THE MAHATMA GANDHI UNIVERSITY

UNDERGRADUATE PROGRAMMES (HONOURS)

SYLLABUS

MGU-UGP (Honours)

(2024 Admission Onwards)

Faculty: Physical Education and Sports Sciences

Expert Committee: Physical Education

Subject: Strength and Conditioning

Mahatma Gandhi University
Priyadarshini Hills
Kottayam – 686560, Kerala, India

Syllabus Index

Name of the Minor: **Strength and Conditioning**

Semester 1

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ week	Hour Distribution /week			
					L	T	P	O
MG1DSCSAC100	Introduction to Strength and Conditioning*	DSC B	4	5	3		2	
MG1DSCSAC101	Techniques, Fundamentals and Spotting	DSC B	4	5	3		2	

*For those who are opting strength & conditioning as a minor from other programme

Semester: 2

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ week	Hour Distribution /week			
					L	T	P	O
MG2DSCSAC100	Musculoskeletal system and Biomechanics*	DSC B	4	5	3		2	
MG2DSCSAC101	Building Robust Athlete	DSC B	4	5	3		2	

*For those who are opting strength & conditioning as a minor from other programme

Semester: 3

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ week	Hour Distribution /week			
					L	T	P	O
MG3DSCSAC200	Speed, Agility, Quickness and Plyometrics*	DSC B	4	5	3		2	

*For those who are opting strength & conditioning as a minor from other programme

Semester: 4

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ week	Hour Distribution /week			
					L	T	P	O
MG4DSCSAC200	Heart Rate Training*	DSC C	4	5	3		2	

*For those who are opting strength & conditioning as a minor from other programme

Semester: 5

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ week	Hour Distribution /week			
					L	T	P	O
MG5DSCSAC300	Energy Expenditure and Fatigue	DSC B*	4	5	3		2	
MG5DSCSAC301	Yoga and Wellness		4	5	3		2	

* Any one

Semester: 6

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ week	Hour Distribution /week			
					L	T	P	O
MG6DSCSAC300	Monitoring Training and Performance of Athletes	DSC B	4	5	3		2	

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Programme						
Course Name	Introduction to Strength & Conditioning					
Type of Course	DSC B					
Course Code	MG1DSCSAC100					
Course Level	**100-199**					
Course Summary	Throughout the course, there's likely a balance between theoretical knowledge and practical application, preparing individuals to effectively manage and support athletes in their recovery journey.					
Semester	I	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3		1		75
Pre-requisites if any						

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Foundational Understanding:** - Develop a foundational understanding of the key principles and concepts in strength and conditioning.	U	1
2	**Exercise Fundamentals:** - Acquire knowledge of fundamental strength training exercises, emphasizing proper form and technique.	A	1
3	- Understand basic ethical considerations and professionalism in the practice of strength and conditioning.	U	2
4	**Application to Daily Life:** - Explore how principles from the course can be applied to enhance overall fitness and well-being in daily life.	A	2
5	**Exercise Modification:** - Learn how to modify exercises and programs to accommodate different fitness levels and goals.	C	10

6	**Program Basics:** - Gain familiarity with basic principles of program design for strength and conditioning	E	10

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1.Overview of Strength and Conditioning	1.1	Historical development and current trends	2	U
	1.2	Defining Strength and Conditioning. Key components of fitness	3	A
	1.3	Need for and importance of Strength & Conditioning Sports-Specific Strength and Conditioning Youth Strength and Conditioning Special Populations in Strength and Conditioning	5	E
	1.4	General adaptation syndrome (GAS)	5	A
2.Injury Prevention and recovery	2.1	Injury prevention, Muscular Imbalance Correction	4	U
	2.2	Flexibility and Mobility	4	U
	2.3	Rehabilitation	4	C
	2.4	Reconditioning	3	C
3.Overall Health and Fitness	3.1	Cardiovascular Health	4	A
	3.2	Body Composition & assessment (Practical)	10	U
	3.3	Lifestyle Benefits	5	U

	3.4	Long-Term Athlete Development (Case studies- practical)	10	U
		Youth Athlete Programs	3	E
		Mastering Fundamentals	3	A
4.Sports-Specific Training	4.1	Skill Integration, Performance enhancement.	2	U
	4.2	Specific adaptations to imposed demands (SAID PRINCIPLE)	4	E
	4.3	Role of strength and conditioning coach	4	A
	4.4	Functional training	5	U
		Introduction to Performance Assessment and Monitoring (Practical component)	10	
5		Teacher Specific Content		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Theory Practical Flip classroom Presentation Strength and conditioning room
Assessment Types	**MODE OF ASSESSMENT** **Continues Comprehensive Assessment (CCA) Total Mark - 35** Practical CCA-15 mark, (Presentation, individual involvement) Theory CCA -25 marks (Written exam- short answer -10x2, viva)
	End Semester Examination ESE Practical -35 marks (Viva, presentation, assignment, quiz) ESE Theory – 50 marks (Written examination theory – MCQ 10x1, Short Answer – 10x2, Short Essay - 4x5).

References

1. Joyce David & Lewinden Daniel, 2014, High Performance Training for Sports, Human Kinetics, United States, P.O.Box 5076,Champaign.IL 61825-5076
2. Hill, A. 1927. Muscular Movement in Man: The Factors Governing Speed and Recovery From Fatigue. NewYork: McGraw-Hill.
3. Pettitt, R. 2010. The standard difference score: Anew statistic for evaluating strength and conditioning programs. Journal of Strength and Conditioning

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Programme						
Course Name	**Techniques, Fundamentals and Spotting**					
Type of Course	DSC B					
Course Code	MG1DSCSAC101					
Course Level	**100-199**					
Course Summary	Throughout the course, there's likely a balance between theoretical knowledge and practical application, preparing individuals to effectively manage and support athletes in their recovery journey.					
Semester	I	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3		1		75
Pre-requisites if any						

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Mastering, understanding, and applying essential techniques and advanced strategies as appropriate	E	2
2	Developing proficiency in applicable tools and methods.	C	1
3	Understand the importance of effective communication between the spotter and lifter to enhance workout efficiency and prevent injuries	U	3
4	Explore advanced spotting methods for specialized exercise and equipment, including free weights and machines.	I	2
5	Develop proficiency in identifying and correcting weightlifting techniques to ensure safety and proper form.	E	3
Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)			

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1. Technique Fundamentals	1.1	Hand grip and grip width • Pronated grip(overhand) • Supinated grip(underhand) • Neutral grip • Alternated grip • Hook grip	4	A
	1.2	Stable body and limb positioning • Proper body alignment	4	A
	1.3	Range of motion and speed	4	A
	1.4	Breathing consideration • Inhalation • Exhalation • Valsalva maneuver (breath holding)	4	A
2. **Spotting**	2.1	Meaning and definition of spotting	4	U
	2.2	Types of Exercise that require spotting. • Free weight exercises performed over the head (e.g., barbell shoulder press) • with the bar on the back (e.g., back squat) • with the bar racked anteriorly on the front of the shoulders or on the clavicles (e.g., front squat) • over the face (e.g., bench press, lying triceps extension)	4	U
	2.3	Communication between athlete and Spotters	3	U
	2.4	Spotting Techniques • Barbell Bench Press – Spotting Technique • Dumbbell Incline Bench Press – Spotting Technique • Barbell Standing Behind the Neck Shoulder Press – Spotting Technique	4	E

		• Barbell Back Squat – Spotting Technique with One Spotter • Barbell Back Squat – Spotting Technique with Three Spotters		
	2.5	Practical of unit 2.4	10	A
3. Exercise Technique-Explosive lifting **(Practical)**	3.1	Clean progression • Barbell Rack Clean (Rack Shrug OR Rack Jump) • Barbell Hang Clean (Hang Shrug OR Hang Jump) • Barbell Power Clean (Clean Shrug OR Clean Jump)	3	E
	3.2	Barbell high pull • High Pull from the Hang	4	E
	3.3	Shoulder progression • Dumbbell Shoulder Raises (choose this if the athlete cannot stabilize the weight overhead) • Barbell Standing behind the Neck Shoulder Press • Barbell Push Press • Barbell Push Jerk	4	C
	3.4	Pulling and Biceps exercise Pulling Choice • Pull-Ups • Standing Low Row • Lat Pulldown • Bent-Over Row Biceps Choice • EZ-Bar Curl	4	E
	3.5	Practical of all units of module 3	10	A
4. Exercise Technique- Strength lifting, Speed & Agility **(Practical)**	4.1	Leg progression and single leg choice Leg progression • Barbell Back Squat • Barbell Front Squat • Barbell Clean Deadlift Single Leg Choice • Forward step lunge • Walking Lunge Barbell Romanian deadlift Single leg choice	4	I
	4.2	Pushing progression – Barbell bench press, Incline bench press, Dumbbell	4	E

		bench press, Dumbbell incline bench press		
	4.3	Triceps and Abdominal Choice Triceps Choice , Abdominal Choice	3	A
	4.4	Warm up drills, Speed Drills, Agility Drills, Landing Drills	4	U
	4.5	Practical of all above units of module 4	10	A
5.	5	Teacher Specific component		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Theory Practical Flip classroom Presentation Strength and conditioning room
Assessment Types	**MODE OF ASSESSMENT** **Continues Comprehensive Assessment (CCA) Total Mark - 35** Practical CCA-15 mark, (Presentation, individual involvement) Theory CCA -25 marks (Written exam- short answer -10x2, viva)
	End Semester Examination ESE Practical -35 marks (Viva, presentation, assignment, quiz) ESE Theory – 50 marks (Written examination theory – MCQ 10x1, Short Answer – 10x2, Short Essay - 4x5).

References

1. NSCA Basics of Strength and Conditioning Manual, Dr Willam A Smith, Jacob J Wirth.

Programme					
Course Name	Musculoskeletal System and Biomechanics				
Type of Course	DSC B				
Course Code	MG2DSCSAC100				
Course Level	**100 -199**				
Course Summary	anatomy of the musculoskeletal system covers the structure and function of the various components that make up the human musculoskeletal system and the biomechanical movement in the human body.				
Semester	II	Credits		4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others
		3		2	75
Pre-requisites, if any					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Comprehensive understanding of the musculoskeletal system's anatomy	U	1
2	Proficient knowledge of bones, joints, muscles, and connective tissues	U	1
3	Application of biomechanical principles to analyze human movement	An	2
4	Ability to relate anatomical structures to biomechanical function	U	2
5	Insight into the interplay between anatomy and biomechanics in various activities	C	10

6	Practical application of knowledge in fields like sports science, physical therapy, or orthopedics.	U	10
Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)			

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1.Muscular System	1.1	Types of Muscle tissue • Skeletal • Smooth • Cardiac	4	1
	1.2	Group of muscles of human body • Head • Neck • Trunk • Upper & lower limbs	4	1
	1.3	Muscle Contraction • Isometric • Isotonic • Isokinetic	3	2
	1.4	Function of Muscular System	3	2
2.Skeletal System	2.1	Understanding Bones and Cartilages	3	2
	2.2	Joints Tendons Ligaments Bursae	4	3
	2.3	Functions of Skeletal System (examination of anatomical models)	10	3
	2.4	Muscle innervation and blood supply	10	4

		(Practical -Identification and examination of muscles using anatomical models and cadaveric specimens)		
3.Introduction to biomechanics	3.1	Need and importance of Biomechanics in muscle actions	3	4
	3.2	Principles of biomechanics	3	4
	3.3	Levers of Musculoskeletal System (Practical component)	10	5
	3.4	Anatomical planes of Human body Forces and torques in the musculoskeletal system	3	5
4.Biomechanical factors in Human Strength	4.1	Neural Control	3	5
	4.2	Muscle Cross Section area, , type of muscle fibres, size principle	3	6
	4.3	Muscle length and Joint angle, strength to mass ratio	4	6
	4.4	Muscles contraction velocity and joint angular velocity Length Tension relationship, Force Velocity relationship, Motor Unit	4	6
	4.5	Hands-on Exploration **Skeletal system, Digestive System, Muscular system, and sense organs :** Identify organs and understand the digestive process	30	1,2,3,4
5.		Teacher Specific component		

Teaching andLearning Approach	**Classroom Procedure (Mode of transaction)** • Theory • Practical • Flip classroom • Presentation
Assessment Types	**MODE OF ASSESSMENT** **Continues Comprehensive Assessment (CCA) Total Mark - 35** Practical CCA-15 mark, (Presentation, individual involvement) Theory CCA -25 marks (Written exam- short answer -10x2, viva)
	End Semester Examination ESE Practical -35 marks (Viva, presentation, assignment, quiz) ESE Theory – 50 marks (Written examination theory – MCQ 10x1, Short Answer – 10x2, Short Essay - 4x5).

References

Essentials of strength training and conditioning / National Strength and Conditioning Association ; G. Gregory Haff, N. Travis Triplett, editors. -- Fourth edition

Earle.W.Roger and Baechle R.Thomas (2003).Essentials of Personal Training, Human Kinetics, Canada

Anatomy and Physiology in health and Illness, Ross & Wilson, Waughgrant.

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Programme						
Course Name	**Building Robust Athlete**					
Type of Course	DSC B					
Course Code	MG2DSCSAC101					
Course Level	**100-199**					
Course Summary	Throughout the course, there's likely a balance between theoretical knowledge and practical application, preparing individuals to effectively manage and support athletes in their recovery journey.					
Semester	II	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3		2		75
Pre-requisites if any						

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Develop a comprehensive understanding of physical aspects crucial for athletic performance.	U	1
2	Acquire skills in designing personalized training programs tailored to individual athlete needs.	C	2
3	Master techniques for injury prevention and recovery to enhance athlete longevity.	Ap	5
4	Understand the importance of teamwork and communication in building a resilient athletic community.	U	7
5	Learn to integrate technology and data analytics for performance monitoring and enhancement.	An	2

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1.Evaluating Athletic capacity	1.1	Understanding the needs of sports and team	3	U
	1.2	Selecting appropriate tests for physical competency	3	A
	1.3	Integrating result with injury screening and injury rehabilitation testing	5	E
	1.4	Presenting the result for maximal impact	4	A
2.Developing Younger Athletes and Female Athlete	2.1	Influence of growth and maturation on physical performance	3	U
	2.2	Chronological and biological age	4	U
	2.3	Long term athlete development modelling	4	C
	2.4	Developing motor skill competency in young athlete Understanding female athlete, female triad.	4	C
3.Enhancing movement efficiency	3.1	Attaining movement efficiency and effective force application	3	A
	3.2	Musculo tendinous function in optimising athletic movement and Isometric muscular actions	3	U

	3.3	Motor patterning for efficient athletic movement Lock position training drills	4	U
	3.4	Movement control versus movement freedom Overcoming a running technique that has excessive braking forces.	5	U
4.Stabilising and strengthening the core	4.1	Defining core Characterising Core • Region • Components • Action Assessment of core and postural stability	5	U
	4.2	Defining flexibility Factors contributing to flexibility, Understanding the effect of flexibility on performance, Key issues in flexibility training	5	E
	4.3	Flexibility training – static or dynamic, Methods of optimising flexibility Implementing a flexibility programme in sport	5	E
	4.4	Practical sessions of Unit 1.3,3.3, 4.1, 4.3	30	A
5.Teacher Specific component	5.1	Teacher Specific component		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Theory Practical Flip classroom Presentation Strength and conditioning room
Assessment Types	**MODE OF ASSESSMENT** **Continues Comprehensive Assessment (CCA) Total Mark - 35** Practical CCA-15 mark, (Presentation, individual involvement) Theory CCA -25 marks (Written exam- short answer -10x2, viva)
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References

Joyce David & Lewinden Daniel,2014, High Performance Training for Sports, Human Kinetics, United States,P.O.Box5076,Champaign.IL 61825-5076

Programme					
Course Name	**Speed, Agility, Quickness and Plyometrics**				
Type of Course	DSC B				
Course Code	MG3DSCSAC200				
Course Level	**200-299**				
Course Summary	Throughout the course, there's likely a balance between theoretical knowledge and practical application, preparing individuals to effectively manage and support athletes in their knowledge of speed, agility, quickness and plyometrics				
Semester	3	Credits		4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others
		3		1	75
Pre-requisites if any					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	A comprehensive understanding of training methods to enhance speed, agility, quickness and plyometrics.	C	1
2	Apply principles of agility training to enhance an athlete's ability to change direction quickly and efficiently.	A	2
3	Implement strategies to improve reaction time and quickness in athletic movements.	An	3
4	Understand the principles of plyometric training and its impact on power development.	U	4
5	Integrate plyometric exercises into training programs for enhanced strength, power, and overall athletic performance.	C	10

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
Speed, Agility and Quickness	1.1	Concept of Speed, Agility and Quickness	4	1
	1.2	Speed, Agility and Quickness for non-athletic Population	4	1
	1.3	SAQ Training programme for Youth and Seniors & SAQ training programme for weight loss	4	2
	1.4	Anaerobic speed reserves, Maximum Anaerobic Speed – profiling and conditioning	5	3
Training Drills and Programming	2.1	Warm up drills (Practical) • High knees • Heel-ups • Forward lunge with elbow to instep • Side lunge with squat • High knee foreleg extension	5	2
	2.2	Speed drills (Practical) • Build ups. • Form starts. • Position start • Power skips (for height) • Power skips (for speed) • Bag jumps • Hollow sprints	5	5
	2.3	Agility drills • Rope or ladder routine • Bag routine a. Change of direction b. Shuffle c. Forward and backward • Line jumps routine. a. Single bunny hop b. Double bunny hop c. Scissors d. All shuffle • Pro agility a. Nebraska Agility b. Three cone drill	10	5

		c. Four cone drill d. Sprint ladder e. Shuffle ladder		
	2.4	Landing drills • Drop jump. • Vertical jump • 180-degree jump • Broad jump with vertical jump • Depth jump • Box shuffle jump • Double box shuffle step • Lateral box jump		5
Introduction to Plyometrics	3.1	Plyometric training concept and principles	4	4
	3.2	Phases of Plyometric exercise (Practical)	10	4
	3.3	Importance of plyometric training	4	4
	3.4	Plyometric training design parameters	4	5
Programme design, usage, contraindication, and safety consideration in plyometrics	4.1	Plyometric programme design	4	1
	4.2	Usage of plyometric exercise	4	1
	4.3	Contra indicated population to plyometrics.	4	4
	4.4	Safety considerations	4	1
5		Teacher Specific component		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Theory Practical Flip classroom Presentation Strength and conditioning room Ground
Assessment Types	**MODE OF ASSESSMENT** **Continues Comprehensive Assessment (CCA) Total Mark - 35** Practical CCA-15 mark, (Presentation, individual involvement) Theory CCA -25 marks (Written exam- short answer -10x2, viva)

	End Semester Examination ESE Practical -35 marks (Viva, presentation, assignment, quiz) ESE Theory – 50 marks (Written examination theory – MCQ 10x1, Short Answer – 10x2, Short Essay - 4x5).

References

1. Earle RW and Baechle TR. Resistance training and spotting techniques, in: Essentials of strength training and conditioning. TR Baechle, RW Earle, eds. Champaign, IL:Human Kinetics, 2008, pp 325 – 376.4.
2. Stone MH, and Chandler J. The squat exercise in athletic conditioning: A position statement and review of the literature. National Strength and Conditioning Association Journal 13: 51, 1991
3. Sands A.William,.*Basics of Strength and conditioning manual*,NSCA

Programme						
Course Name	**HEART RATE TRAINING**					
Type of Course	DSC C					
Course Code	MG4DSCSAC200					
Course Level	**200-299**					
Course Summary	The Heart Rate Training course is designed to educate participants on the fundamentals of using heart rate as a valuable tool in optimizing exercise routines for improved cardiovascular fitness, endurance, and overall health. The course delves into the physiological aspects of heart rate, its relationship to exercise intensity, and how to personalize training programs based on individual fitness goals.					
Semester		Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3		1		75
Pre-requisites, if any						

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	To understand the structure of heart	U	1
2	To understand the heart conduction system	U	1
3	To analyze the mechanism of heart	An	2
4	To identify, understand MHR of an individual	U	4
5	To create heart rate training plan based on the demand	C	2
6	To understand the target training zone of individual	U	1

7	To understand the relationship between heart rate oxygen consumption	U	4
8	To analyse the nature of the activity by looking at heart rate	An	6
Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)			

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1 Heart – structure and function	1.1	• Structure and function of the heart • Cardiac conduction system	4	1
	1.2	• Phases of cardiac cycle (Ventricular filling, isovolumetric contraction, ventricular ejection, is volumetric ejection)	4	2
	1.3	• Regulation of stroke volume (venous return, plasma volume, ventricular filling time, ventricular chamber size, afterload)	4	2
Exercise and Cardiovascular System	2.1	• Hemodynamics (blood, relation among pressure, cardiac output and vascular resistance)	4	3
	2.2	• Measurement of cardiovascular variables (cardiac output, stroke volume, heart rate, maximal oxygen consumption, blood pressure)	4	3

	2.3	• Determining maximum heart rate • Heart rate training zone	4	3
Training and Heart	3.1	• Factors affecting heart rate at rest and exercise • Intensity relationship of heart rate and oxygen consumption	4	3
	3.2	• Energy expenditure relationship between heart rate and vo2 • Physiological adaptation to endurance training	4	4
	3.3	• Training technique for developing endurance, • factors in program design-frequency, intensity, duration, mode, overload, specificity, reversibility,	4	5
Monitoring progress through heart rate	4.1	• monitoring progress and recovery (a)using acute HR to guide recovery (b) using chronic HR to guide recovery	4	5
	4.2	**Identify Target Heart Rate Zones** (Resting Zone, Fat-Burning Zone, Aerobic Zone, Anaerobic Zone, Maximum Effort Zone)	5	6
	4.3	• Walking, determining the walking MHR, determining the walking training zones, different training program for walking	15	6

		• Jogging and running-, determining the running maximum HR, determining the running training zones, different training program for walking		
	4.4	Team sports- determining maximum heart rate, heart rate monitoring in team sports, (P)	15	7
5 Teacher Specific Component				

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecture, demonstration, presentations
Assessment Types	**MODE OF ASSESSMENT** **Continues Comprehensive Assessment (CCA) Total Mark - 35** Practical CCA-15 mark, (Presentation, individual involvement) Theory CCA -25 marks (Written exam- short answer -10x2, viva)
	End Semester Examination ESE Practical -35 marks (Viva, presentation, assignment, quiz) ESE Theory – 50 marks (Written examination theory – MCQ 10x1, Short Answer – 10x2, Short Essay - 4x5).

References

Benson R., Connolly D., (2011) heart rate training, *human kinetics,*
Kenney W.L., Wilmore J.H., (2012) physiology of sports and exercise, *human kinetics*, fifth edition

Programme					
Course Name	**ENERGY EXPENDITURE AND FATIGUE**				
Type of Course	DSC B				
Course Code	MG5DSCSAC300				
Course Level	**300 – 399**				
Course Summary	To understand the science of human metabolism during exercise and the physiological causes behind fatigue.				
Semester	5	Credits		4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others
		3		2	75
Pre-requisites, if any					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	To understand energy sources	U	1
2	To understand the energy system during exercise	U	1
3	Students will understand about how the body uses and expends energy.	U	2
4	Understanding of the hormonal activity during exercise	U	2
5	To understand the regulation of carbohydrate and fat metabolism during exercise	A	3
6	To understand fatigue and its causes	U	10

7	Students should identify and analyze central and peripheral mechanisms of fatigue	An	10
8			
Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)			

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1.Basic energy sources1	1.1	Definition of Energy substrate, bioenergetics and metabolism	4	1
	1.2	Energy sources (Carbohydrate, fat and protein)	4	1
	1.3	Controlling the Rate of Energy Production	3	1
	1.4	Storing energy: high energy phosphate	4	1
2. Basic energy system	2.1	The ATP-PCr system	4	2
	2.2	The glycolytic system	4	2
	2.3	The oxidative system Oxidation of fat and protein	3	3
	2.4	Pre and Post competition nutrition, PEDs	4	3
3. Hormonal regulation during exercise	3.1	Endocrine system- hormones	4	4
	3.2	Hormonal regulation of metabolism during exercise	4	4
	3.3	Regulation of carbohydrate metabolism during exercise	4	5
	3.4	Regulation of fat metabolism during exercise	3	5

4. Fatigue and depletion	4.1	Fatigue and its causes, Fitness fatigue paradigm- Functional overreaching, Overtraining syndrome	4	6
	4.2	energy systems fatigue Metabolic by-products and fatigue	4	6
	4.3	Lactic acid, hydrogen ions and fatigue	4	7
	4.4	Neuromuscular fatigue	3	7
	4.5	Calculation & profiling of Energy expenditure of Athlete (Practical)	30	7
5 Teacher Specific component				

Teaching andLearning Approach	**Classroom Procedure (Mode of transaction)** 1) Theory 2) Practical 3) Presentation 4) Seminar
Assessment Types	**MODE OF ASSESSMENT** **Continues Comprehensive Assessment (CCA) Total Mark - 35** Practical CCA-15 mark, (Presentation, individual involvement) Theory CCA -25 marks (Written exam- short answer -10x2, viva)
	End Semester Examination ESE Practical -35 marks (Viva, presentation, assignment, quiz) ESE Theory – 50 marks (Written examination theory – MCQ 10x1, Short Answer – 10x2, Short Essay - 4x5).

References

1. **(following any standard reference format like APA, MLA, Chicago….)**

(Repeat for 5Modules each of Minimum 15 hrs and Maximum 20hrs Duration)

Physiology of sport and exercises, 5Th edition, Kenny larry.w, Wilmore.h. jack

Programme						
Course Name	**Yogic and Wellness**					
Type of Course	DSC B					
Course Code	MG5DSCSAC301					
Course Level	**300-399**					
Course Summary	Yogic Sciences is a comprehensive field of study that encompasses the traditional practices and philosophies of yoga. It goes beyond the physical postures (asanas) commonly associated with yoga and delves into the broader aspects of mental, spiritual, and holistic well-being. A course in Yogic Sciences typically covers a range of topics, providing students with a deep understanding of the principles and practices of yoga					
Semester	**5**	Credits			**4**	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3		**2**		**75**
Pre-requisites, if any						

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understanding of Yogic Philosophy	U	1,2
2	Application of Yogic principles to personal and Professional life	A	2,10
3	Practical Knowledge of Asanas & Pranayama	S	6,10
4	Analyze the role of yogic sciences and practices in promoting holistic health and well-being.	An	1,6

5	Evaluate the Yogic practices in the treatment of specific medical conditions	E	2,6,10
6	Developing the practice of asanas, pranayama, and other yogic techniques	C	6,9,10
7			
8			
Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)			

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1 **INTRODUCTION TO YOGIC SCIENCE**	1.1	HISTORY AND PHILOSOPHY • Meaning and definitions • The Origins and Development of Yoga • The Philosophical Foundations of Yoga • The Role of Yoga in Indian Culture	4	1
	1.2	PRINCIPLES OF YOGA • The Eight Limbs of Yoga	4	1,2
	1.3	BENEFITS OF YOGA • Physical • Physiological • Psychological • Social • Professional	3	1,2
	1.4	TYPES OF YOGA • Hatha Yoga • Karma Yoga • jnana Yoga • Bhakti Yoga • Thandra Yoga	4	1,2,4

2 **YOGA ASANA**	2.1	INTRODUCTION TO ASANA	5	1,3,6
	2.2	DIFFERENT STYLES OF ASANA • **Standing Asanas** Thadasana, Vrikshasana, Trikonasana, Virbhadarasana, Natarajasana • **Seated Asanas** Sukhasana, Baddha Konasana, Paschimottanasana, Vajrasana. • **Supine Asanas** Savasana, Pavanamuktasana, Halasana, Setu Bandhasana, Matsyasana. • **Inverted Asanas** Salamba Sirsasana, Sarvangasana, Dhanurasana, • **Balancing Asanas** Vrikshasana, Tadasana, Utkatasana, Veerabhadrasana, Natarajasana • **Twisting Asanas** Matsyasana, Marichyasana, Parivritta Trikonasana, Bhujangasana. • **Backbends** Setubandhasana, Dhanurasana, Ustrasana, Chakrasana. • **Forward Bends**	5	3,6

		Uttanasana, Parsvottanasana, Janu Sirsasana, Baddha Konasana.		
	2.3	ASANA FOR SPECIFIC HEALTH CONDITIONS (P) • **Asana for Musculoskeletal Conditions: Bhujangasana, Sethu Bandhasana, Adho Mukha Svanasana** • **Asana for Respiratory Conditions: Matsyasana, Balasana, trikonasana.** • **Asana for Cardiovascular Conditions: Tadasana, Virabahdrasana, Halasana.** • **Asana for Digestive Conditions: Malasana, Ardha Matsyendrasana, Pawanamuktasana.** • **Asana for Mental Health Conditions: Savasana, Ananda Balasana, Sukhasana.** • The Therapeutic Applications of Asana: **Low Back Pain, Osteoporosis, Arthritis, Anxiety and Depression, High Blood Pressure, Asthma, Diabetes**	5	2,5,6
3 **(PRACTICAL)** **KRIYAS, PRANAYAMAS AND MEDITATION**	3.1	KRIYAS**(P)** • The Role of Kriya in Yogic Practice • Benefits of Kriya • Different Kriya Techniques: Neti, Dhauti, Basti, Nauli, Trataka.	10	3,6
	3.2	PRANAYAMAS**(P)** • The Physiology of Breath and Prana • The Major Pranayama Techniques: Nadishodhana, Kapalabhati, Bhastrika, Bhramari, Sheetali, Ujjayi, Anulom Vilom, Sheetkari.	10	3,5,6

		• The Benefits of Pranayama for Physical and Mental Health		
	3.3	MEDITATION **(P)** • The Nature of Meditation and Consciousness • The Major Meditation Techniques • The Benefits of Meditation for Mental Well-being • Meditation and the Chakra System • The Advanced Practices of Meditation: Mantra Meditation, Visualization Meditation, Mindfulness Meditation, Guided Meditation, Chakra Meditation, Yoga Nidhra.	10	2,5,6
4 **YOGA IN DAILY LIFE**	4.1	APPLYING YOGA PRINCIPLES IN DAILY LIFE • Integrating Yoga into Daily Routine • Yoga for Healthy Living	3	2,3,4,6
	4.2	**YOGA FOR STRESS MANAGEMENT AND MENTAL HEALTH** • The Impact of Stress on the Body and Mind • Yoga Techniques for Stress Reduction • Yoga for Anxiety and Depression • Meditation and Mindfulness for Emotional Wellbeing	3	2,5
	4.3	YOGA FOR PERFORMANCE IMPROVEMENT • Integrating Yoga into Athletic Training • Yoga for Specific Sports • Advanced Yoga Techniques for Athletes • Yoga for Injury Prevention and Recovery	3	2,4,6

	4.4	YOGA FOR ENERGY AND VITALITY • **Yoga Poses for Energy and Vitality** • **Pranayama Techniques for Energy and Vitality** • **Lifestyle Modifications for Energy and Vitality**	3	2,4
	4.5	YOGA FOR WEIGHT REDUCTION • Yoga poses for weight reduction: SuryaNamskar, Veerabhadrasana, Trikonasana, Navasana, Chadhuranga Dandasana. • Breathing Technis for weight reduction: Kapalbhati, bhastrika.	3	
5 Teacher specific component				

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** 1. Group Discussion 2. Demonstration 3. Presentation 4. Competition
Assessment Types	**MODE OF ASSESSMENT** **Continues Comprehensive Assessment (CCA) Total Mark - 35** Practical CCA-15 mark, (Presentation, individual involvement) Theory CCA -25 marks (Written exam- short answer -10x2, viva)
	End Semester Examination ESE Practical -35 marks (Viva, presentation, assignment, quiz) ESE Theory – 50 marks (Written examination theory – MCQ 10x1, Short Answer – 10x2, Short Essay - 4x5).

References

1. Iyengar, B.K.S. (1966). Light on Yoga: Yoga Philosophy and Practice. HarperOne.
2. Desikachar, T.K. (1995). The Heart of Yoga: Developing Physical, Mental, and Spiritual Harmony. Inner Traditions.
3. Flood, G. (1996). An Introduction to Hinduism. Cambridge University Press.
4. Eliade, M. (1969). Yoga: Immortality and Freedom. Princeton University Press.

SUGGESTED READINGS

"The Heart of Yoga: Developing a Personal Practice" by T.K.V. Desikachar

Mahatma Gandhi University Kottayam

Programme						
Course Name	**MONITORING TRAINING AND PERFORMANCE IN ATHLETES**					
Type of Course	DSC B					
Course Code	MG6DSCSAC300					
Course Level	**300-399**					
Course Summary	This course is designed to provide students with a comprehensive understanding of the principles, methods, and technologies involved in monitoring and assessing the training and performance of athletes. The curriculum covers various aspects of monitoring, including physiological measures, biomechanics, psychological factors, and data analysis.					
Semester	6	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3		1		75
Pre-requisites, if any						

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Students will develop a deep understanding of the theoretical principles underlying the monitoring of training and performance in athletes, encompassing physiological, biomechanical, and psychological aspects.	U	1
2	Participants will gain proficiency in selecting and applying a range of monitoring tools, including wearable devices, physiological measures, and performance assessments, based on the specific needs and goals of athletes.	A	2
3	Learners will acquire skills in collecting, analyzing, and interpreting monitoring data to make informed decisions regarding training adjustments, individualized programming, and performance enhancement strategies	An	1

4	Students will learn how to integrate data from various monitoring modalities, such as heart rate variability, GPS tracking, and psychological assessments, to gain a holistic understanding of an athlete's response to training	S	2
5	Students will learn effective communication strategies to relay monitoring results to athletes and coaching staff, fostering collaboration and informed decision-making.	S	1, 2
Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)			

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
Introduction to Monitoring in Sports	1.1	Importance of Monitoring in Sports • Understanding the significance of monitoring in athlete development • Historical overview of training monitoring • Relationship between monitoring and performance optimization Ethical considerations in athlete monitoring	4	1
	1.2	Basic Monitoring Tools and Techniques • Introduction to physiological monitoring (heart rate, blood pressure, etc.)	4	1
	1.3	• Monitoring training loads and volumes • Use of subjective measures (questionnaires, perceived exertion, etc.)	4	1
	1.4	Technology in Monitoring • Wearable technology in sports monitoring • GPS and accelerometers for tracking movement • Biofeedback devices and their applications.	3	4
	2.1	Cardiovascular Monitoring	3	2

		• Heart rate variability (HRV) as a measure of autonomic nervous system activity • Resting heart rate and its implications, Blood pressure monitoring in athletes		
Physiological Monitoring in Athletes	2.2	Metabolic Monitoring • Monitoring energy expenditure in athletes • Assessing metabolic rate and substrate utilization • Blood lactate measurements and interpretation • Nutrition and its impact on metabolic monitoring	4	2
	2.3	Endocrine Monitoring • Hormonal response to training • Monitoring cortisol and testosterone levels • The menstrual cycle and female athlete monitoring • Role of hormones in recovery and adaptation • Case studies in effective monitoring practices	4	2
	2.4	Respiratory and Oxygen Uptake Monitoring • Respiratory function testing in athletes • VO2max testing and its applications • Respiratory muscle function and fatigue • Altitude training and respiratory adaptations • Case studies in effective monitoring practices	4	3
Performance Testing and Analysis	3.1	Performance Assessment Protocols • Field-based vs. laboratory-based performance tests • Specificity in performance testing • Measuring strength, power, speed, and agility • Functional movement assessments for athletes	4	4

	3.2	Skill Acquisition and Technical Analysis • Monitoring skill acquisition in athletes • Video analysis and its applications • Technology-assisted skill assessment • Incorporating technical analysis into training programs •	4	4
	3.3	Cognitive and Psychological Monitoring • Cognitive assessments in sports • Psychological profiling of athletes • Monitoring stress, mood, and mental fatigue • Goal setting and athlete motivation	3	4
	3.4	Recovery Monitoring • Assessing fatigue and recovery status • Sleep monitoring and its importance • Nutrition and hydration as recovery factors • Strategies for optimizing recovery	4	3
Practical Applications of Monitoring **(practical)**	4.1	Integrating Monitoring into Training Programs • Individualized vs. group monitoring strategies • Adjusting training based on monitoring outcomes	30	4
	4.2	• Long-term planning and monitoring cycles • Case studies in effective monitoring practices		4
	4.3	Communication with Athletes and Coaches		5

		• Presenting monitoring data to athletes and coaches • Building athlete trust through transparency • Adjusting coaching strategies based on monitoring • Addressing athlete concerns and questions		
	4.4	Ethical Considerations in Monitoring • Privacy and confidentiality in athlete monitoring • Informed consent and athlete rights • Balancing monitoring with athlete well-being •		5
5.Teacher specific compenent				

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** • Presentation • Group Discussion
Assessment Types	**MODE OF ASSESSMENT** **Continues Comprehensive Assessment (CCA) Total Mark - 35** Practical CCA-15 mark, (Presentation, individual involvement) Theory CCA -25 marks (Written exam- short answer -10x2, viva)
	End Semester Examination ESE Practical -35 marks (Viva, presentation, assignment, quiz) ESE Theory – 50 marks (Written examination theory – MCQ 10x1, Short Answer – 10x2, Short Essay - 4x5).

References:

Monitoring Training and Performance in Athlete, Mike McGuigan, Human Kinetics