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#Contents Workshop 2

*Purpose of the course unit: programme competence to be developed:
By the end of this course the students will be able to create 2D and 3D games using Unity3d Engine.

*Learning outcomes of the programme:
Building Two Games using Unity3D Engine.

*Learning outcomes of the course unit:
2D Game
3D Game

#Game System Design

*Purpose of the course unit: programme competence to be developed:
Understand how to write high concept document and how to develop a game idea.

*Learning outcomes of the programme:
Understand how to write high concept document and how to develop a game idea.
Understand various type of game genre to design the system architecture of a playable game.

*Learning outcomes of the course unit:
Ability to write any type of Game Design Document

#Programming Method

*Purpose of the course unit: programme competence to be developed:
Students can understand and explain internal techniques and algorithms used in a commercial Game Engine.

*Learning outcomes of the programme:
Students can describe various features in the Game Engine.
Students can explain the internal operations of various features of the Game Engine and implement the rudimentary classes for the features.

*Learning outcomes of the course unit:
Students have the ability to understand the internal operations of the Game Engine.
Students have the collection of software codes which is related to internal techniques of the Game Engine.

#Database Design

*Goal:
This course will provide students with a general overview of databases, introducing you to database history, modern database systems, the different models used to design a database, and Structured Query
Language (SQL), which is the standard language used to access and manipulate databases.

*Outline:
Databases are incredibly prevalent. Databases reside behind any software system or electronic device that maintains some amount of persistent information. In addition to persistence, database systems provide a number of other properties that make them exceptionally useful and convenient: reliability, efficiency, scalability, concurrency control, data abstractions, and high-level query languages.

#3D Graphics Programming

*Purpose of the course unit: programme competence to be developed:
Computer graphics is the discipline of generating images with the aid of computers. Today, computer graphics is a core technology in digital photography, film, video games, cell phone and computer displays, and many specialized applications. In this course, we implement the 3D rendering engine from scratch.

*Learning outcomes of the programme:
Understanding of topics below:
- Rendering engine architecture
- All the mathematical components for the rendering engine.
- Fundamental knowledge of game physics engine.

*Learning outcomes of the course unit:
Knowledge of topics below:
- The concept of linear algebra.
- Vectors and matrices.
- Scan conversion algorithm.
- The concept of texture mapping
- The principle of the quaternion.
- The basic concepts of the DirectX/OpenGL library.
- Shaders in the DirectX/OpenGL.

#Big Data Processing

*Goal:
The goal of this course is to familiarize the students with most important information technologies used in manipulating, storing, and analyzing big data.
At the end of this class you should be able to:
- Understanding the basic concepts and principles, syntax of R language.
- Tidy and transform data into a format that is convenient for analysis
- Data exploration, data preprocessing, and data visualization for data analysis.
- Big data analysis using public big data

*Outline:
Big Data analytics is the process of examining large and complex data sets that often exceed the computational capabilities. R, the open source scripting language was released in 1995 and since then it has grown efficiently and has become a go-to language for the data scientists around the globe. R includes a large number of data packages, shelf graph functions, etc. which proves as a proficient language for big data analytics as it has effective data handling capability. Tech giants like
Microsoft, Google are using R for large data analysis. In this course you will learn how to program in R and how to use R for effective data analysis. The course covers practical issues in big data processing which includes programming in R, reading data into R, accessing R packages, writing R functions, debugging, and organizing and commenting R code. Topics in big data analysis and optimization will provide working examples.

#Contents Workshop 3

*Purpose of the course unit: programme competence to be developed:
Understand a basic concept of AI and learn various type of algorithms in AI.
Understand how these AI algorithms are used in a Game.

*Learning outcomes of the programme:
Understand therotical background of AI algorithms and code. By doing projects, increase the ability to design and implement applied AI methods.

*Learning outcomes of the course unit:
Understanding and practice of techniques of the modelling method of a NPC behavior(FSM, Steering Behavior Algorithm, Planning etc.)

#Game Tool Programming

*Purpose of the course unit: programme competence to be developed:
Students acquire abilities to apply MFC, a program development tool in windows environment, in game development.

*Learning outcomes of the programme:
The goal is to help students learn MFC programming and build program development ability to process user’s interface in an optimal manner in the game screen.

*Learning outcomes of the course unit:
Students have the ability to understand the internal operations of MFC.

#3D Game Programming

*Purpose of the course unit: programme competence to be developed:
By the end of this course the students will be able to create 3D games using Direct3D.

*Learning outcomes of the programme:
Building Game Engine using Direct3D

*Learning outcomes of the course unit:
Direct3D Game Engine

#Artificial Intelligence

*Purpose of the course unit: programme competence to be developed:
Artificial intelligence (AI) is intelligence demonstrated by machines, in contrast to the natural intelligence displayed by humans. We learn programming techniques for game AI.

*Learning outcomes of the programme:
We learn various topics of AI for game development. We also learn the basic principles of machine learning. And we learn fundamental topics of the Deep Neural Network.

*Learning outcomes of the course unit:
Knowledge of topics below:
- Pathfinding
- FSM
- A* and Navigation Mesh System
- Flocking, Behavior Tree
- Deep Neural Network

#Computer Graphics

* Outline:
  This course introduces students to the basic knowledge of computer graphics with OpenGL. OpenGL is the premier environment for developing portable, interactive 2D and 3D graphics applications. Since its introduction in 1992, OpenGL has become the industry's most widely used and supported 2D and 3D graphics application programming interface (API), bringing thousands of applications to a wide variety of computer platforms. OpenGL fosters innovation and speeds application development by incorporating a broad set of rendering, texture mapping, special effects, and other powerful visualization functions. Developers can leverage the power of OpenGL across all popular desktop and workstation platforms, ensuring wide application deployment.

#Cloud Computing

* Goal:
  Understanding of modern cloud system and it's application

* Outline:
  Cloud computing is the on-demand availability of computer system resources, especially cloud storage and computing power, without direct active management by the user.
  Cloud computing relies on sharing of resources to achieve coherence and economies of scale.

  Cloud computing allows enterprises to get their applications up and running faster, with improved manageability and less maintenance, and that it enables IT teams to more rapidly adjust resources to meet fluctuating and unpredictable demand, providing the burst computing capability: high computing power at certain periods of peak demand.

  The availability of high-capacity networks, low-cost computers and storage devices as well as the widespread adoption of hardware virtualization, service-oriented architecture and autonomic and utility computing has led to growth in cloud computing.

#Contents Workshop 4

* Purpose of the course unit: programme competence to be developed:
  "Learn basic concept of a computer network to develop a online game.
  Understand how to write a code for networking.

  * Learning outcomes of the programme:
    Ability to write a network enabled online game.

  * Learning outcomes of the course unit:
    "Understanding of the entire process of online game development.
    Understanding of the basic computer networking.
    Understand the operations of various type of network protocol.

#Game Project 1

* Purpose of the course unit: programme competence to be developed:
This course aims to achieve a higher level of integrity by checking the progress of the project through guiding, managing, discussing and consulting entire processes ranging from planning, production and first half works of the graduation project.

*Learning outcomes of the programme:
This course aims to achieve a higher level of integrity by checking the progress of the project through guiding, managing, discussing and consulting entire processes ranging from planning, production and first half works of the graduation project.

*Learning outcomes of the course unit:
Executable Game on Computer or Mobile Devices.

### Using Game Engine

*Purpose of the course unit: programme competence to be developed:
Students can understand internal details of a Game Engine. And also describe important features of a Game Engine.

*Learning outcomes of the programme:
Students can understand internal details of a Game Engine. And also describe important features of a Game Engine.

*Learning outcomes of the course unit:
Deep knowledge of a Game Engine.
C++ source codes which is a part of a Game Engine.

### Research Method

*Purpose of the course unit: programme competence to be developed:
The purpose of this course is many-fold: (i) to acquaint with the essence of operations research; (ii) to investigate the linear and the discrete programing; (iii) to study simplest non-linear optimization techniques; (iv) to access to the game theory and the queuing theory; (v) to learn how to simulate and solve economic-type problems of different levels.

*Learning outcomes of the programme:
Is able to independently develop research plan, study and analyze the scientific literature, systematize and summarize information, draw conclusions.

*Learning outcomes of the course unit:
Will be able to formulate a wide range of economic problems (such as linear, discrete and nonlinear programming problems.)

### Contents Workshop 5

*Purpose of the course unit: programme competence to be developed:
This lecture aims to do experiment and survey using scientific method for game user's behavior and psychological state and base on research and design for computer games, such as VR/AR/MR game, mobile game, online game, and arcade game.

*Learning outcomes of the programme:
Current the types of the game are changed as multi-platform game, VR/AR/MR game, and smart phone based game. Students attending a lecture should be need to analyze such game user's behavior and pattern. To figure out it, the student have to understand the cognitive scientific method. It is helpful to learn the basis on the objective analysis methodology. This research consists of four kinds of method. For example, there are experiment, survey, observation, and field research. This lecture concentrates on the experiment and especially think-aloud method. Think-aloud method is useful tool to investigate human mind as quantity.

*Learning outcomes of the course unit:
Ability of writing reports for various type of researches.
#Game Project 2

*Purpose of the course unit: programme competence to be developed:
Make a game with team. Understand entire process of the game making in team.

*Learning outcomes of the programme:
Make a game with team. Understand entire process of the game making in team.

*Learning outcomes of the course unit:
Executable Game on Computer or Mobile Devices.

#Bachelor’s Thesis

*Purpose of the course unit: programme competence to be developed:
Learn to analyze the issues /goals/objectives/tasks raised in order to find the necessary information to analyze the decisions, assessments and practical proposals for experimental research work.

*Learning outcomes of the programme:
*Is able to independently develop research plan, study and analyze the scientific literature, systematize and summarize information, draw conclusions.

*Learning outcomes of the course unit:
Learn to analyze the issues /goals/objectives/tasks raised in the paper to find the necessary information to analyze the decisions, assessments and practical proposals for experimental research work.

#Portfolio

*Purpose of the course unit: programme competence to be developed:
Students will learn a series of processes to plan and carry out portfolio composition and details so that their competence (detailed major) can be displayed well in employment activities applied to screen.

*Learning outcomes of the programme:
This class develop portfolio, and also understand values for the competencies needed for employment.

*Learning outcomes of the course unit:
Complete portfolio to show self-fulfillment in the field of arts as one's specialty.

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