

## **DEPARTMENT OF ENGLISH:**

### **COURSE OBJECTIVES AND OUTCOMES - General English**

#### **COURSE OBJECTIVES:**

1. Ability to be comfortable with English in use while reading or listening.
2. Ability to use receptive skills through reading and listening to acquire good exposure to language and literature.
3. Ability to write and speak good English in all situations.
4. Students should develop style in speech and writing and manipulate the tools of language for effective communication.
5. The course should provide exposure to the learners in Good Prose texts and Poems and expose the learners to value based ideas.
6. Students should enhance their language skills especially in the areas of grammar and pronunciation.

#### **COURSE OUTCOMES :**

1. Students can read and understand any text in English listening to the inputs given by the teacher in the classroom.
2. Students imbibe the rules of language unconsciously and tune to deduce language structure and usage.
3. Students write paragraphs, essays, and letters.
4. Students decipher the mechanism of language and use it for success in competitive examinations and job related speaking and writing tasks.

## **COURSE OBJECTIVES AND OUTCOMES - Foundation Course in Communication Skills**

### **COURSE OBJECTIVES :**

1. Ability to trace the difference of pronunciation of words, their correct pronunciation, accent and intonation.
2. Ability to use English correctly in speaking and writing skills.

### **COURSE OUTCOMES :**

1. Students refer to dictionary and study the correct stress, right accent and right intonation to ask questions, make requests or to make command.
2. Students perform various speaking and writing tasks, such as roleplays, debates, group discussions apart from the use of correct spelling, punctuation and the ability to transfer information in the writing tasks.

## **DEPARTMENT OF COMMERCE:**

### **BACHELOR OF COMMERCE**

#### PROGRAMME OBJECTIVES

1. To Develop Graduates having thirst for knowledge attainable through higher studies and Research.
2. To Develop Graduates with subject knowledge and skills at par with the requirements of Current Job Market.
3. To Develop Graduates with Entrepreneurial skills who can be the Wealth and Employment Generators of Tomorrow.
4. To Develop Graduates with Good code of conduct, moral values and professional attitude who can serve the organizations where they are going to work for and the society as well.
5. To sow the seeds of zeal and enthusiasm among students to learn things quickly from the environment throughout their life.
6. To make students eager to learn on their own by providing basic knowledge and necessary support and guidance.
7. To inculcate the habit of research and scientific thinking among students.
8. To create a base for further learning by students through higher studies and/or through work life.

# BACHELOR OF COMMERCE

## PROGRAMME OUTCOMES

1. Students will gain knowledge on various concepts of Commerce, Business, Accounting, Auditing, Management, Finance, Banking and Financial services, Commercial law, Taxation, Marketing, Information Technology, Computer Applications
2. The practical orientation in learning can make students versed to apply the conceptual knowledge in real time personal and professional life.
3. Students will be armed with key skills viz. Communication, soft skills and inter personal skills and competencies to confront the challenges in dynamic commerce and business environment.
4. Develops students with good code of conduct, ethics, moral and human values to serve the organizations they are working for and the society they are living.
5. Develops students with entrepreneurial spirit, leadership qualities and skills who can create wealth and employment.
6. Develops students with the habit of scientific thinking, research attitude who can be a learners of life time.
7. Develops students with professional attitude, conceptual knowledge and skills who can build their career and prosper in various fields of commerce and industry.
8. Develops graduates who can gain more knowledge through higher studies.

## BACHELOR OF COMMERCE (GENERAL)

### PROGRAMME SPECIFIC OUTCOMES

1. Develops commerce graduates with subject knowledge and skills who can perform jobs and develop in the fields of Accounting, Taxation, Finance, Marketing and Management in general and in Banking, Insurance and other financial services in Particular.
2. Develop conceptual knowledge with practical orientation among students which can be applied by students in their real time personal and professional life.

## BACHELOR OF COMMERCE (COMPUTER APPLICATIONS)

### PROGRAMME SPECIFIC OUTCOMES

1. Develop commerce graduates with subject knowledge skills and computer application abilities who can perform Jobs and prosper in the fields of Accounting, Taxation, Finance, Marketing Management in General and in computerized commercial activities fields viz computer based accounting applications, E-Commerce, E-Marketing ERP, E-Business and so on in particular.
2. Develop conceptual knowledge with practical orientation among students which can be applied by students in their real time professional and personal life.

## BACHELOR OF COMMERCE (ACCOUNTING AND TAXATION)

### PROGRAMME SPECIFIC OUTCOMES

1. Develop commerce graduates with conceptual knowledge and skills who can build a career and prosper in the fields of Finance, Management, Marketing, Banking and Insurance in general and in Accounting and Taxation in particular.
2. Develops conceptual knowledge with practical orientation among students which can be applied by students in their real time professional and personal lives.

**GOVERNMENT DEGREE COLLEGE (A), TUNI**

**DEPARTMENT OF CHEMISTRY**

**PROGRAM OUT COMES**

**The students can obtain the knowledge in the following topics and come to know how chemistry is essential in daily life.**

1. Preparation, properties and applications of some special compounds of s and p block elements.
2. Understand the basic concepts of p-block elements.
3. Understand the phosphonitrilic compounds.
- 4 Structures of interhalogen compounds.
5. Properties of d-block and f-block elements.

□ **By the end of II semester, each and every I degree chemistry student can obtain the knowledge in the following topics and come to know how chemistry is essential in daily life.**

1. Features involved in gaseous state, liquid state and solid state and their applications.
2. Explain the difference between solid, liquid and gases in terms of inter molecular interaction.
3. Apply the concepts of gas equation.
4. PH and electrolytes while studying other chemistry courses.
5. Basic knowledge and Importance of Dilute solutions.

□ **By the end of III semester, each and every II degree chemistry student can attain the knowledge in the following topics and come to know their role in serving the society through chemistry.**

1. Properties of d and f block elements.
2. Bonding nature of the metals.
3. Preparation, properties and applications of halogen compounds, hydroxyl compounds, carbonyl Compounds and carboxylic acids.
4. Importance and synthetic applications of active methylene compounds.
5. Estimation of Fe (II) and Cu (II) in the unknown material through practical.

6. Reactions of some functional groups like phenols, carboxylic acids, aldehydes, ketones, amines and Amides.

□ **By the end of IV semester, each and every II degree chemistry student can attain the knowledge in the following topics and come to know their role in serving the society through chemistry.**

1. Different types of Electronic transitions present in Organic molecules..
2. Identification of Functional groups using IR spectrum.
3. Analysis of Cr and Mn using spectrophotometer.
4. Structural identifications of organic compounds using H1-NMR
5. Different aspects of electrochemistry.
6. Identification of functional group present in the given organic compound by IR spectral analysis.
7. Importance of conductometric techniques by doing strength of acids and bases.

□ **By the end of V semester, each and every III degree chemistry student can obtain the knowledge in the following topics and come to know how to serve the society by becoming a chemist.**

1. Involved theories and properties of coordination compounds.
2. Preparation and properties of nitrogen compounds.
3. Importance, preparations, properties and medicinal uses of heterocyclic compounds.
4. Structural elucidation of glucose and fructose.
5. Importance of Amino acids and Proteins.
5. Determination of Rate of the reactions through chemical kinetics.
6. Some photochemical reactions photophysical processes.
7. Importance of thermodynamical aspects.
8. Identification of functional group present in the given organic compound by following organic qualitative analysis.
9. Determination of surface tension and viscosity of some liquids.

□ **By the end of VI semester, (clusters) each and every III degree chemistry student can get the knowledge in the following topics depending on their choice/interest and come to know how to serve the society by becoming a chemist.**

1. Various types of instrumental techniques like IR and NMR spectroscopies.
2. Different aspects of Environmental Chemistry.
3. Importance of Polymer chemistry.
4. Analyses of drugs, dairy products
6. Importance of vitamins.
7. Preparation of some organic compounds.
8. Synthesis of organic compounds using green synthesis.
9. Hands on experience in operating colorimeters, pH meters and potentiometers.
10. Submission of a project work.

### **OUT COMES**

After completion of B.Sc. course the students will be able to:

1. Acquire comprehensive knowledge in physical inorganic and organic Chemistry. And clusters
2. Acquire experimental skills in chemical analysis.
3. Apply their knowledge and understanding in new situations.
4. Have industrial exposure by visiting nearby industry plants.
5. Achieve good ranks in PG entrance examinations.
6. Acquire employable skills and become industry ready persons.
7. Get motivation for research by carrying out projects.
8. Gain leadership quality by participation in extension programmes and group Projects etc.

## DEPARTMENT OF ECONOMICS

### Programme Outcomes and Programme Specific Outcomes

#### Programme Outcomes (POs) :

After the completion of the B. A. (H.E.P.) Programme, the students will be able to achieve the following outcomes:

PO1. **Critical Thinking:**

Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational and personal) from different perspectives.

PO2. **Effective Communication:**

Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and by connecting people, ideas, books, media and technology across the World.

PO3. **Social Interaction:**

Elicit views of others, mediate disagreements and help reach conclusions in group settings.

PO4. **Effective Citizenship:**

Demonstrate empathetic social concern and equity-centered national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.

PO5. **Ethics:**

Recognize different value systems including that of own, understand the moral dimensions of our decisions, and accept responsibility for them.

PO6. **Environment and Sustainability:**

Understand the issues in the contexts of environmental and sustainable

development.

**PO7. Self-directed and Life-long Learning:**

Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes.

**Programme (Economics) Specific Outcomes (PSO) :**

**After completion of Economics programme, the students will be in a position to take informed decisions with regard to the following:**

- PSO1 - How the consumers and producers will take rational decisions in the context of unlimited needs and availability of scarce resources;
- PSO2 – How the economy at the aggregate level works, what are the determinants of national income, prices, demand for and supply of money, poverty, and unemployment in an economy;
- PSO3 - He/she Gets understanding of the process of economic growth, economic development, sustainable growth in the context of existence of trade-off between rapid economic growth and environmental sustainability in the long-run;
- PSO4 - He/she will be able to apply the determinants of economic growth and development to the economies of India and Andhra Pradesh and appraise the fiscal, monetary and other socio-economic policies being pursued in India and Andhra Pradesh
- PSO5 – He/she will get a basic understanding of Statistical Methods with a view to applying them to economics and real life situations

## SEMESTER – I :: COURSE -I MICROECONOMIC ANALYSIS

### LEARNING OUTCOMES FOR THE COURSE

At the end of the course, the student is expected to demonstrate the following cognitive abilities and psychomotor skills.

1. Remembers and states in a systematic way (Knowledge)

a. the differences between microeconomic analysis and macroeconomic analysis b .various laws and principles of microeconomic theory under consumption,

2. Explains (understanding)

a. various terms and concepts relating to microeconomic analysis with the help of examples of real life  
b. consumer's equilibrium and consumer's surplus using indifference curve analysis.  
c. various laws and principles of consumption, production, and income distribution  
d. determination of price and output discriminating different market conditions in short term and long term

3. Critically examines using data and figures (analysis and evaluation)

a. various laws and principles of microeconomic analysis and market conditions  
b. application of the concept of demand elasticity and its relation with Average and Marginal Revenue  
c. the relationship between average and marginal cost/revenue both in long term and

4. Draws critical diagrams and graphs to explain and examine the application of various laws and principles of microeconomic analysis

## SEMESTER – 2:: COURSE –2

### MACROECONOMIC ANALYSIS

#### LEARNING OUTCOMES FOR THE COURSE

At the end of the course, the student is expected to demonstrate the following cognitive abilities and psychomotor skills.

1. Remembers and states in a systematic way (knowledge)

Various concepts, definitions, laws and principles of macroeconomic theory with reference to income, employment, money, banking and finance

2. Explains (understanding)

a. the difference between various concepts and components of national income with illustrations and methods of measuring national income

b. various terms, concepts, laws and principles, theories relating to income, employment, consumption, investment, money, price-level and phases of trade cycles

d. functions of commercial banks and central bank, creation and control of credit

3. Critically examines using data and figures (analysis and evaluation)

a. in order to understand the interrelationship between various components of national income

b. the theories of macroeconomics with reference to their assumptions, implications

and applicability

c. Empirical evidences of Consumption and Investment Functions and factors influencing them

4. Draws critical formulae, diagrams and graphs.

a. consumption and investment functions; concepts of multiplier and accelerator

b. price indices, inflation and trade cycles

### **SEMESTER – 3:: COURSE – 3 DEVELOPMENT ECONOMICS**

#### **LEARNING OUTCOMES FOR THE COURSE**

At the end of the course, the student is expected to demonstrate the following cognitive abilities and psychomotor skills.

1. Remembers and states in a systematic way (Knowledge)

Various concepts and definitions and indicators relating to economic growth and Development including recent developments

2. Explains (understanding)

a. Distinction between growth and development with examples

c. Characteristics of developing and developing economies and distinction between

the two

d. factors contributing to development, Choice of Techniques and a few important models and strategies of growth

3. Critically examines using data and figures (analysis and evaluation)

a. the theoretical aspects of a few models and strategies of economic growth

b. role and importance of various financial and other institutions in the context of India's economic development

4. Draws critical diagrams and graphs.

- a. to explain the models and strategies
- b. to highlight empirical evidences to support the strategies

**SEMESTER – 4 :: COURSE – 4**

**ECONOMIC DEVELOPMENT- INDIA AND ANDHRA PRADESH**

**LEARNING OUTCOMES FOR THE COURSE**

At the end of the course, the student is expected to demonstrate the following cognitive abilities and psychomotor skills.

1. Remembers and states in a systematic way (Knowledge)

- a. leading issues of Indian economic development with reference to potential for growth, obstacles and policy responses
- b. Objectives, outlays and achievements of economic plans and growth strategies

2. Explains (understanding)

- a. Available Resources, demographic issues, general problems of poverty and unemployment and relevant policies
- b. Sector specific problems, remedial policies and their effectiveness relating to Agriculture and Industrial Sectors of Indian and AP economy and infrastructure issues of AP economy
- c. Indian Tax system, recent changes, issues of public expenditure and public debt, recent finance commissions and devolution of funds
- d. Major issues of economic development of Andhra Pradesh after bifurcation and Central assistance

3. Critically examines using data and figures (analysis and evaluation)

- a. Leading issues of current importance relating to India and AP economy, major policies and programmes
- b. Covid– 19 and its impact on Indian economy

4. Uses official statistical data and reports including tables and graphs

a. To explain the achievements of Indian economy with reference to the objectives of planning and policy and make critical evaluation

## **Department of Computer Science & Applications**

### **Government Degree College(A), Tuni**

#### **Programme Outcomes**

Possess a sound understanding of theoretical foundations of various core subjects. Acquire analytical and logical thinking skills necessary to pursue higher education. Gain employment at entry level positions based on program curriculum.

**Scientific knowledge:** Apply the knowledge of mathematics, science, and computing to the solution of complex scientific problems.

**Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and applied sciences.

**Design/development of solutions:** Design solutions for complex problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**Modern tools usage:** Create, select, and apply appropriate techniques, resources, and modern computing and IT tools including prediction and modelling to complex scientific activities with an understanding of the limitations.

**The software engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional practice.

**Environment and sustainability:** Understand the impact of the professional software engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the scientific practice.

**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**Communication:** Communicate effectively on complex activities with the scientific community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**Project management:** Demonstrate knowledge understanding of the scientific and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**Employability :** Attain knowledge and to be competitive in the current job market .

## Programme Specific Outcomes

**MPCS** : Master a broad set of knowledge concerning the fundamentals in basic areas of Physics and Mathematics added with the necessary hands-on experience in various practical aspects of problem solving/ programming / experimentation. The program imparts students with an understanding of the basics of Computer Science, to develop proficiency in the practices of computing, and to prepare them for continued professional development.

**MCCS** : Master a broad set of knowledge concerning the fundamentals in basic areas of Chemistry and Mathematics added with the necessary hands-on experience in various practical aspects of problem solving/ programming / experimentation. The program imparts students with an understanding of the basics of Computer Science, to develop proficiency in the practices of computing, and to prepare them for continued professional development.

In general a graduate with a **B.Sc. in Computer Science** will have the ability to demonstrate Computer Science skills in the following core knowledge areas

- Computer Fundamentals
- Data Structures and Programming Languages
- Databases, Software Engineering and Development

Apply problem-solving skills and the knowledge of computer science to solve real world problems.

Develop technical project reports and present them orally among the users

A graduate with a **B.Com. in Computer Applications** will have the ability to demonstrate skills in the following core knowledge areas

- Understand the concepts of commerce and computer application operations.
- Apply the current techniques, skills, and tools necessary for computing practices.
- Ability to design, implement domain knowledge for computer programming.

<b>Program</b>	<b>Program Outcome</b>	<b>Program Specific Outcomes</b>
MPCs	<p>Assess a sound understanding of theoretical foundations of various core subjects.</p> <p>Require analytical and logical thinking skills necessary to pursue higher education.</p> <p>Employment at entry level positions based on program curriculum.</p>	<p>Master a broad set of knowledge concerning the fundamentals in basic areas of Physics and Mathematics added with the necessary hands-on experience in various practical aspects of problem solving/ programming / experimentation. The program imparts students with an understanding of the basics of Computer Science, to develop proficiency in the practices of computing, and to prepare them for continued professional development.</p>

<b>Program</b>	<b>Program Outcome</b>	<b>Program Specific Outcomes</b>
MPCs	<p>Assess a sound understanding of theoretical foundations of various core subjects.</p> <p>Require analytical and logical thinking skills necessary to pursue higher education.</p> <p>Employment at entry level positions based on program curriculum.</p>	<p>Master a broad set of knowledge concerning the fundamentals in basic areas of Physics and Mathematics added with the necessary hands-on experience in various practical aspects of problem solving/ programming / experimentation. The program imparts students with an understanding of the basics of Computer Science, to develop proficiency in the practices of computing, and to prepare them for</p>

		continued professional development.
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<b>Program</b>	<b>Program Outcome</b>	<b>Program Specific Outcomes</b>
B.Com.(Computer Applications)	<p>Assess a sound understanding of theoretical foundations of various core subjects.</p> <p>Require analytical and logical thinking skills necessary to pursue higher education.</p> <p>Employment at entry level positions based on program curriculum.</p>	<p>Understand the concepts of commerce and computer application operations.</p> <p>Apply the current techniques, skills, and tools necessary for computing practices.</p> <p>Ability to design, implement domain knowledge for computer programming.</p>

### Physics 2019-2020

2019-2020	PHY-	MECHANICS & PROPERTIES OF MATTER	CO 1	<p>Scalar and vector fields, gradient of a scalar field and its physical significance. Divergence and curl of a vector field with derivations and physical interpretation. Vector integration (line, surface and volume), Statement and proof of Gauss and Stokes theorems.</p> <p>Laws of motion, motion of variable mass system, Equation of motion of a rocket. Conservation of energy and momentum, Collision in two dimension, Concept of impact parameter, scattering cross-section, Rutherford scattering-derivation.</p>
			CO 2	<p>Definition of rigid body, rotational kinematic relations, equation of motion for a rotating body, angular momentum, Euler equations and its applications, precession of a top, Gyroscope, precession of the equinoxes.</p> <p>Elastic constants of isotropic solids and their relations, Poisson's ratio and expression for Poisson's ratio in terms of <math>\nu</math>, <math>n</math>, <math>k</math>. Classification of beams, types of bending, point load, distributed load, shearing force and bending moment, sign conventions.</p>
			CO 3	<p>Central forces, definition and examples, characteristics of central forces, conservative nature of central forces, conservative force as a negative gradient of potential energy. Derivation of Kepler's laws. Motion of satellites, idea of Global Positioning System (GPS).</p>
			CO 4	<p>Galilean relativity, absolute frames. Michelson-Morley experiment, negative result. Postulates of special theory of relativity. Lorentz transformation, time dilation, length contraction, addition of velocities, mass-energy relation</p>

PHY-	WAVES & OSCILLATIONS	CO 1	Simple harmonic oscillator and solution of the differential equation-Physical characteristics of SHM, torsion pendulum-measurements of rigidity modulus, compound pendulum- measurement of 'g', Principle of superposition, combination of two mutually perpendicular simple harmonic vibrations of same frequency and different frequencies. Lissajous figures and its applications.
		CO 2	Damped harmonic oscillator, solution of the differential equation of damped oscillator. Energy considerations, comparison with un-damped harmonic oscillator, logarithmic decrement, relaxation time, quality factor, differential equation of forced oscillator and its solution, amplitude resonance and velocity resonance.
		CO 3	Fourier theorem and evaluation of the Fourier coefficients, analysis of periodic wave functions-square wave, triangular wave, saw tooth wave, simple problems on evolution of Fourier coefficients Transverse wave propagation along a stretched string, general solution of wave equation and its significance, modes of vibration of stretched string clamped at ends, overtones and harmonics. Energy transport and transverse impedance, Laws of vibrating string
		CO 4	Longitudinal vibrations in bars-wave equation and its general solution. Special cases (i) bar fixed at both ends (ii) bar fixed at the midpoint (iii) bar fixed at one end. Tuning fork.  Ultrasonics, properties of ultrasonic waves, production of ultrasonics by piezoelectric and magnetostriction methods, detection of ultrasonics, determination of wavelength of ultrasonic waves.Applications of ultrasonic waves.
PHY-	OPTICS	CO 1	Introduction – monochromatic aberrations, spherical aberration, methods of minimizing spherical aberration, coma, oblique astigmatism and curvature of field, distortion. Types of Chromatic aberration-Methods of reducing chromatic aberration. the achromatic doublet. Achromatism for two lenses (i)in contact and (ii) separated by a distance. Principle of superposition – coherence-

			temporal coherence and spatial coherence-conditions for interference of light. Fresnel's biprism-determination of wavelength of light – change of phase on reflection. Oblique incidence of a plane wave on a thin film due to reflected and transmitted light (cosine law) – colors of thin films- Interference by a film with two non-parallel reflecting surfaces (Wedge shaped film). Determination of diameter of wire, Newton's rings in reflected light. Michelson interferometer, Determination of wavelength of monochromatic light using Newton's rings and Michelson Interferometer.
		CO 2	Introduction,distinction between Fresnel and Fraunhofer diffraction, Fraunhofer diffraction – Diffraction due to single slit- Fraunhofer diffraction due to double slit- Fraunhofer diffraction pattern with N slits (diffraction grating).Resolving power of grating,Determination of wavelength of light in normal incidence and minimum deviation methods using diffraction grating,Fresnel's half period zones-area of the half period zones-zone plate-comparison of zone plate with convex lens-difference between interference and diffraction.
		CO 3	Polarized light: methods of polarization polarization by reflection, refraction, double refraction, scattering of light-Brewster's law-Mauls law-Nicol prism polarizer and analyzer2 Quarter wave plate, Half wave plate-optical activity, determination of specific rotation by Laurent's half shade polarimeter- Babinet's compensator - idea of elliptical and circular polarization
		CO 4	Lasers: introduction, spontaneous emission, stimulated emission. Population Inversion, Laser principle-Einstein coefficients-Types of lasers-He-Ne laser, Ruby laser- Applications of lasers.  Introduction - different types of fibers, rays and modes in an optical fiber, fiber material, principles of fiber communication (qualitative treatment only), advantages of fiber optic communication.

PHY-	THERMO DYNAMIC S	CO 1	Introduction –Deduction of the relation between average velocity ,root mean square and most probable velocity .Deduction of Maxwell’s law of distribution of molecular speeds, experimental verification. Transport phenomena – Mean free path - Viscosity of gases-thermal conductivity-diffusion of gases.
		CO 2	Introduction- Isothermal and adiabatic process- Reversible and irreversible processes- Carnnot’s engine and its efficiency-Carnot’s theorem-Second law of thermodynamics. Kelvin’s and Claussius statements-Entropy, physical significance –Change in entropy in reversible and irreversible processes-Entropy and disorder-Entropy of Universe– Temperature-Entropy (T-S) diagram and its uses - Change of entropy of a perfect gas- change of entropy when ice changes into steam.
		CO 3	Thermodynamic potentials-Derivation of Maxwell’s thermodynamic relations-Clausius-Clayperon’s equation-Derivation for ratio of specific heats-Derivation for difference of two specific heats for perfect gas.Joule Kelvin effect-expression for Joule Kelvin coefficient for perfect and vander Waal’s gas.  Introduction-Joule Kelvin effect-Porous plug experiment - Joule expansion-Distinction between adiabatic and Joule Thomson expansion-Expression for Joule Thomson cooling-Liquefaction of helium, Kapitza’s method-Adiabatic demagnetization, Production of low temperatures -effects of chloro and fluoro carbons on ozone layer.
		CO 4	Blackbody-Ferry’s black body-distribution of energy in the spectrum of black body-Wein’s displacement law,Wein’s law, Rayleigh-Jean’s law-Quantum theory of radiation-Planck’s law-Measurement of radiation-Types of pyrometers-Disappearing filament optical pyrometer-experimental determination – Angstrompyrheliometer-determination of solar constant, Temperature of Sun.
PHY-	ELECTRICI TY & ELECTRO MAGNETI	CO 1	Gauss’s law statement and its proof- E due to (1) Uniformly charged sphere and (2) an infinite conducting sheet of charge. Electrical potential(V) – equipotential surfaces- V due to i) a point charge, ii) charged spherical shell .

	SM		<p><b>2.Dielectrics:</b> Electric dipole moment and molecular polarizability- Electric displacement D, electric polarization P –relation between D, E and P- Dielectric constant and susceptibility. Boundary conditions at the dielectric surface.</p>
		CO 2	<p><b>3.Electric and magnetic fields</b> Biot-Savart’s law, B due to long straight wire, a circular current loop and solenoid – Hall effect – determination of Hall coefficient and applications.</p> <p><b>4.Electromagnetic induction</b> Faraday’s law-Lenz’s law- Self and mutual inductance, coefficient of coupling, L of a long solenoid, energy stored in magnetic field. Transformer - energy losses - efficiency.</p>
		CO 3	<p>Alternating current - Relation between current and voltage in LR and CR circuits, vector diagrams, LCR series and parallel resonant circuit, Q –factor, power in ac circuits.</p> <p><b>6.Maxwell’s equations</b> Idea of displacement current - Maxwell’s equations (integral and differential forms), Maxwell’s wave equation ( . Pointing theorem (statement), production of electromagnetic waves (Hertz experiment).</p>
			<p>PN junction diode, Zener diode, I-V characteristics, PNP and NPN transistors, CB, CE and CC configurations – Relation between <math>\alpha, \beta</math> and <math>\gamma</math> - transistor (CE) characteristics , Transistor as an amplifier.</p> <p>Number systems - Conversion of binary to decimal system and vice- versa. Binary subtraction ( 2’s complement methods).Laws of Booleanalgebra - De Morgan’s laws-statement and proof, Basic logic gates, NANDand NOR as universal gates, exclusive-OR gate, Half adder and Full adder.</p>

PHY-	Modern Physics, Quantum Mechanics	CO 1	<p>Introduction –Drawbacks of Bohr’s atomic model. Vector atom model and SternGerlach experiment - quantum numbers associated with it. L-S and j- j coupling schemes. Zeeman effect(Definition only) -Raman effect, hypothesis, Stokes and Anti Stokes lines. Quantum theory of Raman effect. Experimental arrangement – Applications of Raman effect.</p> <p>Matter waves, de Broglie’s hypothesis - wavelength of matter waves, Properties of matter waves - Davisson and Germer experiment – Heisenberg’s uncertainty principle for position and momentum (x and p) &amp; Energy and time (E and t).</p>
		CO 2	<p>Basic postulates of quantum mechanics-Schrodinger time independent and time dependent wave equations-derivations. Physical interpretation of wave function. Eigen functions, Eigen values. Application of Schrodinger wave equation to particle in one dimensional infinite box.</p> <p>General Properties of Nuclei Basic ideas of nucleus -size, mass,Charge density (matter energy), binding energy, magnetic moment, electric moments. Liquid drop model and Shell model (qualitative aspects only) - Magic numbers.</p>
		CO 3	<p>Radioactivity decay Alpha decay: basics of <math>\alpha</math>-decay processes. Theory of <math>\alpha</math>-decay, Gamow’s theory, Geiger Nuttal law.<math>\beta</math>-decay, Energy kinematics for <math>\beta</math>-decay, positron emission, electron capture, neutrino hypothesis.</p>
		CO 4	<p>Crystal Structure Amorphous and crystalline materials, unit cell, Miller indices, reciprocal lattice, types of lattices, diffraction of X-rays by crystals, Bragg’s law, experimental techniques, Laue’s method. Superconductivity Introduction - experimental facts, critical temperature - critical field - Meissner effect – Isotope effect - Type I and type II Superconductors - applications of superconductors</p>

PHY-	Analog & Digital ckts	CO 1	<p>1.FET-Construction, Working, characteristics and uses; MOSFET-enhancement MOSFET, construction and working , drain characteristics of MOSFET, applications of MOSFET</p> <p>2. Photo electric devices: Structure and operation, characteristics, application of LDR, LED</p>
		CO 2	<p>3. Operational Amplifiers: Characteristics of ideal and practical Op-Amp (IC 741), Basic differential amplifiers, Op-Amp supply voltage, IC identification, Internal blocks of Op-Amp, CMRR, slew rate, concept of virtual ground.</p> <p>4. Applications of Op-Amp: Op-Amp as, Inverting amplifier, Non-inverting amplifier, voltage follower, summing amplifier, difference amplifier, comparator, integrator, differentiator.</p>
		CO 3	<p>5. Data processing circuits: Multiplexers, De-multiplexers, encoders, decoders, Characteristics for Digital ICs -RTL, DTL, TTL, (NAND &amp; NOR Gates).</p> <p>6. IC 555 Timer -Its pin diagram, internal architecture, Application as astablemulti vibrator and mono stable multi vibrator.</p>
		CO 4	<p>7. Sequential digital circuits: Flip-flops, RS, Clocked SR, JK, D, T, Master-Slave, Flip-flop,.</p> <p>8. Code Converters: Design of code converter, BCD to 7 segment, binary/BCD to gray, gray to binary/BCD.</p>
PHY-	Cluster1	CO 1	<p>Structure of Sun, Solar constant, Concept of Zenith angle and air mass, Definition of declination, hour angle, solar and surface azimuth angles; Direct, diffuse and total solar radiation, Solar intensity measurement–pyrheliometer.</p> <p>Kirchoff’s law – Relation between absorptance, emittance and reflectance; Selective Surfaces - preparation and characterization, Types and applications; Anti-reflectivecoating.</p>

			CO 2	Description of flat plate collector, Liquid heating type FPC, Energy balance equation, Efficiency, Temperature distribution in FPC, Definitions of fin efficiency and collector efficiency, Evacuated tubular collectors.
			CO 3	Physics of solar cell – Type of interfaces, homo, hetero and schottky interfaces, Photovoltaic Effect, Equivalent circuit of solar cell, Solar cell output parameters, Series and shunt resistances and its effect on cell efficiency; Variation of efficiency with band-gap and temperature. Solar cell module assembly – Steps involved in the fabrication of solar module, Module performance, I-V characteristics, Modules in series and parallel,
			CO 4	Module protection – Solar PV system and its components, PV array, inverter, battery and load.  Solar hot water system (SHWS), Types of SHWS, Standard method of testing the efficiency of SHWS; Passive space heating and cooling concepts, Solar desalinators and driers, Solar thermal power generation.
PHY-	Cluster II	CO 1	Wind Energy Conversion System: Aerodynamic design principles; Aerodynamic theories; Axial momentum, blade element; Rotor characteristics; Maximum power coefficient.  Wind Energy Application: Wind pumps: Performance analysis, design concept and testing; Principle of wind energy generation; Wind energy in India; Environmental Impacts of Wind farms.	
		CO 2	Wind Energy Conversion System: Aerodynamic design principles; Aerodynamic theories; Axial momentum, blade element; Rotor characteristics; Maximum power coefficient.  Wind Energy Application: Wind pumps: Performance analysis, design concept and testing; Principle of wind energy generation; Wind energy in India; Environmental Impacts of Wind farms.	

			CO 3	Small Hydropower Systems: Overview of micro, mini and small hydro systems; Hydrology; Elements of pumps and turbine; Selection and design criteria of pumps and turbines; Site selection; Speed and voltage regulation.
			CO 4	Ocean Thermal, Tidal and Wave Energy Systems: Ocean Thermal - Introduction, Technology process, Working principle, Electricity generation methods from OCET, Advantages and disadvantages, Applications of OTEC. Tidal Energy - Introduction, Origin and nature of tidal energy, Wave Energy – Introduction, Basics of wave motion, Power in waves, Wave energy conversion devices, Advantages and disadvantages, Applications of wave energy
	PHY-	Cluster3	CO	Energy storage Different modes, Fly wheel storage, Electric and magnetic energy storage, capacitors, electromagnets, chemical energy storage, Thermochemistry, Photochemical, Electrochemical
			CO 2	Hydrogen for energy storage, Batteries, Lithium, Solid state and molten solvent, Lead acid batteries, Nickel cadmium batteries, Advanced Batteries, Carbon nano tubes
			CO 3	Magnetic energy storage systems, Super capacitor, comparison and applications of capacitor and battery Fuel cell Component and principle, advantages and disadvantages, types of fuel cells
			CO 4	Alkaline fuel cell, phosphoric acid fuel cell, molten carbonate fuel cell, proton membrane fuel cell, Applications fuel cell

# **COURSE OUTCOMES**

## **Department of Mathematics**

### **Government Degree College (A), TUNI**

#### **1. DIFFERENTIAL EQUATIONS**

##### **Course Outcomes:**

After successful completion of this course, the student will be able to;

1. Solve linear differential equations
2. Convert nonexact homogeneous equations to exact differential equations by using integrating factors.
3. Know the methods of finding solutions of differential equations of the first order but not of the first degree.
4. Solve higher-order linear differential equations, both homogeneous and non-homogeneous, with constant coefficients.
5. Understand the concept and apply appropriate methods for solving differential equations

#### **2. THREE DIMENSIONAL ANALYTICAL SOLID GEOMETRY**

##### **Course Outcomes:**

After successful completion of this course, the student will be able to;

1. Get the knowledge of planes.
2. Basic idea of lines, sphere and cones.
3. Understand the properties of planes, lines, spheres and cones.
4. Express the problems geometrically and then to get the solution

### **3. ABSTRACT ALGEBRA**

#### **Course Outcomes:**

After successful completion of this course, the student will be able to;

1. Acquire the basic knowledge and structure of groups, subgroups and cyclic groups.
2. Get the significance of the notation of a normal subgroups.
3. Get the behavior of permutations and operations on them.
4. Study the homomorphism and isomorphism with applications.
5. Understand the ring theory concepts with the help of knowledge in group theory and to prove the theorems.
6. Understand the applications of ring theory in various fields.

### **4. REAL ANALYSIS**

#### **Course Outcomes:**

After successful completion of this course, the student will be able to

1. Get clear idea about the real numbers and real valued functions.
2. Obtain the skills of analyzing the concepts and applying appropriate methods for testing convergence of a sequence/ series.
3. Test the continuity and differentiability and Riemann integration of a function.
4. Know the geometrical interpretation of mean value theorems.

### **5. LINEAR ALGEBRA**

### **Course Outcomes:**

After successful completion of this course, the student will be able to;

1. Understand the concepts of vector spaces, subspaces, bases, dimension and their properties
2. Understand the concepts of linear transformations and their properties
3. Apply Cayley- Hamilton theorem to problems for finding the inverse of a matrix and higher powers of matrices without using routine methods
4. Learn the properties of inner product spaces and determine orthogonality in inner product spaces.

## **6. ANALYTICAL SKILLS**

### **Course Outcomes:**

After successful completion of this course, the student will be able to;

- 1) Understand the basic concepts of arithmetic ability, quantitative ability, logical reasoning, business computations and data interpretation and obtain the associated skills.
- 2) Acquire competency in the use of verbal reasoning.
- 3) Apply the skills and competencies acquired in the related areas
- 4) Solve problems pertaining to quantitative ability, logical reasoning and verbal ability inside and outside the campus.

# PROGRAM OUTCOMES

Department of Mathematics  
Government Degree College (A), TUNI

<b>Program</b>	<b>Program Outcome</b>	<b>Program Specific Outcomes</b>
MPC	Assess a sound understanding of theoretical foundations of various core subjects. Acquire analytical and logical thinking skills necessary to pursue higher education. Gain employment at entry level positions based on program curriculum.	The combination integrating all basic science courses lays a strong foundation and prepares the learner for post-graduation research in respective disciplines
		Analyse the concepts of mathematics, physics and chemistry and understand the relation among them like physical chemistry, mathematical modelling of physics and chemistry problems.
		Skills needed to handle instruments and adopt lab procedures to study physical chemical properties of materials. Mathematical,

		numerical techniques required to model them.
		Ability to interlink the skills and knowledge in mathematics, physics and chemistry and develop an aptitude to address the problems in biophysics, stock market analysis.

<b>Program</b>	<b>Program Outcome</b>	<b>Program Specific Outcomes</b>
MPCs	<p>Assess a sound understanding of theoretical foundations of various core subjects.</p> <p>Acquire analytical and logical thinking skills necessary to pursue higher education.</p> <p>Gain employment at entry level positions based on program curriculum.</p>	<p>Master a broad set of knowledge concerning the fundamentals in basic areas of Physics and Mathematics added with the necessary hands-on experience in various practical aspects of problem solving/ programming / experimentation. The program imparts students with an understanding of the basics of Computer Science, to develop proficiency in the practices of</p>

		computing, and to prepare them for continued professional development.
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<b>Program</b>	<b>Program Outcome</b>	<b>Program Specific Outcomes</b>
MCCs	<p>Assess a sound understanding of theoretical foundations of various core subjects.</p> <p>Require analytical and logical thinking skills necessary to pursue higher education.</p> <p>Gain employment at entry level positions based on program curriculum.</p>	<p>Master a broad set of knowledge concerning the fundamentals in basic areas of Chemistry and Mathematics added with the necessary hands-on experience in various practical aspects of problem solving/ programming / experimentation. The program imparts students with an understanding of the basics of Computer Science, to develop proficiency in the practices of computing, and to prepare them for continued professional development.</p>

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**  
**DEPARTMENT OF COMPUTER APPLICATIONS**  
**I Year B. Com., Computer Applications, I Semester**  
**(W.E.F 2020-2021)**  
**PAPER – I: INFORMATION TECHNOLOGY**

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**Time: 5 Hours / Week**

**Internal: 30 Marks**

**External: 70 Marks**

**Learning Outcomes:**

At the end of the course, the students is expected to DEMONSTRATE the following cognitive abilities (thinking skill) and psychomotor skills.

A. Remembers and states in a systematic way (Knowledge)

1. Describe the fundamental hardware components that make up a computer's hardware and the role of each of these components
2. understand the difference between an operating system and an application program, and what each is used for in a computer
3. Use technology ethically, safely, securely, and legally
4. Use systems development, word-processing, spreadsheet, and presentation software to solve basic information systems problems

B. Explains (Understanding)

5. Apply standard statistical inference procedures to draw conclusions from data
6. Retrieve information and create reports from databases
7. Interpret, produce, and present work-related documents and information effectively and accurately

C. Critically examines, using data and figures (Analysis and Evaluation\*\*)

8. Analyze compression techniques and file formats to determine effective ways of securing, managing, and transferring data
9. Identify and analyze user needs and to take them into account in the selection, creation, integration, evaluation, and administration of computing based systems.

10. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.

11. Identify and analyze computer hardware, software

D. Working in 'Outside Syllabus Area' under a Co-curricular Activity(Creativity) Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.

E. Efficiently learn and use Microsoft Office applications.

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**  
**DEPARTMENT OF COMPUTER APPLICATIONS**  
**I Year B.Com., Computer Applications, I Semester**  
**(W.E.F 2020-2021)**  
**PAPER – II: E-COMMERCE AND WEB DESIGNING**

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**Time : 5 Hours / Week**

**Internal: 30 Marks**

**External: 70 Marks**

**Learning Outcomes:**

At the end of the course, the students is expected to DEMONSTRATE the following cognitive abilities (thinking skill) and psychomotor skills.

A. Remembers and states in a systematic way (Knowledge)

1. Understand the foundations and importance of E-commerce
2. Define Internet trading relationships including Business to Consumer, Business- to-Business, Intra-organizational
3. Describe the infrastructure for E-commerce
4. Discuss legal issues and privacy in E-Commerce
5. Understand the principles of creating an effective web page, including an in-depth consideration of information architecture

B. Explains (Understanding)

6. Recognize and discuss global E-commerce issues
7. Learn the language of the web: HTML and CSS.
8. Analyze the impact of E-commerce on business models and strategy

C. Critically examines, using data and figures (Analysis and Evaluation)

9. Assess electronic payment systems
10. Exploring a web development framework as an implementation example and create dynamically generated web site complete with user accounts, page level security, modular design using css

D. Working in 'Outside Syllabus Area' under a Co-curricular Activity(Creativity) Use the Systems Design Approach to implement websites with the following steps:

- Define purpose of the site and subsections
- Identify the audience
- Design and/or collect site content
- Design the website theme and navigational structure

- Design & develop web pages including: CSS Style Rules, Typography, Hyperlinks, Lists, Tables, Frames, Forms, Images, behaviors, CSS Layouts
- E. Build a site based on the design decisions and progressively incorporate tools and techniques covered

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**  
**DEPARTMENT OF COMPUTER APPLICATIONS**  
**B.Com., Computer Applications (W.E.F 2020-2021)**  
**PAPER III :OFFICE AUTOMATION TOOLS**  
**II Year SEMESTER – III**

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**Time : 5 Hours / Week**

**Internal: 25 Marks**

**External: 75 Marks**

**Course Objectives :**

office tools course would enable the students in crafting professional word documents, excel spreadsheets, powerpoint presentations using the Microsoft suite of office tools.

To familiarize the students in preparation of documents and presentations with office automation tools.

**Learning Outcomes:**

1. Computer Literacy
2. Microsoft Office, including Word, PowerPoint, Excel, Access, and Outlook
3. Improve Keyboarding & 10-Key techniques
4. Efficient Internet Research
5. Spelling, Punctuation, and Grammar
6. General Office Skills; File Management, Record Filing, Telephone & Email Etiquette
7. Intuit QuickBooks Accounting
8. Creating Fillable Forms with Adobe Acrobat Pro

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**  
**DEPARTMENT OF COMPUTER APPLICATIONS**  
**II B.Com., COMPUTER APPLICATIONS (W.E.F 2020-2021)**  
**PAPER IV: Business Analytics**  
**SEMESTER – IV**

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**Time: 5 Hours / Week**

**Internal: 25 Marks**

**External: 75 Marks**

**Objectives:** Here are the key objectives that are emphasized during the course:

- Data extraction: Investigate data to establish new relationships and patterns
- Predictive Analytic and Predictive Modelling: Analyze the correlation between different variables
- Logistic Regression: Analyze the possibility of default and generate customer records
- Problem analysis: Understand and explore problems in business
- Data interpretation: Use tools such as Excel and open source to interpret data
- Problem-solving: Use analytics to solve business problems

**Learning Outcomes**

- Enable all participants to recognize, understand and apply the language, theory and models of the field of business analytics
- Foster an ability to critically analyze, synthesize and solve complex unstructured business problems
- Encourage an aptitude for business improvement, innovation and entrepreneurial action
- Encourage the sharing of experiences to enhance the benefits of collaborative learning
- Install a sense of ethical decision-making and a commitment to the long-run welfare of both organizations and the communities they serve

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**  
**DEPARTMENT OF COMPUTER APPLICATIONS**  
**III B.Com. COMPUTER APPLICATIONS (W.E.F 2020-2021)**  
**PAPER – V(A): DATABASE MANAGEMENT SYSTEMS**  
**SEMESTER – V**

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**Time : 5 Hours / Week**

**Internal: 25 Marks**

**External:75 Marks**

**Course Objective:**

Design & develop database for large volumes & varieties of data with optimized data processing techniques.

**Course Outcomes**

On completing the subject, students will be able to:

1. Design and model of data in database.
2. Store, Retrieve data in database.

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**  
**DEPARTMENT OF COMPUTER APPLICATIONS**  
**III B.Com. COMPUTER APPLICATIONS (W.E.F 2020-2021)**  
**Paper V(B) : Web Technologies**  
**SEMESTER – V**

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**Time: 5 Hours / Week**

**Internal: 25Marks**

**External: 75 Marks**

**Course Objective**

To provide knowledge on web architecture, web services client side and server side scripting technologies to focus on the development of web-based information systems and web services.

To provide skills to design interactive and dynamic web sites.

**Course Outcome**

1. To understand the web architecture and webservices.
2. To practice latest web technologies and tools by conducting experiments.
3. To design interactive web pages using HTML and Stylesheets.
4. To study the frame work and building blocks of .NET Integrated Development Environment.
5. To provide solutions by identifying and formulating IT related problems.

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**  
**DEPARTMENT OF COMPUTER APPLICATIONS**  
**III B.Com., COMPUTER APPLICATIONS SYLLABUS (W.E.F 2020-2021)**  
**PAPER V(C) :Project Work (in Web Technologies and DBMS)**  
**SEMESTER – V**

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**Time: 5 Hours / Week**

**Total:100 Marks**

**Course Objective**

To provide knowledge on web architecture, web services client side and server side scripting technologies to focus on the development of web-based information systems and web services. To provide skills to design interactive and dynamic web sites.

**Course Outcome**

On completing the project, students will be able to:

1. Design and model of data in database.
2. Store, Retrieve data in database.
3. To understand the web architecture and webservice.
4. To practice latest web technologies and tools by conducting experiments.

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**  
**DEPARTMENT OF COMPUTER APPLICATIONS**  
**III B.Com COMPUTER Applications (W.E.F 2020-2021)**  
**PAPER VI(A) : e-Commerce**  
**SEMESTER – VI**

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**Time: 5 Hours / Week**

**Internal: 25 Marks**

**External: 75 Marks**

**Course Objectives:**

- Reduce management costs. ...
- Developing business relations. ...
- Providing a unique customer experience. ...
- Increasing the number of loyal customers. ...
- Boosting the efficiency of services. ...
- Developing relevant target. ...
- Making responsive ecommerce website. ...
- Increasing sales.

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**  
**DEPARTMENT OF COMPUTER APPLICATIONS**  
**III B.Com COMPUTER APPLICATIONS (W.E.F 2020-2021)**  
**PAPER VI(B) :Tally with GST Applications**  
**SEMESTER – VI**

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**Time: 5 Hours / Week**

**Internal: 25 Marks**

**External: 75 Marks**

**Objective of the Course:**

- To make students ready with the very well-known Computerized Accounting software
- Making students understand ERP software working and accounting management
- Gaining knowledge on accounting, inventory and Taxation including GST, TDS with Payroll management also.

**Outcome of the Course:**

After Completion of the Course, students are expected to be able to :

- Manage accounting of any Business or individuals
- Creating Computerized Books of accounts with finalizing reports
- Various extra topics related to computerized accounting like Auditing, Grouping companies, Vault passwords and many more
- Getting Automated Printing salary slips, Scheduled reports, Outstanding reports etc

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**  
**DEPARTMENT OF COMPUTER APPLICATIONS**  
**B.Com., COMPUTER APPLICATIONS MODEL PAPER(W.E.F 2020-2021)**  
**III Year: SEMESTER – VI**  
**PAPER VI(C): PROJECT (Tally with GST Applications)**

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**Time: 5 Hours / Week**

**Total:100 Marks**

**Objective of the Course:**

- To make student ready with the very well-known Computerized Accounting software
- Making students understand ERP software working and accounting management
- Gaining knowledge on accounting, inventory and Taxation including GST, TDS with Payroll management also.

**Outcome of the Course:**

After Completion of the Course, students are expected to be able to:

- Manage accounting of any Business or individuals
- Creating Computerized Books of accounts with finalizing reports
- Various extra topics related to computerized accounting like Auditing, Grouping companies, Vault passwords and many more

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**

**DEPARTMENT OF COMPUTER SCIENCE**  
**I B.Sc., Computer Science (W.E.F 2020-2021)**  
**PAPER – I: PROBLEM SOLVING IN C**  
**SEMESTER –I**

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**Time: 4 Hours / Week**

**Internal: 30 Marks**

**External:70 Marks**

**Objectives:**

This course aims to provide exposure to problem-solving through programming. It introduces the concepts of the C Programming language.

**Course Learning Outcomes:**

Upon successful completion of the course, a student will be able to:

1. Understand the evolution and functionality of a Digital Computer.
2. Apply logical skills to analyze a given problem
3. Develop an algorithm for solving a given problem.
4. Understand ‘C’ language constructs like Iterative statements, Array processing, Pointers, etc.
5. Apply ‘C’ language constructs to the algorithms to write a ‘C’ language program.

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**  
**DEPARTMENT OF COMPUTER SCIENCE**  
**I B.Sc., Computer Science (W.E.F 2020-2021)**  
**PAPER – I: PROBLEM SOLVING IN C LAB**  
**SEMESTER –I**

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**Objectives:**

This course aims to provide exposure to problem-solving through programming. It introduces the concepts of the C Programming language.

**Course Learning Outcomes:**

Upon successful completion of the course, a student will be able to:

1. Understand the evolution and functionality of a Digital Computer.
2. Apply logical skills to analyze a given problem
3. Develop an algorithm for solving a given problem.
4. Understand ‘C’ language constructs like Iterative statements, Array processing, Pointers, etc.
5. Apply ‘C’ language constructs to the algorithms to write a ‘C’ language program.

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**

**DEPARTMENT OF COMPUTER SCIENCE  
I B.Sc., Computer Science (W.E.F 2020-2021)  
PAPER – II: Data Structures using C  
SEMESTER –II**

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**Time: 4 Hours / Week**

**Internal: 30 Marks**

**External:70 Marks**

**Course Objectives**

To introduce the fundamental concept of data structures and to emphasize the importance of various data structures in developing and implementing efficient algorithms.

**Course Learning Outcomes:**

Upon successful completion of the course, a student will be able to:

1. Understand available Data Structures for data storage and processing.
2. Comprehend Data Structure and their real-time applications - Stack, Queue, Linked List, Trees and Graph
3. Choose a suitable Data Structures for an application
4. Develop ability to implement different Sorting and Search methods
5. Have knowledge on Data Structures basic operations like insert, delete, search, update and traversal
6. Design and develop programs using various data structures
7. Implement the applications of algorithms for sorting, pattern matching etc

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**  
**DEPARTMENT OF COMPUTER SCIENCE**  
**I B.Sc., Computer Science (W.E.F 2020-2021)**  
**PAPER – II: Data Structures using C Lab**  
**SEMESTER –II**

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**Course Objectives**

To introduce the fundamental concept of data structures and to emphasize the importance of various data structures in developing and implementing efficient algorithms.

**Course Learning Outcomes:**

Upon successful completion of the course, a student will be able to:

1. Understand available Data Structures for data storage and processing.
2. Comprehend Data Structure and their real-time applications - Stack, Queue, Linked List, Trees and Graph
3. Choose a suitable Data Structures for an application
4. Develop ability to implement different Sorting and Search methods
5. Have knowledge on Data Structures basic operations like insert, delete, search, update and traversal
6. Design and develop programs using various data structures
7. Implement the applications of algorithms for sorting, pattern matching etc

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**  
**DEPARTMENT OF COMPUTER SCIENCE**  
**II Year B.Sc., Computer Science (W.E.F 2020-2021)**  
**PAPER – III: OBJECT ORIENTED PROGRAMMING USING JAVA**  
**SEMESTER – III**

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**Time : 4 Hours / Week**

**Internal: 25 Marks**

**External: 75 Marks**

**Course Objectives:**

1. To understand fundamentals of object-oriented programming in Java which includes defining classes, invoking methods, using class libraries.
2. To create Java application programs using sound OOP practices such as interfaces, APIs and error exception handling.

**Course Outcomes:**

- ❖ Able to understand the use of OOPs concepts.
- ❖ Able to solve real world problems using OOP techniques.
- ❖ Able to understand the use of abstraction.
- ❖ Able to understand the use of Packages and Interface in java.

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**  
**DEPARTMENT OF COMPUTER SCIENCE**  
**II B.Sc COMPUTER SCIENCE**  
**OBJECT ORIENTED PROGRAMMING USING JAVA LAB**

**Course Objectives:**

- To make the student learn a object oriented way of solving problems.
- To teach the student to write programs in Java to solve the problems

**Learning Outcomes:**

**Student will be able to**

- ❖ Use basic I/O to communicate with the user to populate variables and control program flow.
- ❖ Use arithmetic, logical, relational, and string manipulation expressions to process data.
- ❖ Write a complete class definition with in the class definition, write class and instance methods including the constructor and overloaded methods.
- ❖ Implement appropriate program design using good programming style. Conceptualize, Analyze and write programs to solve more complicated problems using the concepts of Object Oriented and java technology.
- ❖ Apply validation techniques to build a reliable solution to a given problem. Apply all the programming concepts as and when required in the future application development.

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**  
**DEPARTMENT OF COMPUTER SCIENCE**  
**II B.Sc., Computer Science (W.E.F 2020-2021)**  
**PAPER – IV: DATA STRUCTURES**  
**SEMESTER – IV**

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**Time : 4 Hours / Week**

**Internal: 25 Marks**

**External: 75 Marks**

**Course Objectives:**

To introduce the fundamental concept of data structures and to emphasize the importance of data structures in developing and implementing efficient algorithms.

**Course Outcomes:**

After completing this course satisfactorily, a student will be able to:

1. Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms
2. Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs.
3. Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs
4. Demonstrate different methods for traversing trees
5. Compare alternative implementations of data structures with respect to performance
6. Compare and contrast the benefits of dynamic and static data structures implementations
7. Describe the concept of recursion, give examples of its use, describe how it can be implemented using a stack.
8. Discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing.

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**  
**DEPARTMENT OF COMPUTER SCIENCE**  
**II B.Sc. COMPUTER SCIENCE**  
**DATA STRUCTURES USING JAVA LAB**  
**IV SEMESTER**

**Objectives:**

The course is designed to develop skills to design and analyze simple linear and non linear data structures. It strengthen the ability to the students to identify and apply the suitable data structure for the given real world problem. It enables them to gain knowledge in practical applications of data structures.

**Outcomes:**

At the end of this lab session, the student will

- ❖ Be able to design and analyze the time and space efficiency of the data structure
- ❖ Be capable to identify the appropriate data structure for given problem
- ❖ Have practical knowledge on the applications of data structures

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**

**DEPARTMENT OF COMPUTER SCIENCE**

**III B.Sc Computer Science (W.E.F 2020-2021)**

**PAPER – V (A): DATABASE MANAGEMENT SYSTEMS**

**SEMESTER – V**

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**Time: 4 Hours / Week**

**Internal: 25 Marks External: 75 Marks**

**Course Objective:**

Design & develop database for large volumes & varieties of data with optimized data processing techniques.

**Course Outcomes :**

On completing the subject, students will be able to:

1. Design and model of data in database.
2. Store, Retrieve data in database.

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**  
**DEPARTMENT OF COMPUTER SCIENCE**  
**III YEAR**  
**V SEMESTER**  
**DATABASE MANAGEMENT SYSTEMS LAB**

**Objectives:**

The major objective of this lab is to provide a strong formal foundation in database concepts, Technology and practice to the participants to groom them into well-informed database application developers. Rather than imparting isolated knowledge/experience fragments in each of concepts, technology and practice, the course will aim at achieving a good blend of the three. The overriding concern, therefore, is to include just enough concepts and theory to motivate and enrich the practical component, and to include technology component to maximize the relevance of the course to the industry without sacrificing the long-term objectives of rigorous and foundational strength that can withstand the vagaries of technological advances. The sub-objectives are:

- ❖ To provide a sound introduction to the discipline of database management as a subject in its own right, rather than as a compendium of techniques and product-specific tools.
- ❖ To familiarize the participant with the nuances of database environments towards an information-oriented data-processing oriented framework
- ❖ To give a good formal foundation on the relational model of data
- ❖ To present SQL and procedural interfaces to SQL comprehensively
- ❖ To give an introduction to systematic database design approaches covering conceptual design, logical design and an overview of physical design
- ❖ To motivate the participants to relate all these to one or more commercial product environments as they relate to the developer tasks

- ❖ To present the concepts and techniques relating to query processing by SQL engines
- ❖ To present the concepts and techniques relating to ODBC and its implementations.
- ❖ To introduce the concepts of transactions and transaction processing
- ❖ To present the issues and techniques relating to concurrency and recovery in multi-user database environments

**Outcomes:**

After undergoing this laboratory module, the participant should be able to:

- Understand, appreciate and effectively explain the underlying concepts of database technologies
- Design and implement a database schema for a given problem-domain
- Normalize a database
- Populate and query a database using SQL DML/DDI commands.
- Declare and enforce integrity constraints on a database using a state-of-the-artRDBMS
- Programming PL/SQL including stored procedures, stored functions, cursors,packages.
- Design and build a GUI application using a 4GL

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**DEPARTMENT OF COMPUTER SCIENCE**  
**III B.Sc Computer Science (W.E.F 2020-2021)**  
**PAPER – V(B): SOFTWARE ENGINEERING**  
**SEMESTER – V**

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**Time : 4 Hours / Week**

**Internal: 25Marks    External: 75 Marks**

**Course Objectives**

The Objective of the course is to assist the student in understanding the basic theory of software engineering, and to apply these basic theoretical principles to a group software development project.

**Course outcomes**

1. Ability to gather and specify requirements of the software projects.
2. Ability to analyze software requirements with existing tools
3. Able to differentiate different testing methodologies
4. Able to understand and apply the basic project management practices in real life projects
5. Ability to work in a team as well as independently on software projects

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**  
**DEPARTMENT OF COMPUTER SCIENCE**  
**III B.Sc COMPUTER SCIENCE**  
**III YEAR V SEMESTER**  
**Software Engineering Lab**

**Objectives :**

Students will be capable to acquire the generic software development skill through various stages of software life cycle. He will also be able to ensure the quality of software through software development with various protocol based environment.

**Outcomes:**

After completion of course student will be able to generate test cases for software testing. Students will also be able to handle software development models through rational method. Rational Rose Enterprise Edition software is used to serve the objectives. The courses contains Basic Structural Modeling, Advance Structural Modeling, Basic Behavioral Modeling, Advance Behavioral Modeling, Architectural Modeling, UML Notation, UML Stranded Elements, Designing Test cases, Test Suits, Rational Unified Process etc.

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**DEPARTMENT OF COMPUTER SCIENCE**  
**III B.Sc., Computer Science (W.E.F 2020-2021)**  
**Elective – A: OPERATING SYSTEMS**  
**COURSE CODE: CSC121**  
**SEMESTER – VI**

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**Time: 3 Hours / Week**

**Internal: 25 Marks**

**External: 75 Marks**

**Course Objectives**

1. To understand the services provided by and the design of an operating system.
2. To understand the structure and organization of the file system.
3. To understand what a process is and how processes are synchronized and schedules.
4. To understand different approaches to memory management.
5. Students should be able to use system calls for managing processes, memory and the file system.

**Course Outcomes**

1. Analyze the concepts of processes in operating system and illustration of the scheduling of processor for a given problem instance.
2. Identify the dead lock situation and provide appropriate solution so that protection and security of the operating system is also maintained.
3. Analyze memory management techniques, concepts of virtual memory and disk scheduling.
4. Understand the implementation of file systems and directories along with the interfacing of IO devices with the operating system.

**III YEAR: VI SEMESTER**  
**Elective-A**  
**Operating Systems Lab**

**Objectives:**

- To use linux operating system for study of operating system concepts.
- To write the code to implement and modify various concepts in operating systems

**Outcomes:**

- The course objectives ensure the development of students applied skills in operating systems related areas.
- Students will gain knowledge in writing software routines modules or implementing various concepts of operating system.

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**DEPARTMENT OF COMPUTER SCIENCE**  
**III B.Sc COMPUTER SCIENCE (W.E.F 2020-2021)**  
**Elective –B : COMPUTER NETWORKS**  
**SEMESTER – VI**

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**Time: 3 Hours / Week**

**Internal: 25 Marks**

**External: 75 Marks**

**Course Objectives**

1. To provide an introduction to the fundamental concepts on data communication and the design of computer networks.
2. To get familiarized with the basic protocols of computer networks.

**Course Outcomes**

After this course, the student will be able to

1. Identify the different components in a Communication System and their respective roles.
2. Describe the technical issues related to the Local Area Networks
3. Identify the common technologies available in establishing LAN infrastructure.

**III YEAR: VI SEMESTER**  
**Elective-B**  
**COMPUTER NETWORKS Lab**

**OBJECTIVES:**

1. Analyze the different layers in networks.
2. Define, use, and differentiate such concepts as OSI-ISO, TCP/IP.
3. How to send bits from physical layer to data link layer
4. Sending frames from data link layer to Network layer
5. They can understand how the data transferred from source to destination
6. They can come to know that how the routing algorithms worked out in network layer

List of Experiments:

1. Analyze the different layers in networks.
2. Define, use, and differentiate such concepts as OSI-ISO, TCP/IP.

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**DEPARTMENT OF COMPUTER SCIENCE**  
**III B.Sc COMPUTER SCIENCE (W.E.F 2020-2021)**  
**Elective –C : Web Technologies**  
**SEMESTER – VI**

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**Time: 3 Hours / Week**

**Internal: 25 Marks**

**External: 75 Marks**

**Course Objective**

To provide knowledge on web architecture, web services client side and server side scripting technologies to focus on the development of web-based information systems and web services.

To provide skills to design interactive and dynamic web sites.

**Course Outcome**

6. To understand the web architecture and web services.
7. To practice latest web technologies and tools by conducting experiments.
8. To design interactive web pages using HTML and Style Sheets.
9. To study the framework and building blocks of .NET Integrated Development Environment.
10. To provide solutions by identifying and formulating IT related problems.

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**DEPARTMENT OF COMPUTER SCIENCE**  
**III B.Sc., Computer Science (W.E.F 2020-2021)**  
**Cluster A3: PROJECT WORK**  
**SEMESTER – VI**

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**Time: 5 Hours / Week      Credits: 5      Internal: 25 Marks      External: 75 Marks**

**Follow SDLC process for real time applications and develop real time application project**

The objective of the project is to motivate them to work in emerging/latest technologies, help the students to develop ability, to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and research laboratories.

The project is of 5 hours/week for one (semester VI) semester duration and a student is expected to do planning, analyzing, designing, coding, and implementing the project. The initiation of project should be with the project proposal. The synopsis approval will be given by the project guides.

The project proposal should include the following:

- Title
- Objectives
- Input and output
- Details of modules and process logic Limitations of the project
- Tools/platforms, Languages to be used Scope of future application

The Project work should be either an individual one or a group of not more than three members and submit a project report at the end of the semester. The students shall defend their dissertation in front of experts during viva-voce examinations.

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**  
**DEPARTMENT OF COMPUTER SCIENCE**  
**III Year B.Sc., Computer Science, VI Semester**  
**(W.E.F 2020-2021)**  
**Cluster A1: FOUNDATION OF DATA SCIENCES**

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**Time: 3 Hours / Week**

**Internal: 25 Marks**

**External: 75 Marks**

**Course Objectives**

Modern scientific, engineering, and business applications are increasingly dependent on data, existing traditional data analysis technologies were not designed for the complexity of the modern world. Data Science has emerged as a new, exciting, and fast-paced discipline that explores novel statistical, algorithmic, and implementation challenges that emerge in processing, storing, and extracting knowledge from Big Data.

**Course Outcomes**

1. Able to apply fundamental algorithmic ideas to process data.
2. Learn to apply hypotheses and data into actionable predictions.
3. Document and transfer the results and effectively communicate the findings using visualization techniques.

**III YEAR VI SEMESTER**  
**(Cluster A1)**  
**Foundation of Data Science Lab**

**Objectives:**

- R is a well-developed, simple and effective programming language which includes conditionals, loops, user defined recursive functions and input and output facilities.
- R has an effective data handling and storage facility,
- R provides a suite of operators for calculations on arrays, lists, vectors and matrices.
- R provides a large, coherent and integrated collection of tools for data analysis.

**Outcomes:**

- 1) At end student will learn to handle the data through R.
- 2) Student will familiar with loading and unloading of packages.

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**  
**DEPARTMENT OF COMPUTER SCIENCE**  
**III Year B.Sc., Computer Science, VI Semester**  
**Cluster A2: BIG DATA**

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**Time : 3 Hours / Week**

**Internal: 25 Marks**

**External: 75 Marks**

**Course Objective**

The Objective of this course is to provide practical foundation level training that enables immediate and effective participation in big data projects. The course provides grounding in basic and advanced methods to big data technology and tools, including Map Reduce and Hadoop and its ecosystem.

**Course Outcome**

1. Learn tips and tricks for Big Data use cases and solutions.
2. Learn to build and maintain reliable, scalable, distributed systems with Apache Hadoop.
3. Able to apply Hadoop ecosystem components.

**III YEAR  
VI SEMESTER  
Cluster A2 : BIG DATA TECHNOLOGY LAB**

**Objectives:**

- Understand what Hadoop is
- Understand what Big Data is
- Learn about other open source software related to Hadoop

**Outcomes:**

- i) Get help on the various Hadoop commands
- ii) Observe a Map-Reduce job in action

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**  
**DEPARTMENT OF COMPUTER SCIENCE**  
**III B.Sc COMPUTER SCIENCE (W.E.F 2020-2021)**  
**CLUSTER - B1: DISTRIBUTED SYSTEM**  
**SEMESTER – VI**

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**Time : 3 Hours / Week**

**Internal: 25 Marks**

**External: 75 Marks**

*Course Objectives*

- To expose the fundamentals of distributed computer systems, assuming the availability of facilities for data transmission.
- To discuss multiple levels of distributed algorithms, distributed file systems, distributed databases, security and protection.

*Course Outcomes*

- Create models for distributed systems.
- Apply different techniques learned in the distributed system.

**III YEAR**  
**VI SEMESTER**  
**Cluster B1 : DISTRIBUTED SYSTEMS LAB**

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**OBJECTIVE:**

It covers all the aspects of distributed system. It introduce its readers to basic concepts of middleware, states of art middleware technology

**OUTCOMES:**

1. Students will get the concepts of Inter-process communication
2. Students will get the concepts of Distributed Mutual Exclusion and Distributed Deadlock Detection algorithm.

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI**

**DEPARTMENT OF COMPUTER SCIENCE**

**III B.Sc COMPUTER SCIENCE (W.E.F 2020-2021)**

**CLUSTER – B2 : CLOUD COMPUTING**

**SEMESTER – VI**

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**Time : 3 Hours / Week**

**Internal: 25 Marks**

**External: 75 Marks**

*Course Objectives:*

The student will learn about the cloud environment, building software systems and components that scale to millions of users in modern internet, cloud concepts capabilities across the various cloud service models including Iaas, Paas, Saas, and developing cloud based software applications on top of cloud platforms.

*Course Outcomes:*

1. Compare the strengths and limitations of cloud computing
2. Identify the architecture, infrastructure and delivery models of cloud computing
3. Apply suitable virtualization concept.
4. Choose the appropriate cloud player, Programming Models and approach.
5. Address the core issues of cloud computing such as security, privacy and interoperability
6. Design Cloud Services and Set a private cloud

**GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), TUNI  
DEPARTMENT OF COMPUTER SCIENCE**

**III B.Sc COMPUTER SCIENCE (W.E.F 2020-2021)  
VI SEMESTER  
Cluster B2 : CLOUD COMPUTING LAB**

**OUTCOMES: LEARNER WILL BE ABLE TO...**

1. Appreciate cloud architecture
2. Create and run virtual machines on open source OS
3. To implement Infrastructure, Storage as a Service.

**USE EUCALYPTUS OR OPEN NEBULA OR EQUIVALENT TO SET UP THE CLOUD AND DEMONSTRATE.**

1. Find procedure to run the virtual machine of different configuration. Check how many virtual machines can be utilized at particular time.
2. Find procedure to attach virtual block to the virtual machine and check whether it holds the data even after the release of the virtual machine.
3. Install a C compiler in the virtual machine and execute a sample program.
4. Show the virtual machine migration based on the certain condition from one node to the other.
5. Find procedure to install storage controller and interact with it.
6. Creating a Warehouse Application in Salesforce.com.
7. Creating an Application in Sales Force.com using Apex programming Language.
8. Implementation of SOAP web services in C#/ JAVA Applications.
9. Implementation of Para- Virtualization using VM ware's workstation/ Oracle's Virtual Box and Guest O.S.
10. Case study: PAAS ( Face book, Google App Engine)
11. Case Study: Amazon Webservices.

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**DEPARTMENT OF COMPUTER SCIENCE**  
**III B.Sc COMPUTER SCIENCE (W.E.F 2020-2021)**  
**Cluster C1: PHP and MYSQL**  
**SEMESTER – VI**

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**Time : 3 Hours / Week**

**Internal: 25 Marks**

**External: 75 Marks**

**Course Objectives**

To introduce the concept of PHP and to induce basic knowledge of PHP, learn about PHP Syntax., Arrays, PHP Loops, PHP and MySQL connectivity, PHP form validation, PHP form handling. Overview of MySQL and PHPMyAdmin, Understand basic concepts of how a database stores information via tables, Understanding of SQL syntax used with MySQL, Learn how to retrieve and manipulate data from one or more tables, Know how to filter data based upon multiple conditions, Updating and inserting data into existing tables, Learning how the relationships between tables will affect the SQL, The advantages of store procedures with storing data using variables and functions, How SQL can be used with programming languages like PHP to create dynamic websites for visitors, Review of some sample PHP projects interacting with MySQL.

**Course Outcomes**

After completing this course satisfactorily, a student will be able to:

1. Introduction to web development with PHP
2. How to code a PHP application
3. Introduction to relational databases and MySQL
4. How to use PHP with a MySQL database
5. How to test and debug a PHP application
6. How to work with form data
7. How to code control statements
8. How to work with strings and numbers
9. How to work with dates
10. How to create and use arrays
11. How to work with cookies and sessions
12. How to create and use functions
13. How to use regular expressions, handle exceptions, and validate data

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**DEPARTMENT OF COMPUTER SCIENCE**  
**III B.Sc., Computer Science (W.E.F 2020-2021)**  
**Cluster C2 : Advanced Java Script (JQUERY / AJAX / JSON)**  
**SEMESTER – VI**

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**Time : 3 Hours / Week**

**Internal: 25 Marks**

**External: 75 Marks**

**Course Objective:**

- To impart knowledge in designing a webpage in a structured way by using advanced java script i.e., using different scripting languages.

**Course Outcomes**

- On completing the subject, students will be able to: create a dynamic website using advanced features of JavaScript and create a website with good and attractive design

