

Holy Cross College (Autonomous), Nagercoil

Kanyakumari District, Tamil Nadu.

Accredited with A⁺ by NAAC - IV cycle – CGPA 3.35

Affiliated to

Manonmaniam Sundaranar University, Tirunelveli



Semester I - IV

POs, PSOs & COs

DEPARTMENT OF ZOOLOGY



2023-2026

(With effect from the academic year 2024-2025)

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOs	Upon completion of B.A/B.Sc. degree programme, the graduates will be able to	Mission addressed
PEO 1	apply appropriate theory and scientific knowledge to participate in activities that support humanity and economic development nationally and globally, developing as leaders in their fields of expertise.	M1& M2
PEO 2	inculcate practical knowledge for developing professional empowerment and entrepreneurship and societal services.	M2, M3, M4 & M5
PEO 3	pursue lifelong learning and continuous improvement of the knowledge and skills with the highest professional and ethical standards.	M3, M4, M5 & M6

PROGRAMME OUTCOMES (POs)

POs	Upon completion of B.Sc. Degree Programme, the graduates will be able to:	PEOs Addressed
PO1	obtain comprehensive knowledge and skills to pursue higher studies in the relevant field of science.	PEO 1
PO2	create innovative ideas to enhance entrepreneurial skills for economic independence.	PEO2
PO3	reflect upon green initiatives and take responsible steps to build a sustainable environment.	PEO 2
PO4	enhance leadership qualities, team spirit and communication skills to face challenging competitive examinations for a better developmental career.	PEO 1&PEO 3
PO5	communicate effectively and collaborate successfully with peers to become competent professionals.	PEO 2&PEO 3
PO6	absorb ethical, moral and social values in personal and social life leading to highly cultured and civilized personality	PEO 2& PEO 3
PO7	participate in learning activities throughout life, through self-paced and self-directed learning to develop knowledge and skills.	PEO 1 & PEO 3

PROGRAMME SPECIFIC OUTCOMES (PSOS)

PSO	Upon completion, B.Sc. Zoology graduates will be able to:	PO Addressed
PSO - 1	deep understanding of the key concepts of Zoology in the areas of Taxonomy, Physiology, Cell Biology, Genetics, Applied Zoology, Aquaculture Ecology and Toxicology, Biochemistry, Biophysics, Biostatistics, Biotechnology, Immunology, Microbiology and Evolution.	PO1, PO3
PSO - 2	perform laboratories experiments with suitable techniques at cellular, molecular, biochemical, physiological, and systematic levels.	PO2, PO3
PSO - 3	apply biological methods to formulate hypothesis, collect, analyze, and evaluate the data to address the problem	PO4, PO5

	effectively.	
PSO - 4	plan their career goals and pursue higher studies in different Zoological disciplines and develop entrepreneurship skills by applying the knowledge gained from courses like Aquaculture, Sericulture, Apiculture, Poultry, Vermitechnology and Clinical Laboratory Technology.	PO1, PO4, PO 6
PSO - 5	to identify societal and environmental problems and solve them with innovative ideas and technologies, which can be patented.	PO3, PO6, PO7

MAPPING OF PO'S AND PSO'S

POs	PSO1	PSO2	PSO3	PSO4	PSO5
PO 1	3	3	3	3	3
PO 2	3	3	3	3	3
PO 3	3	3	2	3	3
PO4	2	2	3	2	2
PO5	3	2	3	3	2
PO6	3	2	2	2	3
PO7	3	3	2	2	3
Total	20	18	18	18	19
Average	2.8	2.5	2.5	2.5	2.7

COURSE OUTCOMES

SEMESTER I CORE COURSE I: INVERTEBRATA Course Code : ZU231CC1

On completion of this course, students will be able to		
1	understand the basic concepts of invertebrate animals and recall its structure and functions.	K1
2	illustrate and examine the systemic and functional morphology of various groups of invertebrates.	K2
3	differentiate and classify the animal's mode of life in various taxa and estimate the biodiversity.	K3

K1 - Remember; **K2** - Understand; **K3** – Apply

SEMESTER I CORE LAB COURSE I: INVERTEBRATA Course Code: ZU231CP1

On completion of this course, students will be able to:		
1	identify and label the external features of different groups of invertebrate animals.	K1
2	illustrate and examine the circulatory system, nervous system, and reproductive system of invertebrate animals.	K2
3	differentiate and compare the structure, function, and mode of life of various groups of animals.	K3
4	to compare and distinguish the dissected internal organs of lower animals.	K4
5	prepare and develop the mounting procedure of economically important invertebrates.	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** – Evaluate

SEMESTER I
ELECTIVE COURSE I - ANIMAL DIVERSITY
Course Code : ZU241EC1

On the successful completion of the course, student will be able to:		
1	relate the characteristic features in invertebrates and chordates.	K1
2	classify invertebrates up to class level and chordates up to order level.	K2
3	identify the structural and functional organization of few invertebrates and chordates.	K3
4	survey the adaptations and habits of animals to their habitat.	K4
5	assess the taxonomic position of invertebrate and chordate animals.	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** – Evaluate

SEMESTER I
ELECTIVE LAB COURSE I - LAB ON ANIMAL DIVERSITY
Course Code : ZU241EP1

On the successful completion of the course, student will be able to:		
1	compare and distinguish the dissected internal organs of animals.	K1
2	prepare and develop the mounting procedure of important invertebrate and chordate anatomical parts.	K2
3	identify and label the external features of different groups of invertebrates.	K3
4	analyze the ecological roles and significance of the organisms within their ecosystems.	K4
5	evaluate evolutionary relationships and broader biological concepts among the spotted organisms.	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyse; **K5** - Evaluate

SEMESTER I
NON-MAJOR ELECTIVE NME I
ORNAMENTAL FISH FARMING & MANAGEMENT

Course Code: ZU231NM1

On the successful completion of the course, student will be able to:		
1	identify commercially important ornamental fishes, including indigenous and exotic varieties.	K1
2	explore food and feeding habits in ornamental fishes, including formulated feed and live feed.	K2
3	gain expertise in the maintenance of aquariums and water quality management.	K3

K1 - Remember; K2 - Understand; K3 - Apply

SEMESTER I
FOUNDATION COURSE - INTRODUCTION TO ZOOLOGY

Course Code : ZU241FC1

On the successful completion of the course, students will be able to:		Cognitive level
1	describe the basic concepts of taxonomy, organization, structure and role of cell, environmental issues, importance of culturing organisms.	K1
2	apply classification principles and identify animals, its organ system based on its function, environmental problems, benefits of culturing organisms.	K2
3	enhance leadership qualities, team spirit, participate in learning activities and communicate effectively among the peer.	K3
4	analyze the functional roles of different cell organelles and the integration of various organ systems.	K4
5	critically evaluate the interrelationships and functional significance of physiological systems, cellular structures, environmental factors, and applied zoological practices.	K5

K1 - Remember; K2 - Understand; K3 - Apply; K4 – Analyze; K5 - Evaluate

SEMESTER - I
SPECIFIC VALUE-ADDED COURSE
PET KEEPING AND CARE
Course Code: ZU231V01

On completion of this course, students will be able to:		
1	identify legal regulations and guidelines related to pet ownership	K1
2	interpret pet behaviour and communication cues	K2
3	utilize grooming routines and implement basic first aid and emergency care techniques.	K3
4	analyze the impact of legal regulations on animal welfare and responsible pet care.	K3
5	assess living conditions and space availability and the appropriateness of nutrition and feeding plans.	K5
6	design strategies for responsible pet selection based on living conditions and lifestyle	K6

K1 - Remember; **K2** - Understand; **K3** - Apply

SEMESTER - I
SPECIFIC VALUE-ADDED COURSE
NUTRITION AND WELL-BEING
Course Code: ZU231V02

On completion of this course, students will be able to:		
1.	understand the fundamental principles of nutrition and their roles in maintaining health	K1
2.	Identify different nutrients and its importance.	K2
3.	apply recommended dietary allowances and guidelines to plan balanced diets	K3
4.	identify and address the unique nutritional needs of different age groups	K4
5.	analyze the causes of malnutrition by applying the food and safety regulations of India, and recommend an appropriate diet plan.	K5

K1 - Remember; **K2** - Understand; **K3** – Apply; **K4** - Analyse; **K5** – Evaluate

SEMESTER - I
SPECIFIC VALUE-ADDED COURSE
INTRODUCTION TO BIOFERTILIZERS
Course Code: ZU231V03

On completion of this course, students will be able to		
1	identify different types of biofertilizers and their sources.	K1
2	define biofertilizers and explain their role in enhancing soil fertility.	K2
3	demonstrate the proper methods for the production and application of biofertilizers.	K3
4	compare the advantages and limitations of different biofertilizer formulations.	K4
5	evaluate the effectiveness of biofertilizers in improving crop yield.	K5

K1 - Remember; **K2** - Understand; **K3** – Apply; **K4** - Analyse; **K5** – Evaluate

SEMESTER II
CORE COURSE II: CHORDATA
Course Code : ZU232CC1

On the successful completion of the course, student will be able to:		
1	recall the name and distinct features of different sub phylum belonging to phylum Chordata.	K1
2	explain the structural organization, function and evolutionary aspects of chordates.	K2
3	interpret the biological significance and the conservation of chordates.	K3

K1 - Remember; **K2** - Understand; **K3** - Apply

SEMESTER II
CORE LAB COURSE: CHORDATA
Course Code : ZU232CP1

On the successful completion of the course, student will be able to:		
1	identify and recall the name and distinct external and internal features of animals belonging to phylum Chordata.	K1
2	explain the structural organization of various organs and systems in different classes of vertebrates.	K2

3	analyze, compare, and distinguish the morphological features and developmental stages of chordates	K3
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K1 - Remember; **K2** - Understand; **K3** – Apply

SEMESTER II
ELECTIVE COURSE II: ECONOMIC ZOOLOGY
Course Code : ZU242EC1

On the successful completion of the course, students will be able to:		
1	recall the principles of api-, seri-, and aquaculture, poultry and dairy farming.	K1
2	explain the tools and techniques used in rearing practices.	K2
3	practice the fundamental concepts of applied zoology in research and animal farms.	K3
4	inspect the quality of honey, silk, egg, milk and fish.	K4
5	evaluate the profitability of animal farms.	K5

K1 - Remember; **K2** - Understand; **K3** – Apply; **K4** - Analyse; **K5** – Evaluate

SEMESTER II
ELECTIVE LAB COURSE II: LAB COURSE ON ECONOMIC ZOOLOGY
Course Code : ZU242EP1

On the successful completion of the course, students will be able to:		
1	identify and classify invertebrates and chordates.	K1
2	estimate the salinity and oxygen content of water samples.	K2
3	identify aquatic culturable organisms and their diseases.	K3
4	develop skill in dissection and microscopy.	K4
5	gain knowledge through field visit.	K5

K1 - Remember; **K2** - Understand; **K3** – Apply; **K4** - Analyse; **K5** – Evaluate

SEMESTER II
NON-MAJOR ELECTIVE NME II
BIOCOMPOSTING FOR ENTREPRENEURSHIP

Course Code : ZU232NM1

On the successful completion of the course, students will be able to:		
1.	define the process of bio composting by earthworms and explain the economic cost of establishing small Biocompost units as a cottage industry.	K1
2.	demonstrate composting techniques for various applications like solid waste management, industrial waste recycling using sugarcane bagasse, etc	K2
3.	establish a small Biocompost units as a cottage industry.	K3

K1- Remember; K2- Understand; K3- Apply

SEMESTER II
SKILL ENHANCEMENT COURSE SEC-1: BEEKEEPING

Course Code : ZU242SE1

On the successful completion of the course, students will be able to:		
1	gain a comprehensive understanding of the key concepts related to the beekeeping.	K1
2	impart thorough knowledge about the techniques involved in bee keeping and honey production.	K2
3	develop entrepreneurial skills necessary for self-employment in beekeeping sector.	K3
4	analyze the damage caused by pest and diseases.	K4
5	asses the economic viability, and employment opportunities in small and large-scale beekeeping industries.	K5

K1- Remember; K2- Understand; K3- Apply; K4 - Analyze; K5 - Evaluate

SEMESTER I & II
Life Skill Training I: Catechism

Course Code: UG232LC1

Upon completion of this course the students will be able to		
1	understand the aim and significance of value education	K1,K2
2	develop individual skills and act confidently in the society	K3
3	learn how to live lovingly through family values	K3
4	enhance spiritual values through strong faith in God	K6

5	learn good behaviours through social values	K6
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SEMESTER I & II
Life Skill Training I: Moral
Course Code: UG232LM1

Upon completion of this course the students will be able to		
1	understand the aim and significance of value education	K1,K2
2	develop individual skills and act confidently in the society	K3
3	learn how to live lovingly through family values	K3
4	enhance spiritual values through strong faith in God	K6
5	learn good behaviours through social values	K6

SEMESTER III
CORE COURSE III: CELL BIOLOGY
Course Code: ZU233CC1

On the successful completion of the course, student will be able to:		
1	identify the types of microscopes, cell, cell organelles and cell division.	K1
2	outline the role of cell organelles, nucleic acid and their interactions.	K2
3	differentiate cell types, chromosomes, cell stages, normal and abnormal cells.	K3
4	apply knowledge in cellular research using cytological and modern techniques.	K4
5	assess skills in cytological techniques, microscopy, and cell biology experiments.	K5

K1 - Remember; K2 - Understand; K3 - Apply; K4 – Analyze; K5 – Evaluate

SEMESTER III
CORE LAB COURSE III: LAB ON CELL BIOLOGY
Course Code: ZU233CP1

On the successful completion of the course, student will be able to:		
1	identify prokaryotic and eukaryotic cells.	K 1
2	prepare and develop the whole mounting procedure.	K2
3	apply microscopy techniques for observing mitotic stages.	K3
4	demonstrate proficiency in using microscopes and micrometer scales.	K4

5	interpret abnormalities in blood cell morphology.	K5
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K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** – Analyze; **K5** - Evaluate

SEMESTER III
ELECTIVE COURSE III - ANIMAL DIVERSITY
Course Code: ZU233EC1

On the successful completion of the course, student will be able to:		
1.	relate the characteristic features in invertebrates and chordates.	K1
2.	classify invertebrates up to class level and chordates up to order level.	K2
3.	identify the structural and functional organization of few invertebrates and chordates.	K3
4..	survey the adaptations and habits of animals to their habitat.	K4
5	assess the taxonomic position of invertebrate and chordate animals.	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** – Evaluate

SEMESTER III
ELECTIVE LAB COURSE III - LAB ON ANIMAL DIVERSITY
Course Code: ZU233EP1

On the successful completion of the course, student will be able to:		
1.	compare and distinguish the dissected internal organs of animals.	K1
2.	prepare and develop the mounting procedure of important invertebrate and chordate anatomical parts.	K2
3.	identify and label the external features of different groups of invertebrates.	K3
4.	analyze the ecological roles and significance of the organisms within their ecosystems.	K4
5.	evaluate evolutionary relationships and broader biological concepts among the spotted organisms.	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate

SEMESTER III
SKILL ENHANCEMENT COURSE SEC-II: SEA FOOD PROCESSING
Course Code: ZU233SE1

On the successful completion of the course, students will be able to:		
1.	recall different types of seafood and their characteristics.	K1
2.	understand the importance of maintaining proper hygiene and sanitation in seafood processing	K2
3.	apply proper techniques for handling, filleting, and packaging different types of seafood	K3
4.	analyze the factors affecting seafood quality, such as freshness, texture, and taste	K4
5.	evaluate the sustainability of seafood processing practices and propose improvements for minimizing environmental impact.	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyse; **K5** - Evaluate

SEMESTER – III / IV
SKILL ENHANCEMENT COURSE SEC-III: FITNESS FOR WELLBEING
Course Code: UG23CSE1

On the successful completion of the course, student will be able to:		
1	know physical, mental, and social aspects of health	K1
2	understand holistic health and the role of physical fitness.	K2
3	apply mindfulness and yoga for stress management and mental clarity.	K3
4	implement proper personal hygiene practices for cleanliness and disease prevention.	K4
5	evaluate and implement right nutritional choices.	K5

K1-Remember; **K2**-Understand; **K3**-Apply; **K5**-Evaluate

SEMESTER III
SPECIFIC VALUE-ADDED COURSE
AQUARIUM KEEPING
Course Code: ZU233V01

On completion of this course, students will be able to:		
1	identify common aquarium fish species and their basic care requirements.	K1
2	demonstrate proficiency in maintaining water quality parameters.	K2
3	apply principles of aqua scaping and design to create visually appealing and functional aquarium layouts	K3
4	analyze the common health issues and diseases affecting aquarium fish.	K4

5	evaluate the ethical considerations involved in aquarium keeping.	K5
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K1 - Remember; **K2** - Understand; **K3** – Apply; **K4** - Analyse; **K5** – Evaluate

SEMESTER III
SPECIFIC VALUE-ADDED COURSE
FOOD ADULTERATION
Course Code: ZU233V02

On completion of this course, students will be able to:		
1.	classify food additives based on their functions	K1
2.	explain key food safety laws and regulations in India	K2
3.	determine common adulterants in various food items.	K3
4.	analyze the practical applicability and effectiveness in addressing food adulteration concerns.	K4
5.	evaluate the redressal measures of consumer complaints.	K5

K1 - Remember; **K2** - Understand; **K3** – Apply; **K4** - Analyse; **K5** – Evaluate

SEMESTER III
SPECIFIC VALUE-ADDED COURSE
BASIC MICROBIAL TECHNIQUES
Course Code: ZU233V03

On completion of this course, students will be able to:		
1	define the principles microbial culture.	K1
2	identify common bacterial species based on morphological and biochemical characteristics.	K2
3	practice aseptic techniques and safety precautions when working with microorganisms.	K3
4	interpret microbial growth patterns, and draw conclusions from observations.	K4
5	perform basic laboratory techniques for culturing, staining, and observing microorganisms	K5

K1 - Remember; **K2** - Understand; **K3** – Apply; **K4** - Analyse; **K5** – Evaluate

SEMESTER III/V
SELF-LEARNING COURSE
PUBLIC HEALTH AND HYGIENE
Course Code: ZU233SL1 /ZU235SL1

On completion of this course, students will be able to:		
1	grasp of public health principles, and epidemiological concepts.	K1
2	identify strategies to address public health challenges.	K2
3	apply evidence-based approaches to promote health and prevent disease in diverse populations	K3
4	explore the socio-economic determinants of health and their influence on health	K4
5	assess the importance of hygiene practices in preventing the spread of infectious diseases	K5

K1 - Remember; **K2** - Understand; **K3** – Apply; **K4** - Analyse; **K5** – Evaluate

SEMESTER IV
CORE COURSE IV: ANIMAL PHYSIOLOGY
Course Code: ZU234CC1

On the successful completion of the course, students will be able to:		
1.	recall the basic anatomy of digestive, respiratory, excretory, homeostatic, neuromuscular, endocrine and reproductive system	K1
2.	describe the important physiological systems and internal regulation.	K2
3.	compare various organ systems and adaptations exhibited by animals.	K3
4.	infer the integration of activities of different organ and organ system.	K4
5.	interrelate different organ systems to diseases for a holistic approach to human health.	K5

K1 - Remember; **K2** - Understand; **K3** – Apply; **K4** - Analyse; **K5** - Evaluate

SEMESTER IV
CORE LAB COURSE IV: LAB ON ANIMAL PHYSIOLOGY
Course Code:ZU234CP1

On the successful completion of the course, students will be able to:		
1.	choose appropriate methods to analyse physiological functions and food adulterants.	K1
2.	describe the principles of analytical methods and instruments and its uses in	K2

	physiology.	
3.	prepare balanced diet for different age group, calculate BMI, identify food adulterants.	K3
4.	analyse the effect of physical factors on the rate of activity physiological process.	K4
5.	estimate the variation in rate of physiological activity, BMI, blood cells, oxygen consumption and excretory products under varying environmental condition.	K5

K1 - Remember; **K2** - Understand; **K3** – Apply; **K4** - Analyse; **K5** - Evaluate

SEMESTER IV
ELECTIVE COURSE IV: ECONOMIC ZOOLOGY
Course Code: ZU234EC1

On the successful completion of the course, students will be able to:		
1	recall the principles of api-, seri-, and aquaculture, poultry and dairy farming.	K1
2	explain the tools and techniques used in rearing practices.	K2
3	practice the fundamental concepts of applied zoology in research and animal farms.	K3
4	inspect the quality of honey, silk, egg, milk and fish.	K4
5	evaluate the profitability of animal farms.	K5

K1 - Remember; **K2** - Understand; **K3** – Apply; **K4** - Analyse; **K5** – Evaluate

SEMESTER IV
ELECTIVE LAB COURSE II: LAB COURSE ON ECONOMIC ZOOLOGY
Course Code: ZU234EP1

On the successful completion of the course, students will be able to:		
1	identify and classify invertebrates and chordates.	K1
2	estimate the salinity and oxygen content of water samples.	K2
3	identify aquatic culturable organisms and their diseases.	K3
4	develop skill in dissection and microscopy.	K4
5	gain knowledge through field visit.	K5

K1 - Remember; **K2** - Understand; **K3** – Apply; **K4** - Analyse; **K5** – Evaluate

SEMESTER - III / IV
SKILL ENHANCEMENT COURSE SEC - IV
DIGITAL FLUENCY
Course Code: UG23CSE2

On the successful completion of the course, students will be able to:		
1.	work with text, themes and styles	K1
2.	produce a mail merge	K2
3.	secure information in an Excel workbook	K2
4.	perform documentation and presentation skills	K2, K3
5.	add special effects to slide transitions	K3

K1 - Remember; **K2** - Understand; **K3** – Apply

SEMESTER – IV
ENVIRONMENTAL STUDIES
Course Code: UG234EV1

On the successful completion of the course, students will be able to:		
1.	know the different kinds of resources, pollution and ecosystems	K1
2.	understand the biodiversity and its constituents	K2
3.	use the methods to control pollution and, to conserve the resources and ecosystem	K3
4.	analyse the factors behind pollution, global warming and health effects for sustainable development	K4
5.	evaluate various water, disaster and waste management systems	K5

K1 - Remember; **K2** - Understand; **K3** – Apply; **K4** - Analyse; **K5** – Evaluate

SEMESTER IV/VI
SELF-LEARNING COURSE
DAIRY PRODUCTION TECHNOLOGY
Course Code: ZU234SL1 /ZU236SL1

On completion of this course, students will be able to:		
1	outline the historical evolution and future prospects of the dairy industry.	K1
2	identify various dairy products and their nutritive values	K2
3	address common disorders in dairy cattle and implement measures to prevent disease transmission	K3
4	ensure milk quality through proper milking management, hygiene	K4

	practices, etc.	
5	explore various milk products and their production processes, including cheese, yogurt, and gluten.	K5

K1 - Remember; **K2** - Understand; **K3** – Apply; **K4** - Analyse; **K5** – Evaluate

SEMESTER III & IV
LIFE SKILL TRAINING II: MORAL
Course Code: UG234LM1

Upon completion of this course the students will be able to		
1	know the significance of life	K1
2	understand the importance of self-care	K2
3	realise the duty of youngsters in the society and live up to it	K3
4	analyse how to achieve success in profession	K4
5	develop mystical values by inculcating good thoughts	K5

K1 - Remember; **K2** - Understand; **K3** – Apply; **K4** - Analyse; **K5** – Evaluate

SEMESTER III & IV
LIFE SKILL TRAINING II: CATECHISM
Course Code: UG234LC1

Upon completion of this course the students will be able to		
1	know and understand the aim and importance of value education	K1,K2
2	get rid of inferiority complex and act confidently in the society	K3
3	live lovingly by facing loneliness and make decisions on their own	K3
4	develop human dignity and able to stand bravely in adversity	K6
5	learn unity in diversity and grow in a life of grace	K6

K1 - Remember **K2**-Understand; **K3**-Apply; **K6**- Create