Sri Ramakrishna Mission Vidyalaya College of Arts and Science

(AUTONOMOUS)

For Students admitted from 2020-2021 & onwards

COURSE OF STUDY

- Syllabus is framed for B.VOC (Automobiles) 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 Automobiles provides the practical learning environment for the students which aim to meet out the industrial requirements in the field of Automobiles 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 knowledge of vehicle science and automobile fundamentals in the field of competitive automotive field.

PSO2. Understand the applications of electrical, electronics and hydraulic devices in the field of Automobile.

PSO3. Diagnose the automotive system failures and repair / replace the components / systems so as to bring the vehicle in original condition.

PSO4. Ability to work in an industry as a team member as well as an individual with professional qualities and evolve oneself for lifelong learning.

PSO5. Ability to lead professionally in an industrial environment by applying managerial and technical skills related to Research and development, production and service activities.

SCHEME OF EXAMINATION

SEMESTER – I

Subject Code	Part	Name of the Subject	Lecture / Practical Hrs		Duration of Exam in Hours	Marks		Total Marks	Credits
			Lecture	Practical / Field Work		Internal	External		
GENERAL EDUCATION COMPONENT									
20KUG 1TA1	I	Tamil I	60	-	2	50	50	100	4
20KUG 1EN1	II	Basic English	60	-	2	50	50	100	4
20KUG 1AL1	III	Allied I: Mathematics- I	60	-	2	50	50	100	4
Sub Total (A)			**180**	**-**	**06**	**150**	**150**	**300**	**12**
VOCATIONAL EDUCATION COMPONENT									
20KUA 1C01	III	Core I: Basic Automobile Technology	60	-	2	50	50	100	4
20KUA 1C02	III	Core II: Automotive Electrical and Electronics	60	-	2	50	50	100	4
Sub Total (B)			**120**	**-**	**04**	**100**	**100**	**200**	**08**
Total (A +B)			**300**	**-**	**10**	**250**	**250**	**500**	**20**

T-Theory

P-Practical

SEMESTER – II

Subject Code	Part	Name of the Subject	Lecture / Practical Hrs		Duration of Exam in Hours	Marks		Total Marks	Credits
			Lecture	Practical / Field Work		Internal	External		
GENERAL EDUCATION COMPONENT									
20KUG2TA2	I	Tamil II	60	-	2	50	50	100	4
20KUG2EN2	II	Professional English	60	-	2	50	50	100	4
20KUG2AL2	III	Allied II: Office Automation	60	-	2	50	50	100	4
Sub Total (A)			**180**	**-**	**06**	**150**	**150**	**300**	**12**
VOCATIONAL EDUCATION COMPONENT									
20KUA2C03	III	Core III: Automobile Technology and Maintenance	60	-	2	50	50	100	4
20KUAT2P1	III	Practical I: Automotive Electrical and Electronics Lab	-	60	3	50	50	100	2
20KUAT2P2	III	Practical II: Automobile Repair and Maintenance Lab –I	-	60	3	50	50	100	2
20KUAT2I1	III	Internship Training-I	-	1200	3	100	300	400	20
Sub Total (B)			**60**	**1320**	**11**	**250**	**450**	**700**	**28**
Total (A+B)			**240**	**1320**	**17**	**400**	**600**	**1000**	**40**

T-Theory

P-Practical

SEMESTER – III

Subject Code	part	Name of the Subject	Lecture / Practical Hrs		Duration of Exam in Hours	Marks		Total Marks	Credits
			Lecture	Practical/ Field Work		Internal	External		
GENERAL EDUCATION COMPONENT									
20KUG3EN3	II	Technical Communication	60	-	2	50	50	100	4
20KUG3AL3	III	Allied III: Mathematics-II	60	-	2	50	50	100	4
20KUG3ENS	IV	Environmental studies	60	-	2	50	50	100	4
Sub Total (A)			**180**	**-**	**06**	**150**	**150**	**300**	**12**
VOCATIONAL EDUCATION COMPONENT									
20KUA3C04	III	Core IV: Advanced Automobile Technology	60	-	2	50	50	100	4
20KUA3C05	III	Core V: Automobile Repair and Maintenance	60	-	2	50	50	100	4
Sub Total (B)			**120**	**-**	**04**	**100**	**100**	**200**	**08**
Total (A +B)			**300**	**-**	**10**	**250**	**250**	**500**	**20**

T-Theory

P-Practical

SEMESTER – IV

Subject Code	Part	Name of the Subject	Lecture / Practical Hrs		Duration of Exam in Hours	Marks		Total Marks	Credits
			Lecture	Practical / Field Work		Internal	External		
GENERAL EDUCATION COMPONENT									
20KUA4C06	III	Core VI: Technical Drawing	60	-	2	50	50	100	4
20KUG4EA1/ 20KUG4EB1	III	**Open Elective I**	60	-	2	50	50	100	4
20KUG4VAD	IV	Value education-Indian Cultural heritage	60	-	2	50	50	100	4
Sub Total (A)			**180**	**-**	**06**	**150**	**150**	**300**	**12**
VOCATIONAL EDUCATION COMPONENT									
20KUA4C07	III	Core VII: Automotive Safety	60	-	2	50	50	100	4
20KUAT4P3	III	Practical III: Workshop Technology Lab-I	-	120	3	50	50	100	4
20KUAT4I2	III	Internship Training-II	-	1200	3	100	300	400	20
Sub Total (B)			**60**	**1320**	**08**	**200**	**400**	**600**	**28**
Total (A +B)			**240**	**1320**	**14**	**350**	**550**	**900**	**40**

T-Theory

P-Practical

SEMESTER – V

Subject Code	Part	Name of the Subject	Lecture / Practical Hrs		Duration of Exam in Hours	Marks		Total Marks	Credits
			Lecture	Practical / Field Work		Internal	External		
GENERAL EDUCATION COMPONENT									
20KUG5EA2/20KUG5EB2	II	**Open Elective II**	60	-	2	50	50	100	4
20KUG5AL4	III	Allied IV: Mathematics –III	60	-	2	50	50	100	4
20KUA5C08	III	Core VIII: Organizational Behavior	60	-	2	50	50	100	4
Sub Total (A)			**180**	**-**	**06**	**150**	**150**	**300**	**12**
VOCATIONAL EDUCATION COMPONENT									
20KUA5C09	III	Core IX: Workshop Supervising and Management	75	-	2	50	50	100	5
20KUAT5P4	III	Practical IV: Workshop Practice Lab	-	90	2	50	50	100	3
Sub Total (B)			**75**	**90**	**04**	**100**	**100**	**200**	**08**
Total (A +B)			**255**	**90**	**10**	**250**	**250**	**500**	**20**

T-Theory

P-Practical

SEMESTER – VI

Subject Code	Part	Name of the Subject	Lecture / Practical Hrs		Duration of Exam in Hours	Marks		Total Marks	Credits
			Lecture	Practical / Field Work		Internal/Theory	External /Practical		
GENERAL EDUCATION COMPONENT									
20KUG6EA3 /20KUG6EB3	III	**Open Elective III**	60	-	2	50	50	100	4
20KUA6C10	III	Core X: Safety Engineering	60	-	2	50	50	100	4
20KUG6EA4 /20KUG6EB4	III	**Open Elective IV**	60	-	2	50	50	100	4
Sub Total (A)			**180**	**-**	**06**	**150**	**150**	**300**	**12**
VOCATIONAL EDUCATION COMPONENT									
20KUAT6PR	III	Project	-	240	3	50	50	100	8
20KUAT6I3	III	Internship Training-III	-	1200	3	100	300	400	20
Sub Total (B)			**-**	**1440**	**06**	**200**	**400**	**600**	**28**
Total (A +B)			**180**	**1440**	**12**	**350**	**550**	**900**	**40**

T-Theory

P-Practical

COURSE	CREDITS	MARKS
Language	8	200
English	12	300
Part III: Core & Elective ,Allied	152	3500
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.

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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.

Text Books:

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

Reference Books:

- 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.

Text Books:

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

Basic Automobile Technology

Subject code	20KUA1C01	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	I

Course outcomes (CO):

CO1	Realize the Construction, working and other fine points of Internal Combustion Engines used in automobiles.	**K2**
CO2	Attain the concept of automotive transmission system	**K1 & K2**
CO3	Explicate the working principle of transmission and components of driveline system.	**K2**
CO4	Understand the need of tyre and various braking system in automobile	**K2**

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

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

S – Strong; M – Medium; L – Low

UNIT – I

Constructional details of spark ignition (SI) and compression ignition (CI) engines. Working principles. Two stroke SI and CI engines – construction and working. Comparison of SI and CI engines and four stroke and two stroke engines. Engine classification, firing order. Otto, diesel and dual cycles.

UNIT – II

Clutch – Types and Construction – Gear Boxes, Manual and Automatic Types and Construction – Simple Floor Mounted Shift Mechanism – Over Drives – Transfer Box– Propeller shaft – Slip Joint – Universal Joints – Differential and Rear Axle – Hotchkiss Drive and Torque Tube Drive.

UNIT – III

Requirement of Suspension System, Types of Suspension Springs, Constructional details and characteristics of Single Leaf, Multi–Leaf spring, Coil and Torsion bar Springs, Rubber, Pneumatic and Hydro – elastic Suspension Spring Systems, Independent Suspension System, Shock Absorbers, Types and Constructional details of Leaf and Coil Springs.

UNIT – IV

Basic construction of chassis, Types of Chassis layout, with reference to Power Plant location and drive, various, types of frames, Types of Front Axles and Stub Axles. Steering system – Ackerman's and Davi's Steering Mechanisms - principle of steering – front end geometry – castor, camber, king pin inclination, toe-in, toe-out on turns – steering gear box – types – Over Steer and Under Steer and Power Steering.

UNIT – V

Types and Construction of Hydraulic Braking System, Mechanical Braking System, Pneumatic Braking System, Power–Assisted Braking System, Servo Brakes – antilock braking systems(ABS) - Wheels and Tyres.

Text Book:

1. Dr. Kirpal Singh, "Automobile Engineering", Vol 1&2, 13th Edition, Standard Publishers, New Delhi, 2020.
2. Prof. R.B. Gupta, "Basic Automobile Engineering ", Satya Publishers, New Delhi, 2016.

Reference Book:

1. John B.Heywood, "Internal Combustion Engine Fundamentals", 1st edition, McGraw Hill Education, India, 2017.
3. Er. R .K Rajput, "A Textbook of Automobile Engineering", Laxmi Publications, Chennai, 2017.

Automotive Electrical and Electronics

Subject code	20KUA1C02	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	I

Course objectives:

- Fathom the construction and applications of Electrical and electronics components in various automotive electrical circuits.
- Identify, demonstrate and compare the various components and systems of Automotive electrical and electronics system.
- Ascertain the concepts and develop basic skills necessary to diagnose automotive electrical problems.

Course outcomes (CO):

CO1	Enumerate the basic terminologies, components and concepts of Automotive electrical and Electronics systems in automobiles	**K1&K2**
CO2	Explain the construction, characteristics and maintenance of starting and ignition system	**K2**
CO3	Enlighten purpose, circuits, construction and working of components of lighting and accessories system.	**K2**
CO4	Interface automotive sensors, actuators with microcontrollers and various future technologies of vehicle.	**K2 & K3**

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

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

CO1: S – Strong; M – Medium; L – Low

UNIT–I

Ohm's law- Kirchoff's Law – voltage, power, current (AC/DC), resistance, Capacitors, magnetism and electromagnetic induction, vehicle earthing – Electrical symbols – electrical safety procedures – Wiring and lighting circuits and their components – Different types of Batteries – principle, rating, testing and charging.

UNIT-II

Charging system and its components – Starting system and its components – Types of starter motors and its drives – Different Types ignition systems – Diagnose troubles in starting system – Carry out various tests on starter motor – Servicing of starter motor – Diagnose troubles in charging system–Carry out various tests in charging system–Servicing of alternator.

UNIT-III

Lighting system: insulated and earth return system, details of head light and side light, LED lighting system, head light dazzling and preventive methods – Horn, wiper system and trafficator. DC Generators and Alternators their characteristics. Control unit – cut out, electronic regulators. Spark plugs. Advance mechanisms. Electronic fuel injection systems, mono and multi point fuel injection system, Air conditioning system

UNIT-IV

Current trends in automotive electronic engine management system, electromagnetic compatibility, electronic dashboard instruments, onboard diagnostic system, security and warning system, Fingerprint technologies, Types of sensors, Wind screen washers & wipers, Headlight wipers & washers, Engine cooling fan motors. Electronic speed control

UNIT-V

Anti theft system, keyless entry system, Immobilizer system design, voice warning system, road navigation system, , Smart Cars and Traffic system, Wi–Fi cars ,blue Tooth, Applications, Vision Enhancement, Microprocessor and microcomputer controlled devices in automobiles such voice warning system, travel information system, Electronic protection system, electronic steering system.

Text books:

1. Babu A. K, "Automotive Electrical and Electronics ", 2nd Edition, Khanna Publishers, 2018
2. Dr. Kirpal Singh, "Automobile Engineering", Vol 1 & 2, 13th Edition, Standard Publishers, New Delhi, 2020.

Reference Book:

1. Tom Denton , "Automobile Electrical and Electronic Systems", 5th Edition, Routledge Publisher, 2017.
2. William B.Ribbens, "Understanding Automotive Electronics: An Engineering Perspective, Eighth Edition, Elsevier Inc, 2017.

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.

Text Books:

- 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.

Text Books:

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

Reference Books:

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

Automobile Technology and Maintenance

Subject code	20KUA2C03	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	II

Course objective:

- Understand the complete knowledge of the vehicle maintenance procedures and acquire skills.
- Understand the functional of each system, Component and aggregate (Including both Mechanical and Electrical aggregates) of a Vehicle.
- Identify and change vehicle components requiring change due to continuous wear and tear (including oil and air filters in the engine aggregate).

Course outcomes (CO):

CO1	Understand diagnose procedures: repairing, overhauling and troubles in petrol and diesel engine and sub system.	**K2&K3**
CO2	Enlighten the principle of cooling & various lubrication systems.	**K2**
CO3	Understand the fundamentals, principle of operation and Performance of various clutches, gear boxes, Axles, etc.,	**K4**
CO4	Illustrate the basic concepts of steering, brake, suspension and wheel maintenance.	**K2 & 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	M	S	M		S	M	S	M	L
CO3	S	S	M	S	M		S	S	S	M	L
CO4	S	S	S	M	S		S	S	S	M	L

S – Strong; M – Medium; L – Low

UNIT – I

Petrol Engine– Working principle – Major components – Petrol supply system and its components – Carburetor – Petrol pump and injectors of MPFI engine – Various sensors and its uses – Diagnosing troubles in petrol supply system.

UNIT – II

Diesel Engine– Working principle – Major components - Diesel supply system and its components – Individual injection system –Diesel pump – Injectors – Filters - CRDI –Air supply system – Air cleaners - Diagnosing troubles in diesel supply system.

UNIT – III

Cooling system and its components – Types of cooling systems – Coolants used – Antifreeze solution - Lubrication system and its components – Types of lubrication systems – Types of lubricants – Properties and SAE grade of lubricating oils –Diagnosis of troubles in cooling system and lubricating system.

UNIT – IV

Clutch – Types – Function – Fluid flywheel – Torque convertor – Hydraulic assisted clutch – Clutch adjustments – Gear box – Types – Functions – Constant mesh gear box – Synchromesh gear box – Manual and automatic gear boxes – Planetary gears. Transfer box – Trans axle arrangement – Propeller shaft and universal joints – Rear axle and differential – Final drives – Diagnosing troubles in clutch, gear box and rear axles.

UNIT – V

Steering system – Types – Components – Rack and pinion, Warm and sector and re-circulating ball and nut steering gear boxes – Electronics control of steering system – Wheel alignments. Suspension systems – Conventional suspension – Independent suspension system for front and rear wheels – Types of springs and shock absorbers – Stability control – Air suspension with electronic control – Diagnosing troubles in steering system and suspension system.

Text Book:

1. Dr. Kirpal Singh, "Automobile Engineering", Vol 1 & 2, 13th Edition, Standard Publishers, New Delhi, 2020.
2. K.K Jain, R.B Asthana"Automobile Engineering", McGraw Hill Education; 1st edition, 2017.

Reference Book:

1. Jigar A. Doshidhruv U. Panchaljayesh P. Maniar, "Vehicle Maintenance and Garage Practice", PHI Learning Pvt. Ltd.,2014.
2. Ed May, "Automotive Mechanics Volume One" and Two, Mc Graw Hill Publications, 2009.

Automotive Electrical and Electronics Lab

Subject code	20KUAT2P1	Credits	02	Year	I
No. of Lecture Hours	--	No. of Practical Hours	60	Sem	II

Course objectives:

- Comprehend the concepts and develop basic skills necessary to diagnose automotive electrical problems.
- Understand the Starting, and charging, lighting systems, advanced automotive electrical systems, to include body electrical accessories and basic computer control.
- Acquaintance the testing procedure for electrical and electronics system in automobile.

Course outcomes (CO):

CO1	Ability to rectify the faults in electrical and electronics systems.	**K2&K4**
CO2	Fathom the battery testing and maintenance.	**K1 & K2**
CO3	Understand the testing of starting motors, generators and alternators.	**K2**
CO4	Describe the Diagnosis of ignition system faults.	**K2 & K4**

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

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

S – Strong; M – Medium; L – Low

1. Testing, charging and discharging of lead acid battery used in automobiles,
2. Testing and troubleshooting of starting system in automobiles
3. Starter motor component test
4. Testing and troubleshooting of charging system in automobiles
5. Alternator component test
6. Testing and troubleshooting of lighting system in automobiles
7. Testing of lighting conventional analog instrumentation, indicator light, warning devices
8. Testing of electrical accessories in automobiles
9. Study & testing of conventional ignition system

Automobile Repair and maintenance Lab-I

Subject code	20KUAT2P2	Credits	02	Year	I
No. of Lecture Hours	--	No. of Practical Hours	60	Sem	II

Course objectives:

- Recognize various maintenance and reconditioning of vehicle parts.
- Identify the fault responsible for vehicle trouble
- Understand the fundamental knowledge in evaluation and maintenance
- Recognize the various methods of maintaining vehicles and their subsystems

Course outcomes (CO):

CO1	Understand the general procedures for servicing and maintenance schedule.	**K1&K2**
CO2	Expose the safety aspects with respect to man, machine and tools.	**K1 & K2**
CO3	Demonstrate the procedure for reconditioning and repairing of various component and subsystems of vehicles.	**K2 & K4**
CO4	Perform dismantling & assembling of automobile components by using tools.	**K2 & K3**

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

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

S – Strong; M – Medium; L – Low

1. Tools and instruments required for maintenance
2. Safety aspects with respect to man, machine and tools
3. General procedures for servicing and maintenance schedule
4. Minor and major tune up of gasoline and diesel engines
5. Dismantling, Studying and Assembling the piston and connecting rod assembly.
6. Dismantling, Studying and assembling the given fuel injection pump.

7. Dismantling, Studying and Assembling the given Single plate clutch assembly and to practice to adjust clutch free play.
8. Dismantling, Studying and assembling the given type of gearbox.
9. Determine the gear ratio, final transmission ratio and overall ratio for a gear box.
10. Learning to overhaul adjust the brake shoe‘and bleed the air‘in the hydraulic brake system.
11. Dismantling, studying and assembling the given steering gearbox, and also knowing to adjust the backlash and end play.
12. Measure wheel base, wheel track, ground clearance, angle of approach, minimum turning circle radius for a vehicle, steering ratio, lock-to-lock angle.

Internship Training –I

Subject code	20KUAT2I1	Credits	20	Year	I
No. of Lecture Hours	--	No. of Practical Hours	1200	Sem	II

Objectives:

- To develop skills in the application of theory to practical work situations, skills and techniques directly applicable to their careers. Internships will increase a student's sense of responsibility and good work habits.
- To expose students to real work environment experience gain knowledge in writing report in technical works/projects. Internship programs will increase student earning potential upon graduation.
- To build the strength, teamwork spirit and self-confidence in students life, creativity skills and sharing ideas.
- To build a good communication skill with group of workers and learn to learn proper behavior of corporate life in industrial sector. The student will be able instilled with good moral values such as responsibility, commitment and trustworthy during their training.

Course outcomes (CO):

CO1	Understanding career field, including the skills and responsibilities.	**K1&K2**
CO2	Develop effective work habits, including time management, punctuality and inter personal skills.	**K2& K3**
CO3	Exhibit critical thinking and problem solving skills by analyzing underlying issues to challenges in Automotive engineering.	**K3 & K4**
CO4	Articulate career options by considering opportunities in company, sector, industry, professional and educational advancement in Automotive engineering.	**K3 & K4**

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

2.	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

S – Strong; M – Medium; L – Low

Students should undergo internship training in an esteemed Automobile service 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

Text Books:

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

Reference Books:

- 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 $cos\ n\theta, sin\ n\theta$ and $tan\ n\theta$ - Expansion of $sin\theta$ and $cos\theta$ in a series of ascending powers of θ.

Unit - V

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

Text Books:

- 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.

Reference Books:

- 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.

Text Books:

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

Reference Books:

- 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.

Advanced Automobile Technology

Subject code	20KUA3C04	Credits	04	Year	II
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	III

Objectives:

- Acquire knowledge of alternate fuels.
- Illustrate the new generation vehicles and their operation and controls
- Describe the advanced vehicles and their operation and controls.

Course outcomes (CO):

CO1	Understand the availability of alternate fuels and other alternate Energy sources.	**K2**
CO2	Make out the advanced engine function concepts.	**K1 & K2**
CO3	Understand the Emission norms, standards and emission control systems.	**K2**
CO4	Understand the recent development and technologies of Automobile Engineering.	**K2**

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

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

S – Strong; M – Medium; L – Low

Unit – I

Introduction to alternative fuels. - Need for alternative fuels - Availability of different alternative fuels for SI and CI engines - Various vegetable oils and their important properties -Different methods of using vegetable oils engines – Performance in engines – Performance, Emission and Combustion Characteristics in diesel engines.

Unit – II

Air assisted Combustion, Homogeneous charge compression ignition engines – Hydrogen, Compressed Natural Gas, Liquefied Petroleum Gas and Bio Diesel - Properties, Suitability, Merits and Demerits - Engine Modifications.

Unit – III

Layout of an electric vehicle, advantage and limitations, specifications, system components, electronic control system, high energy and power density batteries, hybrid vehicle, fuel cell vehicles, solar powered vehicles.

Unit-IV

Emission norms – EURO, USA, JAPAN and INDIA - Controlling of pollutants from engine – catalytic converters – Char coal canister control for evaporative emission – Positive crank case ventilation system for Un-burnt hydro carbon emission reduction – Fumigation EGR (Exhaust gas recirculation) – Silencer design on sound reduction in automobiles – Exhaust gas analyzer – Smoke meter – Smoke emissions from engines.

Unit–V

Preparation and maintenance of proper road network - National highway network with automated roads and vehicles - Satellite control of vehicle operation for safe and fast travel, GPS.

Textbook:

1. S Srinivasan ,"Automotive Mechanics" Mc Graw Hill Publications,2017.
2. Dr. Kirpal Singh, "Automobile Engineering", Vol 1 & 2, 13th Edition, Standard Publishers, New Delhi, 2020.

Reference Book:

1. Heinz, "Modern Vehicle Technology" Second Edition, Bu.
3. R. K. Rajput,"A Text Book of Automobile Engineering". Publisher, Firewall Media, 2011.

Automobile Repair and Maintenance

Subject code	20KUA3C05	Credits	05	Year	II
No. of Lecture Hours	75	No. of Practical Hours	--	Sem	III

Objectives:

- Understanding the complete knowledge of the vehicle procedure and acquire skills in handling situations where the vehicle is likely fail.
- Understand various types of maintenance of vehicles and features and applications.
- Analysis various Trouble shooting, fault tracing practices available in automobile
- Recognize the various methods of maintaining vehicles and their subsystems.

Course outcomes (CO):

CO1	Understand the various methods of maintenance and techniques.	**K2&K4**
CO2	Demonstrate the maintenance procedure for automotive transmission systems.	**K1 & K2**
CO3	Illustrate trouble diagnosis procedure for lubrication and fuel delivery system.	**K2**
CO4	Developing the ideas on trouble diagnosis procedure for electrical and electronic systems in automobiles.	**K2 & K4**

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

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

S – Strong; M – Medium; L – Low

Unit–I

Maintenance – Need, importance, primary and secondary functions, policies – classification of maintenance work – vehicle insurance – basic problem diagnosis. Automotive service procedures – workshop operations – workshop manual – vehicle identification – Safety – Personnel, machines and equipment, vehicles, fire safety – First aid. Basic tools – special service tools – measuring instruments – condition checking of seals, gaskets and sealants. Scheduled maintenance services – service intervals – Towing and recovering.

Unit–II

Basic construction of chassis – Types of Chassis layout – with reference to Power Plant location and drive – various types of frames, Loads acting on vehicle frame – Types of Front

Axles and Stub Axles – Front Wheel Geometry – Condition for True Rolling Motion – Driving Thrust and its effects, torque reactions and side thrust, Hotchkiss drive, torque tube drive, radius rods and stabilizers, Propeller Shaft, Universal Joints, Constant Velocity Universal Joints, Final drive, different types of final drive, Worm and Worm wheel, straight bevel gear, spiral bevel gear and hypoid gear final drive. Differential principle – Constructional details of differential unit, Differential housings and Non–Slip differential, differential locks.

Unit–III

Dismantling of engine components and cleaning – cleaning methods – visual and dimensional inspections – minor and major reconditioning of various components (like engines and fuel system, ignition systems, suspension system, Braking System, etc), reconditioning methods – engine assembly – engine tune up.– special tools used for maintenance and overhauling – Mechanical and automotive clutch and gear box servicing and maintenance and servicing of propeller shaft and differential system – Maintenance and servicing of suspension systems – Brake systems, types and servicing techniques. Steering systems – overhauling and maintenance. – Wheel alignment – computerized alignment and wheel balancing.

Unit–IV

Servicing and maintenance of fuel system of different types of vehicles – calibration and tuning of engine for optimum fuel supply – Maintenance of cooling systems and its components – water pump, radiator, thermostat – anticorrosion and antifreeze additives. Lubrication maintenance – lubricating oil changing – greasing of parts. Vehicle body maintenance – minor and major repairs – Door locks and window glass actuating system maintenance.

Unit–V

Batteries and power storage system, power–generating systems – electrical wire harness – lighting, ignition – electronic and air conditioning systems etc – energy recuperation systems – electronic active and passive safety – comfort and convenience supplementary restraint systems (SRS) – networking and other systems – electronic control unit – ECU / ECM and sensors – Diagnosing troubles in Electrical and Electronics equipments.

Text Books:

1. Dr. Kirpal Singh, "Automobile Engineering", Vol 1 & 2, 13th Edition, Standard Publishers, New Delhi, 2020.
2. Jigar A. Doshidhruv U. Panchaljayesh P. Maniar, "Vehicle Maintenance and Garage Practice", PHI Learning Pvt. Ltd.,2014.

Reference Book:

1. Tim Gills, "Automotive Service: Inspection, Maintenance, Repairing", Cengage Learning, 2004
2. Bosch Automotive Handbook, Sixth Edition, 2004.

TECHNICAL DRAWING

Subject code	20KUA4C06	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)

Text Books:

- 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.

Reference Books:

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

Open Elective I- PRINCIPLES OF MANAGEMENT

Subject 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.

Text Books:

- 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.

Reference Books:

- 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.

Text Books:

- 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.

Reference Books:

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

Automotive Safety

Subject code	20KUA4C07	Credits	04	Year	II
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	IV

Objective:

- Identify several significant automobile safety devices and the technology involved.
- Illustrate how each device works and distinguish the purpose of those devices.
- An understanding of automotive safety, comfort systems &its future prospects.

Course outcomes (CO):

CO1	Express the characteristics and importance of safety.	**K2&K4**
CO2	Understand and analyze the safety systems - ABS, air bags and seat belt, etc.,	**K1 & K2**
CO3	Analyze the comfort system requirements for automobiles.	**K4**
CO4	Describe the various systems that enhance vehicle safety, passenger comfort, and recent technologies in automobile.	**K2 & K4**

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

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

S – Strong; M – Medium; L – Low

Unit I

Introduction to automotive safety, Design of the body for safety, engine location, deceleration of vehicle inside passenger compartment, deceleration on impact with stationary and movable obstacle, concept of crumble zone, safety sandwich construction

Unit II

Active safety: driving safety, conditional safety, perceptibility safety, operating safety, passive safety: exterior safety, interior safety, deformation behavior of vehicle body, speed and acceleration characteristics of passenger compartment on impact.

Unit III

Anti-lock braking system, air bags, electronic system for activating air bags, Seat belt, regulations, automatic seat belt tightener system, collapsible steering column, tillable steering wheel, traction control systems, Roll over mitigation, , bumper design for safety

Unit IV

Collision warning system, causes of rear end collision, adaptive cruise control, frontal object detection, rear vehicle object detection system, object detection system with braking system interactions, Reverse sensing system, Automatic emergency braking

Unit V

Steering and mirror adjustment, central locking system, Automatic parking, Garage door opening system, tyre pressure control system, speed load limiting, rain sensor system, lighting and windscreen wipers control, environment information system, In-car internet.

Text Books:

1. Bosch, "Automotive Handbook", 8th Edition, SAE publication, 2011.
2. "Fundamentals of Automotive and Engine Technology", Springer Nature; 2014

Reference Books:

1. Powloski. J., "Vehicle Body Engineering", Business books limited, London, 1969.
2. Ronald.K.Jurgen, "Automotive Electronics Handbook", Second Edition, McGraw-Hill Inc., 1999.

Workshop Technology Lab –I

Subject code	20KUAT4P3	Credits	03	Year	II
No. of Lecture Hours	--	No. of Practical Hours	90	Sem	IV

Objectives:

- Familiarize with fault diagnosis techniques used in automobiles.
- Understand the different procedures involved in any maintenance shop.
- Impart practical knowledge in reconditioning of degraded parts.
- Impart the Students to know the details of different components, constructional details, working principles and operation.

Course outcomes (CO):

CO1	Learn about fault diagnosis and service of transmission system.	**K2&K4**
CO2	Describe the minor tuning on engine and vehicle.	**K1 & K2**
CO3	Perform removal and re - fitting of tire using automatic tire changer.	**K2**
CO4	Identify and repair of all the major vehicle systems.	**K2 & K4**

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

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

CO1: S – Strong; M – Medium; L – Low

1. Guidelines for human and machine safety in workshop
2. To study and prepare report on the constructional details, working principles and operation of the Automotive Clutches.
3. To study and prepare report on the constructional details, working principles and operation of the Automotive Transmission systems.
4. To study and prepare report on the constructional details, working principles and operation of the Automotive Drive Lines & Differentials.
5. To study and prepare report on the constructional details, working principles and operation of the Multi-cylinder: Diesel and Petrol Engines.
6. To study and prepare report on the constructional details, working principles and operation of the Automotive Engine Systems & Sub Systems.

7. To study and prepare report on the constructional details, working principles and operation of the Fuels supply systems.
8. To study and prepare report on the constructional details, working principles and operation of the Engine cooling & lubricating Systems.
9. To study and prepare report on the constructional details, working principles and operation of the Automotive Suspension Systems.
10. To study and prepare report on the constructional details, working principles and operation of the Automotive Steering Systems.
11. To study and prepare report on the constructional details, working principles and operation of the Automotive Brake systems
12. To study and prepare report on the constructional details, working principles and operation of the Automotive Tyres & wheels.

INTERNSHIP TRAINING – II

Subject code	20KUAT4I2	Credits	20	Year	II
No. of Lecture Hours	--	No. of Practical Hours	1200	Sem	IV

Objectives:

- To develop skills in the application of theory to practical work situations, skills and techniques directly applicable to their careers. Internships will increase a student's sense of responsibility and good work habits.
- To expose students to real work environment experience gain knowledge in writing report in technical works/projects. Internship programs will increase student earning potential upon graduation.
- To build the strength, teamwork spirit and self-confidence in students life, creativity skills and sharing ideas.
- To build a good communication skill with group of workers and learn to learn proper behavior of corporate life in industrial sector. The student will be able instilled with good moral values such as responsibility, commitment and trustworthy during their training.

Course outcomes (CO):

CO1	Understanding career field, including the skills and responsibilities.	**K1&K2**
CO2	Develop effective work habits, including time management, punctuality and inter personal skills.	**K2& K3**
CO3	Exhibit critical thinking and problem solving skills by analyzing underlying issues to challenges in Automotive engineering.	**K3 & K4**
CO4	Articulate career options by considering opportunities in company, sector, industry, professional and educational advancement in Automotive engineering.	**K3 & K4**

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

7.	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

S – Strong; M – Medium; L – Low

Students should undergo internship training in an esteemed Automobile service 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- 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.

Text Books:

- 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

Reference Books:

- 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.

Text Books:

- 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

Reference Books:

- 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.

Text Books:

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

Reference Books:

- M.K.Venkataraman, *Numerical methods for Science and Engineering,* The National publishing company, Fifth Edition,1999.

1. P.Navanitham, *Business Mathematics and statistics*, Jain publishers, 2008

CORE VIII: ORGANIZATIONAL BEHAVIOUR

Subject code	20KUA5C08	Credits	04	Year	III
No. of Lecture Hours	60	No. of Practical Hours	--	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

Text Books:

- 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.

Reference Books:

- Jit S. Chandan, *Organisational Behaviour,* Vikas Publishing House, 3rd Edition, 1999

1. Mishra M.N, *Organizational Behaviour,* Vikas Publishing House, First Edition, 2001

Workshop Supervising and Management

Subject code	20KUA5C09	Credits	05	Year	III
No. of Lecture Hours	75	No. of Practical Hours	--	Sem	V

Objectives:

- Understand the roles and responsibilities of a supervisor (understanding the fundamentals of the supervision framework) to foster excellent performance that supports individual and organizational needs.
- Organize the service& repair department through, controlling manpower resources and other assets and tools at a level commensurate with workshop requirements.
- Understand and importance of motor vehicle and pollutions.

Course outcomes (CO):

CO1	Gain knowledge about to Identifying, understanding and working with professional standards.	**K2&K4**
CO2	Manage quality issues in the work done by the technicians and components.	**K1 & K2**
CO3	Understanding of motor vehicle act.	**K2**
CO4	Identifying and understanding the various automotive components.	**K2 & K4**

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

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

S – Strong; M – Medium; L – Low

Unit-I

Basic principles of supervising - Organising time and people - Job instruction training, training for new devices and techniques - Evaluate and allotment of technician - Vehicle operation and types of process - Work scheduling, Overtime, Breakdown analysis, Cost estimation - Vehicle technical specifications of various OEM vehicular products - Relevant and up-to-date knowledge of vehicle design, manufacture, consumer, industry and trade practices - Importance of maintenance, types- preventive (scheduled) and breakdown (unscheduled) maintenance - Safety precautions in maintenance- Knowledge of free and paid service schedules, fault diagnosis, technician notes, job cards, warranty procedures, log

sheets and other forms- Evaluate the information gathered from the customer report, customer satisfaction

Unit-II

Lubrication system - lubricating/ engine oil top up, oil changing, cleaning methods, visual and dimensional inspections, minor/major adjustments of various components - maintenance of engine accessories- air filter, battery, cooling system, electrical wiring in engine compartment. Engine tune up, top overhauling, dismantling of engine - components, cleaning, visual and dimensional inspections, minor/major reconditioning of various components, reconditioning methods, engine assembly - special tools used for maintenance/ overhauling

Unit-III

lubricating/ gear oil top up, oil changing, cleaning methods - visual and dimensional inspections, minor/major adjustments of various components of transmission system - Servicing and maintenance of clutch, gear box, propeller shaft, differential - Servicing and maintenance of suspension system, brake system, steering system, wheel alignment and wheel balancing

Unit-IV

Checking of electrical components for functioning, checking of battery, electrolyte - top up, terminal cleaning & protection methods, checking of starter motor, checking of charging systems- fan belt tension checking and adjustment - Testing methods for checking of ignitions system, lighting system - fault diagnosis and maintenance of modern electronic controls - checking and servicing of dash board instruments.

UNIT-V

Motor Vehicle Act: Schedules and sections, Registration of motor vehicles, Licensing of drivers, Control of permit, Limits of speed, traffic signs - Constructional regulations - Description of goods carrier, delivery van, tanker, tipper, Municipal - fire fighting and break down service vehicle.

Pollution: Pollutant formation in Engines, mechanism of HC and CO formation in four stroke and two stroke engines, NOx formation in engines - Engine Design modifications, fuel modification, evaporative emission control - EGR, air injection, thermal reactors, Water Injection, catalytic converters - Application of microprocessor in emission control- Pollution standards, driving cycles – Indian Pollution standards.

Text book:

1. Ed May, "Automotive Mechanics Volume One" and Two , Mc Graw Hill Publications, 2003
2. Vehicle Service Manuals of reputed manufacturers

Reference Book:

1. Tim Gills, “Automotive Service: Inspection, Maintenance, Repairing”, Cengage Learning, 2004.
2. Kirpal Singh, “Automobile Engineering”, Vol 1 & 2, Seventh Edition, Standard Publishers, New Delhi, 1997.

Automobile Workshop Practice Lab

Subject code	20KUAT5P4	Credits	03	Year	III
No. of Lecture Hours	--	No. of Practical Hours	90	Sem	V

Objectives:

- Understand the structures in identifying the fault and rectification.
- Acquaint with Vehicle maintenance practices by hands on training on actual Vehicle.
- Fathom various methods of maintaining vehicles and their subsystems.

Course outcomes (CO):

CO1	Understand the functioning of maintenance shop.	**K1 & K2**
CO2	Identify with the vehicle trouble shooting and Maintenance.	**K1 & K2**
CO3	Developing the knowledge to use the Electrical equipment's and trouble shooting.	**K3 & K4**
CO4	Fault diagnosis and service of vehicle air conditioning system.	**K2 & K4**

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

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

CO1: S – Strong; M – Medium; L – Low

1. Study and layout of an automobile repair, service and maintenance shop.
2. Study and preparation of different statements/records required for the repair and maintenance works.
3. Minor and major tune up of gasoline and diesel engines.
4. Study and checking of wheel alignment - testing of camber, caster.
5. Testing kingpin inclination, toe-in and toe-out
6. Study and checking of wheel balancer
7. Study and checking of fault diagnose of MPFI Engine
8. Study, Check and change of tyre.
9. Brake adjustment and Brake bleeding.
10. Fault diagnosis and service of vehicle air conditioning system
11. Study ,check and clean to injector
12. Study and checking of air bag simulator
13. Study and layout of motor car electrical systems
14. Study, check and charge of battery

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

Text Books:

- 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.

Reference Books:

- 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.

Text Books:

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

SAFETY ENGINEERING

Subject code	20KUA6C10	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)

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.

Text Books:

- 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.

Reference Books:

- 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 - 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.

Text Books:

- 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.

Reference Books:

- 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).

Text Books:

- 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.

Reference Books:

- 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

Project

Subject code	20KUAT6PR	Credits	08	Year	III
No. of Lecture Hours	--	No. of Practical Hours	240	Sem	VI

Objectives:

- The objective of the project work is to enable the students in convenient groups of not more than 5 members on a project involving theoretical and experimental studies related to the branch of study. Every project work shall have a guide who is the member of the faculty of the institution. The students to receive the directions from the guide, on library reading, laboratory work, computer analysis or field work as assigned by the guide and also to present in periodical seminars on the progress made in the project.
- Each student shall finally produce a comprehensive report covering background information, literature survey, problem statement, project work details and conclusion. This final report shall be typewritten form as specified in the guidelines.
- The continuous assessment shall be made as prescribed by college regulations

Course outcomes (CO):

CO1	Expand the technical knowledge of their selected project topic.	**K1 & K2**
CO2	Exhibit the knowledge, skills and attitudes of a professional engineer.	**K2 & K4**
CO3	Analyze the learning and understand techniques for Project planning, scheduling and Execution Control.	**K4**
CO4	Apply the theoretical concepts to solve industrial problems with teamwork and multidisciplinary approach.	**K3**

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

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

S – Strong; M – Medium; L – Low

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Internship Training-III

Subject code	20KUAT6I3	Credits	20	Year	III
No. of Lecture Hours	--	No. of Practical Hours	1200	Sem	VI

Objectives:

- To develop skills in the application of theory to practical work situations, skills and techniques directly applicable to their careers. Internships will increase a student's sense of responsibility and good work habits.
- To expose students to real work environment experience gain knowledge in writing report in technical works/projects. Internship programs will increase student earning potential upon graduation.
- To build the strength, teamwork spirit and self-confidence in students life, creativity skills and sharing ideas.
- To build a good communication skill with group of workers and learn to learn proper behavior of corporate life in industrial sector. The student will be able instilled with good moral values such as responsibility, commitment and trustworthy during their training.

Course outcomes (CO):

CO1	Understanding career field, including the skills and responsibilities.	**K1&K2**
CO2	Develop effective work habits, including time management, punctuality and inter personal skills.	**K2& K3**
CO3	Exhibit critical thinking and problem solving skills by analyzing underlying issues to challenges in Automotive engineering.	**K3 & K4**
CO4	Articulate career options by considering opportunities in company, sector, industry, professional and educational advancement in Automotive engineering.	**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

S – Strong; M – Medium; L – Low

Students should undergo internship training in an esteemed Automobile service 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: 1 Hour **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.