Educational Data Mining and Learning Analytics

COURSE CONTENT:
1. **Overview and Introduction to Educational Data Mining (EDM) and Learning Analytics**
   o Overview of the field, introduction to educational data analytics aimed at knowledge extraction, educational data warehouses, introduction to learning analytics, and preparation of educational data for knowledge extraction tasks.
2. **Techniques and Algorithms for Knowledge Extraction from Educational Data**
   o Techniques and algorithms for data mining in educational contexts (classification, clustering, association rule mining), applications in systems (e.g., SQL Server Analysis Services, WEKA), and special topics in educational data mining (temporal/spatial knowledge extraction).
3. **Predictive Modeling and Data Visualization for Learning Analytics**
   o Predictive modeling in learning analytics and data visualization techniques for analyzing learning.
4. **Application of Learning Analytics Results in Educational Software**
   o Emphasis on using learning analytics results and applying them to educational software. Specifically, students will learn how to leverage learning analytics to optimize educational software.
5. **Personal Data and Privacy Policy**
   o Topics on personal data, privacy policies, and educational data security. Summary and future directions for the field.

Detailed Description of Units:

In the **first unit**, concepts of educational data mining and learning analytics are introduced, definitions are provided, differences from related scientific fields are explained, and educational data warehouses and data preparation methods for knowledge extraction tasks are described.

The **second unit** delves into topics related to techniques and algorithms for knowledge extraction from educational data (such as classification, clustering, association rule mining), their application in systems (e.g., WEKA, SQL Server Analysis Services), and special topics in educational data mining (temporal/spatial knowledge extraction).

The **third unit** focuses on predictive modeling and data visualization in learning analytics.

In the **fourth unit**, emphasis is placed on using learning analytics results and applying them to educational software. Specifically, students will learn how to utilize learning analytics to optimize educational software.

The **fifth unit** addresses personal data, privacy policies, and the security of educational data. The unit concludes with a summary and an exploration of future directions in the field.