Lecture Hours	60	No. of Practical Hours	-	Sem	IV

Objective:

- To create an awareness of values promoted in the cultural and spiritual heritage of India and to impart means to inculcate these values for one's personal growth and national development.

Course Outcomes (CO)

CO1	Understand the importance of our cultural and spiritual heritage	**K1 &K2**
CO2	Know the life history of national leaders of our Country.	**K2 &K3**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	L	L	L	S	M		L	L	L	S	S
CO2	L	L	L	S	M		L	L	L	S	S

S – Strong; M – Medium; L - Low

UNIT I- Character formation through Positive personality

Truthfulness, Sacrifice, Sincerity, Self Control, Altruism, Tolerance, Cultivating will-power and character building - Swami Vivekananda's ideas on Personality Development – Strength - Faith in one's self – Self-confidence – Ego, overconfidence and inferiority complex .

UNIT II- Holy Mother Sarada Devi Life

Birth of holy mother- The holy life of Sarada Devi with Bahavan Sri Ramakrishna- Message of Sarada Devi to the world

UNIT III- Yoga's

Introduction to Yoga – Asanas, Pranayama & Meditation – Benefits of Yoga – Four types of Yoga (Karma yoga - Bakthi Yoga- Raja Yoga- Gnana Yoga)- Control of Mind through Yoga & Meditation.

UNIT IV- The inspirational life of Indian leaders

Rabindranath Thagore- Sri. Aurobindo- BalagangatharaThilak- Vinobabave- Nethaji Subash Chandra Bosh- Baghatsingh, Rajaguru, Sukdev- TheeranChinnamalai- Dr. A.P.J. Abdhul Kalam.

UNIT V- Importance days of India

Independence Day -Republic Day- Dandhi Salt March- Jallianwallah Bagh Massacre Day- Sepoy Mutiny- Battle of Plassey- Kargil Victory Day.

Books for Study:

1. Personality development by Swami Vivekananda
2. Holy Mother by Swami Nikhilananda
3. My India, The India Eternal by Swami Vivekananda

SAFETY ENGINEERING

Course code	20KUT6C11	Credits	04	Year	III
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	VI

Objectives:

- To follow standard safety rules and concepts.
- To understand the Safety procedures in material handling.
- To understand the Road and Electrical Safety.

Course Outcomes (CO)dcy

CO1	Understand the importance of safety.	**K2**
CO2	Able to handle the materials and tools safely.	**K2 &K3**
CO3	Follow the road and electrical safety.	**K3**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	M	M	M	S	M		M	M	M	S	S
CO2	S	S	S	S	S		S	S	S	S	S
CO3	S	S	S	S	S		S	S	S	S	S

S – Strong; M – Medium; L - Low

Unit-I Introduction

Evolution of modern safety concept- Safety policy - Safety Organization - line and staff functions for safety- Safety Committee- budgeting for safety - Risk assessment & management - Safety Education and training- Importance, various training methods – First Aid, Resuscitation, Bleeding, management of shock, Burns, scalds and accidents caused by electricity, Rescue and transport of casualty Role of management and role of Govt. in industrial safety, safety analysis.

Unit-II Safety prevention

Definitions and theories, Accident, Injury, unsafe condition, Dangerous occurrence- Cost of accidents- Accident prevention- Safety performance - Personal protective equipment- survey the plant for locations and hazards, part of body to be protected - Economic importance of accidents, Analysis of accident records, accident investigations.

Unit-III Safety in Material Handling

General safety rules, principles, maintenance, Inspections of turning machines, boring machines, milling machine, planning machine and grinding machines, CNC machines, electrical guards, work area, material handling, inspection - Heat treatment operations, paint shops, sand and shot blasting, safety in inspection and testing, pressure vessels, air leak test, steam testing, safety in radiography, personal monitoring devices, radiation hazards.

Unit-IV Shop floor Safety

Automotive vehicle design, selection, operation and maintenance of motor vehicle - Basic automotive road Signals, Symbols, Rules and Regulation - safety on manual, mechanical handling equipment operations - Servicing and maintenance equipment grease rack operation wash rack

operation - battery charging - gasoline handling - other safe practices - preventive maintenance - check lists - motor vehicle insurance and surveys.

Unit-V Electrical Safety

General principles of electric safety - Preventive maintenance - Electricity & Human body - Earthing / Grounding - Safety against over voltage, extra-low and residual voltages - Hazardous areas, Electrical insulation - Energy leakage - Electrical fires and Arc flash - Electrical causes of fire and explosion - National electrical Safety code - Safety in the use of portable tools.

Books for Study:

- C.RayAsfahl ,*Industrial Safety and Health management,* Pearson Prentice Hall, 5th Edition, 2003.
- N.V Krishnan. *Safety Management in Industry* Jaico Publishing House, Bombay, First Edition, 1993.

Books for Reference:

- A.K.Gupta, *Industrial Safety and Environment*, Lakshmi Publication, Third Edition, 2021.
- Mark A. Friend, James P. Kohn, *Fundamentals of Occupational Safety and Health*, Bernan Press, 7th Edition, 2018.

Open Elective IV

1. **ENTREPRENEURSHIP DEVELOPMENT**
2. **HUMAN RESOURCE MANAGEMENT**

Open Elective IV - ENTREPRENEURSHIP DEVELOPMENT

Course code	20KUG6EA4	Credits	04	Year	III
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	VI

Objectives:

- To understand the concept of Entrepreneur and entrepreneurship.
- To gain the knowledge about financial institutions.
- To understand the institutional setup, incentives and subsidies.
- To evaluate business ideas and to prepare the project report.

Course Outcomes (CO)

CO1	Understand concept of finance institutions, project report, incentives and subsidies.	**K2**
CO2	Develop the qualities to become an entrepreneur	**K2 &K3**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	M	M	L	S	M		L	M	M	S	S
CO2	M	M	M	S	M		L	M	M	S	S

S – Strong; M – Medium; L - Low

Unit I: Entrepreneurship

Meaning, Definition, Characteristics and Functions-Role of Entrepreneur in economic development -Types-Qualities of an Entrepreneurs - Classification of Entrepreneurs-Factors Influencing Entrepreneurship – Entrepreneurship development programme – Self Employment schemes – Government policies on Entrepreneurial development.

Unit II: Institutional Finance to Entrepreneurs

State Level Financial Institutions: State Financial Corporation (SFCS) - State Industrial Development Corporation (SIDCS) – Tamilnadu Industrial Investment Corporation (TIIC) - Small Industries Promotion Corporation of Tamilnadu (SIPCOT).

All Indian Financial Institutions:
Industrial Development Bank of India (IDBI) – Industrial Finance Corporation of India (IFCI) – Industrial Credit Investment Corporation of India (ICICI) – Industrial Rural Development Bank of India (IRDBI).

Unit III: Institutional Setup to Entrepreneurs
District Industries Centre (DIC) – National Small Industries Corporation (NSIC) – Small Industries Development Corporation (SIDC) – Small Industries Service Institute (SISI) – Indian Investment Centre – Kadhi and Village Industries (KVIC).

Unit IV: Incentives and Subsidies of State and Central Government
Subsidy For Market – Capital Assistance - Subsidized Services – Taxations, Benefits to SSI – Transport Subsidy – Seed Capital Assistance – Special Facilities for imports.

Unit V: Sources of Ideas
Preliminary Evaluation and Testing of ideas – Demand based industries and Resource based industries - Project Formulation - Project Identification-Evaluation-Feasibility Analysis-Project Report.

Books for Study:

- Dr.Gupta C. B, Dr. Srinivasan N.P.,*Entrepreneurship Development*, S. Chand & Co. Ltd., 2017.
- KhakaSS, *Entrepreneurship Development*, S. Chand & Co. Ltd., Revised Edition, 2007.

Books for Reference:

- Vasant Desai, *The Dynamics of Entrepreneurship Development and Management,* Himalaya Publishing House, 6th edition, 2011
- Radha V, *Entrepreneurship Development*, Prasanna Publication House, 2008.

Open Elective IV -HUMAN RESOURCE MANAGEMENT

Course code	20KUG6EB4	Credits	04	Year	III
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	VI

Objectives:

- To achieve a sound theoretical understanding about Human Resource Management.
- To develop knowledge and skill in handling Human Resource in an organization.
- To orient the student about the social compliance & Social Audit followed by an organization.
- To acquaint the student with the goals of the organization

Course Outcomes (CO)

CO1	Basic understanding and gain knowledge about the role and responsibilities of HR Manager.	**K2**
CO2	Develop the problem solving attitude.	**K2 &K3**
CO3	Develop the qualities to become an HR manager.	**K2 &K3**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	L	L	L	S	M		L	M	M	S	S
CO2	L	L	M	S	M		L	S	M	S	S
CO3	L	L	M	S	M		L	S	M	S	S

S – Strong; M – Medium; L - Low

UNIT – I: Introduction to Human Resource Management:

Human Resource Management: Definition, Objectives, Importance and Functions (An overview of Operative and Managerial) – **HRM Models:** Rational model, Social system model, Human resource development model - **Human Resource Policies**: Meaning, importance, types and formulation - Role of human resource manager.

UNIT – II: Acquiring Human Resources:

Human Resource Planning: Definition, Need, Process – **Job analysis:** Job Description, Job specification – **Recruitment:** Meaning, Sources of Recruitment (internal and external) – e recruitment - Recent trends in Recruitment - **Selection:** Meaning and Steps – Placement and Induction.

UNIT – III: Developing Human Resources:

Employee Training: Meaning, Objectives, Importance, Types, Methods, Needs for Training and Evaluation of Training effectiveness – **Human Resource Development:** Concept, Need, Interventions – **Performance Appraisal:** Objectives, Uses and **Methods:** Traditional and Modern methods (720 Degree performance appraisal system), Barriers of performance appraisal - Career planning, Succession planning and Competency map.

UNIT – IV: Compensation, Retaining and Controlling of Human Resource:

Wage and Salary Administration: Concept and Methods of Wages – Theories - Incentives – Job evaluation - Employee Benefits and Services. **Retaining of Human Resource**: Promotion:

Meaning, purpose, types – Demotion – Transfer – Separation. **Controlling of Human Resource**: Human Resource Records: Meaning, objectives, importance, types and Principles of Record

Keeping – Human Resource Reports – Human Resource Audit : Meaning, objectives, importance and scope – Human Resource Research: Meaning, objectives and techniques.

UNIT – V: Strategy of quality management:

Social Compliance: Definition, Meaning and Significance – **Social Compliance Audit:** Purpose, Obligations of employers, Audit process – **Social Compliance Standard:** SA 8000 (Social Accountability 8000) – **Social Compliance Training:** GSCP (Global Social Compliance Programme) – **Social Compliance Certification:** Principles, Significance of WRAP (Worldwide Responsible Accredited Production).

Strategy of quality management: Six Sigma, Keizen, TQM, TPM, QMS - ISO Systems, ISO Certification Schemes, **ISO types:** ISO 9001, 14001, ISO/TS 16949– Preparing an Organization for ISO Certification - **Quality assurance:** Mckinesey's 7s frame work, HR out sourcing – People Capacity Maturity Model (PCMM).

Books for Study:

- Biswajeet Pattanayak, *Human Resource Management*, Prentice Hall of India Private Ltd, 3rd Edition, 2005.
- Decenzo and Robbins, *Personnel/Human Resource Management*, Prentice Hall, 3rd Edition, 1987.

Books for Reference:

- Jayagopal R, *HRD Conceptual Analysis and Strategies*,Sterling, 1992
- Lynton and Pareek, *Training for Development*, SAGE India, 3rd Edition, 2011.

E-Resource:

https://www.kkahuja.com/books/HumanResourceManagement-DiscerningSlice.pdf

MICROPROCESSOR AND MICROCONTROLLER LAB

Course code	20KUTE6P3	Credits	04	Year	III
No. of Lecture	--	No. of Practical	120	Sem	VI

Course Outcomes (CO)

CO1	Able to write an Assembly Language Arithmetic program of 8085 Microprocessor and 8051 Microcontroller.	**K3 &K4**
CO2	Able to write an Assembly Language Interfacing program of 8051 Microcontroller.	**K3 &K4**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	L	M		S	S	S	L	L
CO2	S	S	S	L	M		S	S	S	L	M

S – Strong; M – Medium; L - Low

8085 MICROPROCESSOR

Write an Assembly Language Program to

1. Add two 8 bit numbers using 8085 Microprocessor.
2. Subtract two 8 bit numbers using 8085 Microprocessor
3. Multiply two 8 bit numbers using 8085 Microprocessor
4. Divide two 8 bit numbers using 8085 Microprocessor.

8051 MICROCONTROLLER

Write an Assembly Language Program to

1. Addition and Subtraction of two 8 bit numbers using 8051 Microcontroller.
2. Multiplication and Division of two 8 bit numbers using 8051 Microcontroller.
3. Arranging the given data in ascending order.
4. Square Root of a given number.
5. Solve the given Boolean Equation.

INTERFACING PROGRAMS

1. Interfacing the 4*4 Key MATRIX with 8279
2. Interfacing push to on switches and relays with 89C51.
3. Interfacing the two Digit Seven segments LED with 8051.
4. Interfacing ADC 0808 with 89C51.
5. Interfacing of the given DC Motor with Microcontroller.
6. Interfacing of stepper Motor with Microcontroller.

PROJECT

Course code	20KUTE6PR	Credits	04	Year	III
No. of Lecture	--	No. of Practical	120	Sem	VI

Course Outcomes (CO)

CO1	Develop Electronic Hardware working model suitable for real practical environment.	**K3 &K4**
CO2	Develop the production plan	**K3 &K4**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S		S	S	S	S	S
CO2	S	S	S	S	S		S	S	S	S	S

S – Strong; M – Medium; L - Low

Develop Electronic Hardware working model suitable for real practical environment by implementing the theoretical and practical knowledge gained through the curriculum.

Develop the production plan by considering the following parameters

a)) Material Requirement

b) Analyze the specification and quantity of required Electronic components

c) Cost estimation.

d) Time and resource required for completing a product

e) Man power planning

f) Maintain proper documents and reports wherever required

INTERNSHIP TRAINING-III

Course code	20KUTE6I3	Credits	20	Year	III
No. of Lecture	--	No. of Practical	1200	Sem	VI

OBJECTIVES:

- To Understand the work requirement
- To Understand the customer and market requirement
- To Develop product
- To Report and document completion of work
- To Follow quality procedures

Course Outcomes (CO)

CO1	Gain practical knowledge along with work experience in addition to their academic credits	**K3 &K4**
CO2	Develop the skills which are required to get employment or to become an Entrepreneur.	**K2 &K3**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	PSO2	PSO3	PSO4	PSO5		PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S		S	S	S	S	S
CO2	S	S	S	S	S		S	S	S	S	S

S – Strong; M – Medium; L - Low

Students should undergo internship training in an esteemed Electrical and Electronic concern to gain hands on practice and practical industrial exposure. Students are expected to submit their daily work report at the time of examination.

SCHEME OF EXAMINATION
(For General Education and Vocational Education Component)

General Rule of Examination:

Every student should earn a minimum attendance of 75% to become eligible to appear for Semester Examinations.

To pass in an examination, a student has to score a minimum of 40% marks in each theory & practical paper (Internal and External combined but with a minimum of 40% marks in internal and external).

Evaluation of student's performance for the theory, practical and Internship Training part includes two components.

Components	Internal Marks	External Marks	Total Marks
General and Vocational Component (Theory)	50	50	100
Vocational Component (Practical)	50	50	100
Vocational Component (Internship Training)	100	300	400

Continuous Internal Assessment:

Two CIA tests conducted for each paper during each semester.

CIA for General and Vocational component (Theory):

S.No	Type	Units	Max. Marks
1.	CIA test – I	1 & 2	**20 Marks**
2.	CIA test – II	3, 4 & 5	**25 Marks**
Total			**45 Marks**

Internal Marks (Theory):

Internal Marks- Break up (50 Marks)		
A	CIA – I & CIA – II test (45 marks converted to 30 Marks)	**30 Marks**
B	Percentage of Attendance 95% - and above - 10 Marks 90% - 94% - 8 Marks 85% - 89% - 6 Marks 81% - 84% - 4 Marks 75% - 80% - 2 Marks	**10 Marks**
C	Marks for Assignment / Seminar	**10 Marks**
Total		**50 Marks**

Internal Marks (Practical):

Internal Marks- Break up (100 Marks)		
A	Model practical Examination	**50 Marks**
B	Percentage of Attendance 95% - and above - 10 Marks 90% - 94% - 8 Marks 85% - 89% - 6 Marks 81% - 84% - 4 Marks 75% - 80% - 2 Marks	**10 Marks**
C	Record Note	**20 Marks**
D	Overall performance in the class	**20 Marks**
Total		**100 Marks**

Total 100 marks will be converted to 50 marks and the same will be awarded as an internal mark for practical.

Internal Marks (Internship Training):

Internal Marks- Break up (100 Marks)		
A	Model Examination	**50 Marks**
B	Internship Report Note	**50 Marks**
Total		**100 Marks**

QUESTION PAPER PATTERN

1) The question paper pattern and coverage of syllabus for each CIA and External (semester) examinations for all General and vocational component subjects except Environmental Studies.

CIA TEST – I
(Unit 1 & 2 only)

Time: 1Hour **Max. Marks: 20**

Part - A	**No choice** (Five questions from unit 1 & 2)	**5 x 2 = 10**
Part – B	**Two out of three** (Three questions from unit 1 & 2)	**2 x 5 = 10**

CIA TEST – II
(Unit 3, 4 & 5 only)

Time: 1½ Hour **Max. Marks: 25**

Part - A	**No choice** (Five questions from unit 3, 4 & 5)	**5 x 2 = 10**
Part – B	**Answer any Three questions out of Five** (Five questions from unit 3, 4 & 5)	**3 x 5 = 15**

SEMESTER EXAMINATION
(All Five Units)

Time: 2 Hours **Max. Marks: 50**

Part - A	**No Choice** (Ten questions from All five units)	**10 x 2 = 20**
Part – B	**Answer any Five questions out of Eight** (Eight questions from All five units)	**5 x 6 = 30**

2) Both internal Assessment and Semester Examination **for Environmental Studies (III semester- General Component)** will be conducted through online exam.