Subject Description Form

<table>
<tr><td>Subject Code</td><td>BME5353</td></tr>
<tr><td>Subject Title</td><td>Emerging Technologies for Performance Tracking and Analysis</td></tr>
<tr><td>Credit Value</td><td>3</td></tr>
<tr><td>Level</td><td>5</td></tr>
<tr><td>Pre-requisite/
Co-requisite/
Exclusion</td><td>Nil</td></tr>
<tr><td>Objectives</td><td>To provide students with a comprehensive understanding of the advanced technologies and methodologies used in tracking and analyzing sports performance. The course aims to equip students with the knowledge and skillsets necessary to leverage emerging technology to improve athlete performance, optimize training regimens, and enhance overall sports management.</td></tr>
<tr><td>Intended Learning Outcomes</td><td>Upon completion of the subject, students will be able to:
a. Demonstrate an in-depth understanding of the principles and applications of emerging technologies in tracking and analyzing sports movements.
b. Develop practical skills in utilizing and managing advanced technological tools, such as wearable devices and data analytics platforms, to monitor and enhance athletic performance.
c. Gain analytical abilities to interpret and leverage data obtained from tracking technologies to inform decisions in sports management and academy-related events.</td></tr>
<tr><td>Contribution to Programme Outcomes (Refer to Part I Section 2)</td><td>Program Learning Outcome (a) Acquire and apply advanced levels of knowledge and skills in the sports technology and management discipline. (Teach, Practice, Measure)
Program Learning Outcome (b) Apply critical analysis and problem-solving skills for evidence-based practice in the sports technology and management discipline. (Teach, Practice, Measure)
Programme Learning Outcome (c) Demonstrate a higher level of professional competence to cope with the rapid changes in practice in the sports technology and management discipline. (Teach, Practice, Measure)
Programme Learning Outcome (e) Demonstrate abilities to continuously develop in professional practice. (Teach, Practice)</td></tr>
<tr><td>Subject Synopsis/ Indicative Syllabus</td><td>The syllabus begins with an introduction to the fundamentals of performance-tracking technologies, including the history and evolution of these tools. Students will then delve into the various types of wearable devices, sensors, and their specific applications in monitoring physiological and biomechanical parameters. The course will cover data processing techniques to interpret performance. Key modules will include the integration of AI and machine learning in sports analytics, exploring predictive models for injury prevention, performance optimization, and recovery strategies. Practical sessions, case studies, and a research project will be incorporated to provide hands-on experience, enabling students to apply theoretical knowledge in real-world scenarios.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>The course will consist of a combination of lectures, lab sessions, and tutorials to provide a comprehensive understanding of emerging technologies in sports performance tracking and analyses.
<table>
<tr><td rowspan="2">Teaching/ learning methodology</td><td colspan="6">Intended subject learning outcomes</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td></td><td></td><td></td></tr>
<tr><td>1. Lectures</td><td>✓</td><td></td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>2. Lab sessions</td><td>✓</td><td>✓</td><td></td><td></td><td></td><td></td></tr>
<tr><td>3. Tutorials</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr>
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- Lectures will cover the theoretical aspects, introducing students to the principles, tools, and applications of various technologies.
- Lab sessions will offer hands-on experience with wearable devices, sensors, and data analytics platforms, allowing students to apply their knowledge in real-world contexts.
- Tutorials will include case studies to illustrate the implementation of these technologies in different sports settings, fostering critical thinking and problem-solving skills.

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<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>

<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td></td><td></td><td></td></tr>
<tr><td>Continuous assessment</td><td>100%</td><td colspan="6"></td></tr>
<tr><td>1. In-class quiz</td><td>30%</td><td>✓</td><td>✓</td><td></td><td></td><td></td><td></td></tr>
<tr><td>2. Assignments</td><td>30%</td><td>✓</td><td>✓</td><td></td><td></td><td></td><td></td></tr>
<tr><td>3. Lab reports</td><td>40%</td><td></td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="6"></td></tr>
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Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Note: Assignments, working sheet and class quiz will mainly assess outcome 1 and 2; while the lab report will mainly assess outcome 3.

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<tr><td>Student Study Effort Expected</td><td>

<table>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lectures/Laboratories</td><td>36 Hrs.</td></tr>
<tr><td>▪ Tutorials</td><td>3 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Self-study</td><td>39 Hrs.</td></tr>
<tr><td>▪ Assignments and paper preparation</td><td>39 Hrs.</td></tr>
<tr><td>Total student study effort</td><td>117 Hrs.</td></tr>
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<tr><td>Reading List and References</td><td>

1. Alamar, B. C. (2013). Sports Analytics: A Guide for Coaches, Managers, and Other Decision Makers. Columbia University Press.
2. EMC Education Services. (2015). Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data. Wiley.
3. Lara-Bercial, S., & Mendo-Castillo, I. (2020). Wearable Technology in Sport: A Practical Guide to the Use of Wearables to Improve Athletic Performance. Human Kinetics.
4. Li RT, Kling SR, Salata MJ, Cupp SA, Sheehan J, Voos JE. Wearable Performance Devices in Sports Medicine. Sports Health. 2016;8(1):74-78.
5. Memmert, D. (2024). Sports Technology: Technologies, Fields of Application, Sports Equipment and Materials for Sport. Springer Spektrum.
6. Shaw, R. N., Krzhizhanovskaya, V. V., Lees, M., Dongarra, J. J., & Sloot, P. M. A. (Eds.). (2020). Artificial Intelligence in Sport: Applications and Innovations. Springer.
7. Seçkin AÇ, Ateş B, Seçkin M. Review on Wearable Technology in Sports: Concepts, Challenges and Opportunities. Applied Sciences. 2023; 13(18):10399.

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<tr><td>Date of Last Major Revision</td><td>20 August 2025</td></tr>
<tr><td>Date of Last Minor Revision</td><td>20 August 2025</td></tr>
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