# Year 13 Overview

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| | Autumn | Spring | Summer |
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| **Mathematics** | **Pure Mathematics 3**<br><br>**Understand mathematical proof**<br><br>- Prove mathematical statements using 'Proof by Deduction'.<br>- Prove mathematical statements using 'Proof by Exhaustion'. {Less than 5 cases}<br>- Disprove mathematical statements using 'Counter-Examples'.<br>- Prove mathematical statements using 'Proof by Contradiction'<br><br>**Understand partial fractions**<br><br>- Use algebraic long division to convert an improper algebraic fraction into a mixed fraction: $f(x) \ g(x) = q(x) + r \ g(x)$<br>- Convert a proper fraction with linear factors in the denominator into partial fractions<br>- Convert a proper fraction with linear factors, one of which is repeated, in the denominator into partial fractions (maximum of two factors)<br>- Convert an improper fraction with linear factors in the denominator into partial fractions (maximum of two factors) | **Mechanics**<br><br>**Understand projectile motion**<br><br>- Resolve velocity vectors in to horizontal and vertical components.<br>- Know and understand that, in the absence of air resistance, horizontal acceleration is zero.<br>- Know and understand that, in the absence of air resistance, vertical acceleration is the acceleration due to gravity.<br>- Know and understand that the vertical and horizontal motions do not influence each other and can therefore be considered separately.<br>- Apply the SUVAT equations separately to the vertical and horizontal motions.<br>- Calculate distances, speed, angles and time of flight at specific points or times.<br><br>**Understand forces on extended objects. (moments and centre of mass)**<br><br>- Know and understand that a 'Moment' is a turning force given by the magnitude of a force multiplied by the perpendicular distance to the pivot point. | **Statistics**<br><br>**Understand probability**<br><br>- Know the meaning of the term 'Probability', 'Experiment', 'Event', 'Outcome', 'Sample Space', 'Mutually Exclusive', 'Independent', 'Equally Likely' and 'Biased'<br>- The sum of the probabilities of all possible events equals one.<br>- Use 'Sample Space Diagrams', 'Venn Diagrams', 'Tree Diagrams' and 'Histograms' to map out the probability space<br>- 'Intersection' of A and B is denoted by $A \cap B$ and 'Union' of A and B is denoted by $A \cup B$.<br>- Know and use the fact that if two events are mutually exclusive then $P(A \cup B) = P(A) + P(B)$.<br><br>**Understand the representation and characterisation of data**<br><br>- Draw histograms, box plots and stem and leaf diagrams for data sets and extract information from them.<br>- Use 'Grouped Frequency Tables' to group data into 'Classes' and find the class boundaries, midpoint and width. |

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**Understand differentiation**

- Differentiate products of functions using the 'Product Rule', "Chain rule"
- Differentiate quotients of functions using the 'Quotient Rule'
- Use the derivatives of the trigonometric functions sec, cot and cosec (given).
- Differentiate the inverse trigonometric functions arcsin, arccos and arctan.
- Know and understand Parametric Differentiation and Implicit Differentiation

**Understand integration**

- Use the chain rule for differentiation to solve an integral by finding the function which differentiates to the integrand when the integrand is of the form $f(ax + b)$.
- Use trigonometric identities to integrate functions.
- Solve integrals using 'Integration by Parts' and 'Integration by Substitution'
- Solve integrals using partial fractions.

**Understand vectors**

- Recognise and use standard notation for scalars and vector.

- Calculate moments using Moment = $Fd$ or Moment = $Fd\sin\theta$.
- Know and understand that moments have a direction, 'Clockwise' or 'Anticlockwise'. 2.4 Calculate the 'Resultant Moment' by taking the sum of a set of moments.
- Know and use the fact that if a beam is on the point of rotating (tilting) about a pivot then the force on all other pivots is zero.
- Know and understand that the 'Centre of Mass' of an object is the point at which all the mass of the object appears to act.
- Know and use the fact that the centre of mass of a uniform bar is the mid-point of the bar.
- Use moments to find the location of the centre of mass of a non-uniform bar. laminas.

**Understand circular motion and simple harmonic motion**

- Understand the term 'Angular Velocity' and the formula $\omega = \theta\, t$ .
- Know and use the link between 'Linear Speed', $v$, and 'Angular Speed', $\omega$, for motion in a circle of radius $r$, $v = \omega r$.

- Calculate the measures of central tendency for a set of data – 'Mean', 'Median' and 'Mode', "Quartiles' and 'Percentiles".
- Calculate 'Range', 'Interquartile Range' and 'Interpercentile Range', 'Standard Deviation'.
- 'Cleaning' the data.

**Understand discrete random variables**

- 'Discrete Random Variable' can only take specific numerical values
- Construct tables and/or diagrams to display the probability distribution for a discrete random variable.
- Calculate the 'Cumulative Distribution Function' and Construct cumulative distribution tables.
- Calculate the 'Expected Value' of a discrete random variable

**Understand the normal distribution**

- 'Continuous Random Variable' can take any value
- The area under the probability distribution curve is equal to one.
- Know and use the properties of the 'Normal Distribution'

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- Know and use the 'Parallelogram Law' for addition of vectors.
- Represent vectors in 'Column Vector' form and 'Unit Vectors'
- Know and understand how to find the magnitude of a vector, and use the magnitude notation, $|v|$.

**Understand complex numbers**

- Know and understand that the square root of -1 has no real solutions, and that the 'Imaginary Number' $i$ is defined as $i = \sqrt{-1}$.
- Add and subtract complex numbers.
- Multiply complex numbers by real numbers.
- Multiply and divide complex numbers of the form $z = a + bi$.
- Know and use the fact that the complex number $z = a + bi$ has a 'Complex Conjugate' $z* = a - bi$.
- Know and use the fact that the product of a complex number and its complex conjugate is real.
- Know and understand how to find the two distinct complex roots of a quadratic and cubic equation where $b2 - 4ac < 0$.

- Frequency of circular motion, the number of complete revolutions per second, and a 'Period' for one complete revolution.
- The concept of centripetal acceleration
- Use Newton's laws to show that an object undergoing centripetal acceleration must be acted upon by a 'Centripetal Force' and understand the direction of both
- Calculate the linear speed, angular speed, centripetal acceleration, centripetal force
- Know and understand that the definition of 'Simple Harmonic Motion'

- Use coding to standardise a normal distribution or find unknown means or variances from a standardised distribution.

**Understand correlation and regression**

- 'Bivariate' data is pairs of values of two variables.
- Bivariate data is plotted on 'Scatter Diagrams'
- 'Correlation' is the linear relationship between the independent and the dependent variables and can be positive or negative, strong or weak, or zero.
- 'Linear Regression' fits a straight line ('Line of Best Fit') to the data set
- Calculate the bivariate summary statistics , 'Least Squares Linear Regression Line' , the product moment correlation coefficient
- Apply coding to one or both variables

# Year 13 Overview

| Physics | Circular Motion | Refraction, Diffraction and Interference | Charge-Mass Field |
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| | - Convert angles between radians and degrees.<br>- Compare angular and tangential velocity<br>- Calculate centripetal acceleration for a variety of bodies performing circular motion, both with and without a physical connection to the centre of the circle.<br>- Apply the definitive SHM formula<br>- Analyse a system performing SHM in terms of a straight-line graph with a gradient which is negative.<br>- Justify from various examples that to perform SHM.<br>- Apply the formulae of SHM to theoretical examples of pendulums and springs<br>- Illustrate the motion of SHM with a cosine or sine wave with a phase shift included if necessary.<br>- Illustrate the motion of various damped SHM systems.<br>- Analyse a graph of amplitude (of an SHM system) vs. driving frequency – noting that the maximum amplitude refers to the natural (resonant frequency) of the material.<br>- Investigate a simple pendulum, varying length, mass and material used for the | **Refraction, Diffraction and Interference**<br><br>- Justify what happens at the boundary between materials when the wave speed changes upon crossing the boundary – in terms of wavelength and frequency.<br>- Define the refractive index for Material.<br>- Apply Snell's law for various entry and exit angles.<br>- Illustrate the critical angle for a combination of materials.<br>- Illustrate total internal reflection and its role in the fibre optic industry.<br>- Compare effect of gap size and wavelength.<br>- Justify the result from Young's fringes experiment using the concept of interference between waves.<br>- Recall that when electrons are fired at a diffraction grating, an interference pattern is produced.<br><br>**Binding energy,Fission,Fusion**<br><br>- Calculate mass defect for various reactions, using the atomic mass unit.<br>- Use $E=mc^2$ for to calculate the energy released in a variety of | **Charge-Mass Field**<br><br>- Calculate the force on a moving charge in a magnetic field.<br>- Compare scalar and vector products (one produces a scalar and the other a vector perpendicular to the others).<br>- Calculate force on a charged particle due to a current carrying Wire.<br>- Calculate the mutual forces between 2 current carrying wires.<br>- Critically compare Fleming's left and right-hand rule and how they are applied.<br>- Recall Faraday's and Lenz's laws for electromagnetic induction.<br>- Apply Faraday's and Lenz's laws to motors and generators.<br>- Summarise the workings behind transformers and the Hall effect in terms of fields and charges.<br>- Summarise the workings behind particle accelerators in terms of fields and moving charges.<br>- Recall the equations of motion.<br>- Justify how all the equations of motion are independent of mass |

string – calculate the period, compare the data, plot the amplitude-time graph and choose a suitable function to model the behaviour.

**Capacitance**

- Describe the design of a basic capacitor with 2 plates and dielectric between them.
- Justify from given data, the relationship between capacitance, area of plates, distance between them and the dielectric constant of the material used.
- Distinguish whether a capacitor is charging, storing or discharging.
- Design a circuit which can switch between charging and discharging, involving only one battery, one resistor and one capacitor.
- Analyse a given circuit in terms of time constant (RC).
- Analyse given discharging data of V or Q vs time.
- Analyse given charging data of V or Q vs. time.
- Rearrange exponential decay functions (using logs) for charging or discharging to find unknown values of R, C, time, Q or V.

reactions.
- Analyse the graph of binding energy per nucleon vs. nucleon number.
- Determine which parts of the binding energy per nucleon vs. Nucleon number graph represent fusion or Fission.
- Justify how both fission and fusion result in an increased of binding energy.
- Calculate the energy generated from fusion or fission from the graph of binding energy per nucleon vs. nucleon number.

**Fields and their sources**

- Conclude that all fields are invisible, 3 dimensional and behave as vectors.
- Justify that electric and magnetic fields have both sources and sinks while gravitational fields have only sources.
- Calculate resultant fields when two or more of the same field type act upon the same point.
- Justify that gravitational fields are always attractive.
- Apply the inverse square law to calculate the attractive force between two masses.

or shape of the projectile.
- Categorise workings into horizontal and vertical.

**Revision of A-level syllabus and examination preparation.**

**Photons, photo-electric effect**

- Draw the apparatus setup for the Photoelectric experiment
- Justify from data that as intensity plays no role in releasing photoelectrons below a certain energy level, that light cannot be acting as a wave.
- Justify that a new concept (for light) was necessary to explain the phenomena of the PE.
- Justify that modelling light as a particle could explain the PE effect.
- Apply the stopping potential concept to find the kinetic energy of the emitted Photoelectrons.
- Determine work function and max kinetic energy from a graph of KE vs. frequency using a straight line graph.
- Use $E=hf$ and $E=hc/\lambda$ in various Calculations.
- Recall the ranges of typical values of frequency and wavelength for the different categories of electromagnetic radiation.
- Apply the unit of electron-volt in calculations regarding the energy of photons.
- Justify electron transitions between

- Calculate the gravitational field strength at any point.
- Calculate the potential at any point around a mass.
- Calculate the potential energy of a Mass.
- Calculate the work done when a mass moves across a gravitational potential difference.
- Apply the inverse square law to calculate the attractive force between two charges.
- Conclude that electric potential energy arises when a charge exists within the field of another charge.
- Calculate the work done when a charge moves across an electric potential difference.
- Contrast ways in which electric fields arise – either sole charges or potential difference (such as capacitors).
- Calculate the force on a charge within an electric field.
- Calculate the magnetic flux density due to a current in a wire.
- Calculate the magnetic flux density due to a current flowing through a solenoid.
- Apply the right-hand-grip rule to find the direction of the magnetic field

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| | energy levels as giving rise to the emission or absorption of photons.<br>- Compare the characteristic patterns of these emissions/absorptions to identify Elements. | around a current carrying wire.<br>- Define magnetic flux as the product of area and magnetic flux density, when normal to each other.<br>- Investigate planets in our solar system from given data, using knowledge from circular motion, calculate the period of these planets due to gravitational. | |
| **Biology** | **Energy and ecosystems**<br><br>- Understand energy and ecosystems.<br>- Understand nutrient cycling.<br>- Understand populations in ecosystems.<br><br>**Genetics, variation, and evolution**<br><br>- Understand inheritance.<br>- Understand variation and evolution. | **Gene technologies**<br><br>- Understand gene expression.<br>- Understand gene technology.<br><br>**Revision of the A- Level Syllabus for the two years** | **Revision of the A- Level Syllabus for the two years**<br>**Exam preparation.**<br>**External exams** |
| **Chemistry** | **Kinetics**<br><br>- Measuring the rate of reaction<br>- Rate equations<br>- Determining order of reaction<br>- Activation energy and catalysts<br><br>**Entropy and lattice energy**<br><br>- Introducing entropy | **Redox  equilibria**<br><br>- Standard electrode potential<br>- Electrochemical cells<br>- Thermodynamic feasibility<br>- Fuel cells<br>- Redox titrations<br><br>**Transition metals** | **Organic synthesis**<br><br>- Organic analysis and organic synthesis<br>- Hazards, risks and control measures<br>- Practical techniques in organic Chemistry Which include recrystallisation, vacuum filtration, drying, heating under reflux, distillation, purification<br>- Creating a route of an organic compound synthesis |

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- Calculating total entropy
- Entropy change
- Experimental and theoretical lattice energy
- Enthalpy change of solution and hydration

**Acid-base equilibria**

- PH scale, ionic product of water
- Acid-base titrations
- Indicators
- Buffer solutions

**Organic chemistry and instrumental techniques**

- Chiral compounds and optical activity
- Aldehydes and ketones
- Carboxylic acids
- Acyl chlorides and esters, polyesters

**Chromatography and nuclear magnetic resonance**

- Gas chromatography

- Thin layer chromatography

- C13 NMR

- H1 NMR

- Transition metals and electronic configurations
- Ligands and complexes
- Common shapes of complexes
- Transition metals reactions
- Catalysts

**Organic Chemistry**

- Arenes: reactions of benzene
- Electrophilic substitution mechanisms
- Phenol

**Organic nitrogen compounds**

- Amines and their physical and chemical properties
- Amides and their physical and chemical properties
- Amino acids and proteins and their physical and chemical properties
- Application of organic nitrogen compounds

- Determining the missing step in a given organic synthesis

**Exam practice**

- Practising exam style questions
Working on past papers
- Practical sessions on
a)titration
b) lattice energy
c) entropy change

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| | - Splitting pattern<br><br>- Deternination of the structure using NRM | | |
| **Business Studies** | **Introduction to Business and Enterprise**<br><br>-Explore the interrelationship between multinationals and the international market.<br>-Describe the strengths and limitations of privatisation and internationalisation in business.<br>-Discuss the motivation behind fluctuation in overseas production involving off- shoring and re-shoring.<br>-Examine major issues arising with international businesses such as pressures with local responsiveness and cost reduction.<br>-Explore different global strategies aiding management of international business including Bartlett and Ghoshal`s international, multi domestics and translational strategies.<br>-Explain the stages of business growth.<br>Compare the major methods of inorganic growth for businesses such as: (i) joint ventures, (ii) strategic alliances, (iii) franchising, (iv) mergers, and (v) takeovers.<br>-Discuss the issues accompanying growth problems such as: (i) economies of scale, (ii) economies of scope, (iii) diseconomies of | **Introduction to Marketing**<br><br>-Summarise major strategies to calculate market share and growth.<br>-Compare primary and secondary research methods.<br>-Examine strengths and limitations of major ways of information gathering and sampling methods.<br>-Examine the techniques to interpret market research results.<br>-Compare elements of the 4Ps and 4Cs of marketing.<br>-Judge the advantages and disadvantages of detailed marketing plan.<br>-Examine the influence of major concepts of elasticity such as cross, promotional, and income elasticity.<br>-Explain the key stages used in process of product development.<br>-Compare external and internal sources of ideas for product development.<br>-Explain the role of research and development in improving and expanding a business. | **Introduction to Accounting**<br><br>-Analyse the technique used for contribution costing.<br>-Explore methods for resolving numerical problems involving costing methods.<br>-Compare major techniques to improve cash flow.<br>-Judge the goals and value of budgeting in a business in processes.<br>-Examine the major factors which influence a budget.<br>-Compare the strengths and limitations associated with budgeting.<br>-Examine the key elements involved in production of budget.<br>-Compare features of common types of budgeting such as imposed, negotiate and incremental budgeting.<br>-Examine major techniques used to analyse budgets such as variance analysis.<br>-Explain the factors inflicting changes within income statement and statement of financial position. |

scale, (iv) the experience curve, (v) synergy, and (vi) over trading.

-Explore the usage of strategic management to deal with issues arising from growth, such as Griener`s model of growth.

-Examine key types of growth such as: (i) conglomerate, (ii) vertical, and (iii) horizontal integration.

-Summarise the influence of the state within a business involving (i) conditions of workplace, (ii) role of regulators, (iii) infrastructure, (iv) employmeCnt rate, (v) local competition, (vi) marketing behaviour, and (vii) minimum wage.

-Examine the advantages and disadvantages of international business agreements for a country.

-Explain how the government could intervene to help local businesses.

-Explain primary macroeconomic objectives of government such as: (i) reduction in inflation and unemployment, (ii) business growth, (iii) fluctuation of wealth, and (iv) stable exchange rate.

-Examine the importance of policies used to fulfil macroeconomic objectives such as: (i) fiscal, (ii) monetary, and (iii) exchange rate policy.

-Examine the top techniques used for forecasting such as: (i) simple linear and (ii) multiple linear regression, (iii) moving average, and (iv) straight line.

-Judge the role of forecasting in marketing.

-Examine the influence of coordinated marketing mix strategies on services.

-Explain the effect of globalisation on the marketing strategy of a business.

-Examine the strengths and limitations of BRICS with respect to the process of globalisation.

-Judge the requirements of international marketing for a business in a given institution.

-Examine the key stages of international market development.

-Apply a global marketing strategy to a given situation while explaining its key components.

-Use main techniques of measuring market shares to calculate percentage of sales of any industry of your choice.

-Use secondary research approach to analyse growth of a specific market.

-Investigate the process and stages of interpreting given market research content.

-Apply and recommend an appropriate marketing plan for a growing business.

-Apply the appropriate forecasting method on a given business situation.

-Examine the impact of given changes such as depreciation, valuing inventories and non-current assets, on the statement of financial position and income statement.

-Differentiate between major elements of income statement and statement of financial position.

-Examine the major techniques of inventory valuation and the limitations that accompany the process.

-Judge the strengths and limitations of net realisable valuation method.

-Assess the importance of depreciation in accounts.

-Examine the importance of probability ratio analysis and its limitations.

-Compare the main features of major efficiency ratios such as inventory turnover, payable and receivables days.

-Compare the characteristics for determining positive or negative gearing ratios.

-Examine the significance of investor ratios.

-Examine major goals of investment appraisal.

-Explain the key elements involved in investment appraisal such as payback, net present value and average rate of return.

-Explain the role of risk analysis in investment appraisal.

-Judge the strengths and limitations of the accounting rate of return.

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-Discuss the negative and positive impact of community within businesses, with respect to competitive advantage.
-Summarise the influence of environmental changes and hazards on businesses.
-Explore how a business adapts to competition and demographic changes such as urbanisation and migration.
-Assess the relevance of digital technology in business and its evolution overtime.
E-xplore the influence of objectives such as pressure for short termism and business ownership on business activities.
-Examine changes in economic data including (i) taxation, (ii) open rate, (iii) protectionism, (iv) GDP.
-Differentiate between stakeholder and shareholder concept.
-Explain the strengths and limitations of Corporate Social Responsibility.

**Introduction to Organisational Behaviour**

-Explore HRM approaches such as: (i) system, (ii) proactive and (iii) humanistic approach, and (iv) hard vs soft approach.
-Examine the purpose of setting HRM objectives such as: (i) training, (ii) diversity, (iii) alignment of values, (iv) skill development, and (v) employee involvement

**Introduction to Project and Operations Management**

-Explain main features and functions of Enterprise Resource Planning (ERP) such as:
(i) automation, (ii) data analysis, (iii) integration, and (iv) reporting.
-Summarise the significance of ERP in business activities such as capacity utilisation, costing and pricing.
-Explain the significance of capacity utilisation in a business.
-Examine how to measure capacity utilisation.
-Summarise major factors which influence capacity planning.
-Examine the impact of maximum capacity on a business.
-Compare approaches in improving capacity utilisation such as sub-contracting and rationalisation.
-Explain the inter-relationship between capacity utilisation and efficiency.
-Examine the strengths and limitations of outsourcing.
-Analyse the key stages of outsourcing process.
-Judge the benefits and limitations to lean production.
-Examine the inter-relationship between lean production and relevant business activities.

-Evaluate analysis methods employing discounting cash flow concepts such as net present value and internal rate of return.
-Explain external factors which influence investment decisions.

**Introduction to Strategic Management**

-Examine the primary goals of strategic management in business activities.
-Compare features of major types of corporate strategies such as growth, renewal and stability.
-Examine the key distinguishing factors between strategy and tactics.
-Explain the impact of strategy on business structure with respect to Alfred Chandler`s assertion.
-Explain the interrelationship between corporate objectives and strategy.
-Examine the role of strategic management in determining which market to compete in.
-Examine strengths and limitations of SWOT analysis.
-Analyse the influence of strategic analysis on functional decision making within business activities.
-Explain the key steps involved in SWOT analysis.

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| -Explain the reasons behind use of HR data such as labour turnover and productivity, retention rates.<br>-Examine advantages and disadvantages of main employment contracts such as temporary, permanent and independent.<br>-Summarise main methods of measuring employee performance such as: (i) self-evaluation, (ii) management by objectives, (iii) 360-degree feedback, and (iv) graphic rating scales.<br>-Compare the key reasons behind poor employee performance, its impact on business and possible adaptations.<br>-Explain the purpose of UK labour legislation with respect to its principles.<br>-Analyse the role of cooperative measures between management and employees in order to improve workplace culture.<br>-Explain the basic stages of workforce planning.<br>-Examine the interrelationship between labour union and HRM.<br>-Assess the influence of key elements of organisational structure including departmentalisation, centralisation, decentralisation and span of control.<br>-Compare the strengths and limitations of main types of organisational structure such as | -Compare Kaizen, Just In Time (JIT), six sigma and lean production.<br>-Examine the impact of JIT on business productivity.<br>-Explain the requirement of quality within a business.<br>-Examine the problems arising with implementation of the JIT system.<br>-Judge the methods of improving quality such as quality assurance,<br>-Examine the consequences of poor quality management within business production.<br>-Compare major quality control methods.<br>-Examine key principles of Total Quality Management.<br>-Compare major types of benchmarking such as: (i) performance, (ii) internal, (iii) external, and (iv) practice benchmarking.<br>-Explain the factors acting as precursors for development of projects.<br>-Examine the factors influencing project success and failure.<br>-Judge the strengths and limitations of network diagram.<br>-Examine the key stages of international market development.<br>-Explain key components of network diagram such as nodes, activities and dummy activities. |

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| -Judge the issues associated with turning SWOT analysis into actionable strategies.<br>-Compare the features of PEST and SWOT analysis.<br>-Examine the interrelationship between mission, corporate objectives and strategic analysis.<br>-Compare the value of Boston Matrix and product portfolio analysis in strategic management.<br>-Judge the advantages and disadvantages of Boston Matrix.<br>-Examine the role of Porter`s five forces in developing competitive strategy.<br>-Compare the implications and possible changes Porter`s five forces might go through, involving substitute and entry threat, buyer and supplier power, and rivalry.<br>-Explain the significance of core competency analysis in business strategy.<br>-Compare the possible indicators when using the Ansoff matrix such as diversification, market development and penetration.<br>-Explain the basic structure of the Ansoff Matrix.<br>-Summarise the role of force field analysis in business adaptation.<br>-Examine the purpose of decision trees to include an understanding of risk, uncertainties and rewards. |

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| | (i) hierarchical, (ii) functional, (iii) horizontal, (iv) network and (v) divisional structure.<br>-Examine the different ways of accomplishing organisational change such as remedial and structural change, along with key motives behind it.<br>-Summarise the differentiating factors between formal and informal structure.<br>-Explain the role of delegation and accountability in a business.<br>-Examine the stages of delegation, and its strengths and limitations.<br>-Judge negative and positive impact of line vs staff organisational structure.<br>-Explain the requirement of efficient communication in a given situation.<br>-Examine the predominant types of organisational communication such as: (i) written, (ii) verbal, (iii) oral, and (iv) visual communication.<br>-Judge the key issues arising with main channels of communication.<br>-Examine the purpose and requirement of informal communication within a workplace.<br>-Apply basic cognitive theories on given organisations.<br>-Using an organisation of your choice, explain the role of motivation in its culture as a hypothetical concept. | -Judge the value and usefulness of a Critical Path Analysis in business.<br>-Compare types of float such as total, free and project float.<br>-Compare the main methods of data interpretation in project management. | -Compare the structure and types of decision trees in strategic management.<br>-Assess the strengths and limitations of decision trees in making strategic decisions.<br>-Judge the main components of a business plan.<br>-Compare main features of business and corporate strategy.<br>-Examine the major goals of corporate planning.<br>-Examine the features of key corporate cultures in the context of strategic management.<br>-Judge the importance of governing the process of strategic implementation.<br>-Examine the major steps in the strategic change process.<br>-Explain the key principles guiding implementation of strategic change.<br>-Judge the value of contingency planning.<br>-Examine the possible difficulties in case of strategic implementation.<br>-Use major corporate strategies to devise a competitive framework for a business of your choice.<br>-Investigate the current condition of any business of your choice by using Alfred Chandler`s assertions.<br>-Apply SWOT analysis to a given business model. |

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| | -Apply the concept of employee satisfaction to a given organisation`s structure and analyse its impact.<br>-Investigate the causes of problems arising from poor communication, in an organisation of your choice and recommend possible solutions.<br>-Apply remedial and structural change concepts to any developing organisation of your choice.<br>-Use main methods of measuring employee performance to evaluate given organisation's structure. | | -Investigate the problems arising with implementation of SWOT analysis to the given business model and recommend possible solutions.<br>-Use Boston Matrix to amplify the growth rate of any business of your choice.<br>-Investigate the competitive framework of given business using Porter`s Five Forces Analysis.<br>-Apply Ansoff Matrix to construct a strategy for growth of a given developing business.<br>-Apply an appropriate strategy for change management for a business of your choice. |
| **Psychology** | **Atypical psychology: Schizophrenia and related psychosis.**<br><br>-Explain the characteristics of schizophrenia and psychotic disorders.<br>-Explain the difference between schizophrenia and delusional disorder.<br>-Examine how Freeman, 2008's VR symptom assessment procedure is used to study schizophrenia.<br>-Evaluate the evidence for a genetic component to schizophrenia. | **Applied psychology: Workplace and consumer behaviour**<br><br>-Explain intrinsic and extrinsic motivation.<br>-Evaluate traditional (behaviourist) remuneration systems: pay, bonuses, performance-related pay and profit sharing.<br>-Evaluate non-monetary rewards: praise, respect, recognition, empowerment and a sense of belonging.<br>-Examine need theories of motivation: Maslow's hierarchy of needs, ERG (Alderfer, 1972) and McClelland's achievement motivation theory. | **Know and understand buyer behaviour**<br><br>-Evaluate the utility theory, satisficing (Simon, 1956), and prospect theory (Kahneman and Tversky, 1979) models of decision-making.<br>-Evaluate the black box stimulus-response (Kotler, 1997), the EBK consumer decision model (Engel, Blackwell, and Kollat, 1968) and the theory of planned behaviour (Ajzen 1991).<br>-Examine the significance of product colour (Grossman & Wisenbit (1999). |

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| | -Examine how schizophrenia may have biochemical sources (dopamine hypothesis, vitamin D deficiency).<br>-Evaluate cognitive (Frith, 1992) and psychodynamic (Laing, e.g., 1960) accounts of schizophrenia.<br>-Examine how CBT, ECT, biochemical interventions and conditioning (token economies) can be used in the treatment and management of schizophrenia.<br>-Explain the characteristics of generalised anxiety disorders and phobias.<br>-Explain the difference between agoraphobia and specific phobias (e.g., hemophobia, claustrophobia, arachnophobia).<br>-Evaluate classical and operant conditioning explanations for phobias.<br>-Evaluate psychodynamic explanations of phobias (e.g., Freud, 1909).<br>-Evaluate cognitive explanations of phobias (e.g., DiNardo et all, 1988).<br>-Evaluate biomedical/genetic explanations of phobias.<br>-Examine how systematic desensitization, CBT and applied tension can be used in the treatment and management of phobias. | -Examine cognitive theories of motivation: goal-setting theory, VIE (expectancy) theory and equity theory.<br>-Evaluate job satisfaction as a motivator: Herzberg's two-factor theory, Hackman & Oldham's jobs characteristics model.<br>-Evaluate methods of measuring job satisfaction: job descriptive index, QWL questionnaire and Minnesota satisfaction questionnaire.<br>-Examine what research into absenteeism, workplace sabotage and commitment suggest about job satisfaction.<br>-Explain how enrichment, rotation and enlargement can enhance job design and thereby job satisfaction.<br>-Explain the effect of manipulating physical work conditions, including open plan offices, and temporal conditions, such as shift work.<br>-Examine the impact of psychological changes in the workplace: additional attention and bullying interventions.<br>-Explain the levels and causes of organisational and interpersonal conflict.<br>-Evaluate Belbin's theories on team roles (including the team role inventory)<br>Explain the differences between authoritarian, participative, delegative, transactional and transformational leadership styles. | -Examine the environmental influences on consumers: cognitive maps of retail locations (Mackay and Olshavsky, 1975), crowding (Machleit et al., 2000) and patterns of shopper movements (Gil et al., 2009).<br>-Examine the significance of sound, lighting, odours and colour in stores (Guéguen et al., 2007, Kutlu et al., 2013, Chebat & Michon, 2003). |

| | | -Explain the relationship between leaders and followers ((Dansereau,1994, 1996 Kelley, 1988) | |
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| **Art** | **Personal Portfolio**<br><br>AO1:  Students will record ideas, observations and insights relevant to intentions as work progresses. They will be able to:<br>-Use line to accurately record shape and proportion<br>-Use graduated tone and mark making techniques to describe volume and texture<br>-Create effective compositions by carefully considering the layout of their subject<br>-Use a camera to record a subject with emphasis on technical ability<br>-Record their thoughts and ideas as work develops using subject specific language<br>-Demonstrate skill in recording observations from a variety of relevant sources and show intentions effectively<br>AO2: Students will explore and select appropriate resources, media, materials, techniques and processes. They will be able to:<br>-Use artistic processes to develop and extend ideas<br>-Experiment with relevant combinations of media, materials, techniques, processes and compositions<br>-Reflect on their ideas as they develop<br>-Select the most appropriate material for the purpose of their study<br>-Refine their handling of materials as their work progresses<br>-Demonstrate excellent exploration of media, materials, techniques and processes, showing effective selection of relevant sources<br>AO3: Students will develop ideas through investigation, demonstrating critical understanding. They will be able to:<br>-Research, record and contribute verbally, their understanding of the work of other artists<br>-Produce transcriptions to show understanding of artists' techniques and methods<br>-Incorporate the style and traditions of their chosen artists into their own work | | **Personal Portfolio**<br><br>Component 3:<br><br>Coursework – 50%<br><br>-Students will independently be choosing a theme to base their portfolio of work.<br><br>-Their choice can be a response from several starting points or based on an area of their own personal interest.<br><br>-Students will work in accordance with the Assessment Objectives 1,2,3 and 4. Through producing observational studies, artist research and developmental studies and finally completing their final piece. |

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| | -Use subject specific key words to analyse the work of other artists<br>-Have used the experience of gallery visits (virtual) to contextualise their project<br>-Demonstrate excellent development of ideas through investigation, showing effective critical understanding<br>AO4: Students will present a personal and coherent response that realises intentions and demonstrates an understanding of visual language. They will:<br>-Produce personalised outcomes that demonstrate clear and effective connections to source materials<br>-Show clear and confident evidence of interpretation of other artists' responses<br>　-Appreciate the importance of resolving the project with a final piece or pieces ready for exhibition<br>-Present their work on A2 boards in preparation for external assessment<br>-Apply visual elements as practised in earlier development stages skilfully in final outcomes<br>Demonstrate excellent realisation of intentions, showing effective understanding of visual language. | |
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| **Computer Science** | **Databases**<br><br>**Aim**<br>- Enable learners to demonstrate a theoretical understanding and practical experience with database concepts, DBMS<br>- Understand database concepts and database management system.<br>- Be able to demonstrate a practical application of databases.<br><br>**Computational Thinking, Algorithm Design, and Problem Solving**<br><br>**Aim** | **Data Types and Structures**<br><br>**Aim**<br>- Enable learners to demonstrate a theoretical understanding and practical knowledge of data types, records, arrays, files, and ADT.<br>- Understand the concepts of data types, records, arrays, files, and abstract data types.<br>- Be able to demonstrate a practical knowledge of data types and structures.<br><br>**Programming**<br><br>**Aim** | **Artificial Intelligence**<br><br>**Aim**<br>- Enable learners to demonstrate a theoretical understanding and practical experience with artificial intelligence graphs and applications.<br>- Understand artificial intelligence graphs and applications.<br>- **Analyse** how graphs can be used to aid Artificial Intelligence.<br>- **Assess** how artificial neural networks help with machine learning<br>- **Evaluate** the use of Deep Learning, Machine Learning and Reinforcement Learning |

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- Enable candidates to demonstrate a theoretical understanding and practical knowledge of computational thinking skills and algorithms.
- Understand theoretical concepts of computational thinking, algorithm design and problem solving.
- Be able to demonstrate a practical application of computational thinking algorithm design and problem solving.

- Enable learners to demonstrate a theoretical understanding and practical knowledge of programming and structured programming.
- Understand the concepts of programming.
- Be able to demonstrate a practical application of Programming.

**Software Development**

**Aim**
- Enable learners to demonstrate a theoretical understanding and practical experience with software development lifecycle, program design, testing and maintenance.
- Understand the program development lifecycle.
- Be able to demonstrate a practical application of software development.

and the reasons for using these methods.
- **Justify** the reasons for using Deep Learning, Machine Learning and Reinforcement Learning.
- **Appraise** back propagation and regression methods in machine learning.
- Be able to demonstrate a practical application of Artificial Intelligence.
- **Use** A* and Dijkstra's algorithms to perform searches on a graph.
- **Create** a game using sequence/selection/loops-using variables/Constants/maths symbols/input/output.