Basketball Data Science

(1) GENERAL

SCHOOL	SCHOOL OF INFORMATION SCIENCES & TECHNOLOGY		
ACADEMIC UNIT	DEPARTMENT OF STATISTICS		
LEVEL OF STUDIES	POSTGRADUATE		
COURSE CODE		**TRIMESTER**	**3**
COURSE TITLE	Basketball Data Science		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
	3	5
	30	5

COURSE TYPE	Specialization Elective
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	ENGLISH
COURSE DELIVERY METHOD	Distance
IS THE COURSE OFFERED TO ERASMUS STUDENTS	NO
COURSE WEBSITE (URL)	https://cloud.aueb.gr/index.php/s/7mNQnGqQspHozKs

(2) LEARNING OUTCOMES

Learning outcomes
• Combination of programming, mathematics, and statistics skills for data analysis in the field of basketball. • Understanding of the fundamental principles of data science in sports, with emphasis on applications in high-level basketball. • Familiarity with modern systems for collecting performance data, such as player movement tracking cameras. • Analysis of tracking data and their synchronization with game statistics. • Extraction of meaningful insights into player and team performance through integrated analytical approaches. • • Development of skills in applied evaluation of competitive behavior based on real-world data conditions.
General Competences
• Analysis and synthesis of data and information, using the necessary data technologies. • Decision-making. • • Working in an interdisciplinary environment.

(3) SYLLABUS

The detailed curriculum in Basketball data science combines programming skills and specialization in the field, with knowledge of mathematics and statistics to extract meaningful basketball-related insights from data. At the most elite level of basketball, teams use tracking cameras positioned at all angles of the court to monitor every movement each player makes on the floor. This data is then synchronized with player statistics to provide a comprehensive analysis of player performance.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Distance
METHOD AND FREQUENCY OF COMMUNICATING WITH THE STUDENTS	Remotely via email and through weekly office hours (and whenever necessary) via teleconferencing or in-person office visits.
ENSURING COMMUNICATION AMONG STUDENTS	Teleconference, Chat via eclass and/ or TEAMS, and QA sessions
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	MS Teams, e-class, MS Outlook, R, Python, WayGround or Kahoot educational games and quizzes
REQUIRED EQUIPMENT AND TECHNOLOGY KNOWLEDGE	Camera, mic, PC, MS Office, and TEAMS
COURSE POLICY ON PLAGIARISM AND PLAGIARISM DETECTION TOOLS	Turnitin
COURSE POLICY ON USE OF AI TOOLS	The use of Artificial Intelligence is permitted with explicit reference to the bibliography (2) for the verbal correction of assignments and as long as students have understood the basic principles and methods of the course.
TEACHING METHODS	

Activity	*Semester workload*
Lectures	30
Assignment writing	40
Lab Exercise	20
Self-Study hours	40
Course total	***130***

STUDENT PERFORMANCE EVALUATION	Evaluation language is English. Evaluation methods include lab exercises, written assignments, and/or written examinations. Oral examinations of the assignments may be conducted if clarifications are needed or if there are suspicions of plagiarism or unauthorized use of Artificial Intelligence tools. Assessment criteria are provided on the course eClass platform and in the course materials.

(5) RECOMMENDED BIBLIOGRAPHY

- Zuccolotto, P., & Manisera, M. (2020). Basketball data science: With applications in R. CRC Press.
- Shea, S. M., & Baker, C. E. (2013). Basketball analytics: Objective and efficient strategies for understanding how teams win. Advanced Metrics.