ELEC 5614

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**Hydroelectric Dam System Simulation**

Real Time Computing

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# Introduction

Power and water consumption are integral parts of any type of community to provide the basic neccessities available for people to use. This makes the use of a hyrdoelectric dam system to be hugely important to be able to extract both appoprriate power and water needs for a community while calculating important water capacity constraints between dams and ensuring appropriate flow. This makes the use of real time computing widely important as data such as dam capacity, power useage, water useage, river flow and upstream pumping are highly competing factors that have large impacts on the system all of which must be done at real time to ensure appropriate calculatioins are carried out and constraints are being adhered to so that the functional requirements of the system is met.

# Project Description

# Deliverable 1

## Use Case Diagram

# Deliverable 2

## Functional Requirements

* Provide Appropriate Electricity
* Provide Appropriate Water
* Pump Water upstream to a dam
* Flow water downstream for power and movement

## Non-functional Requirements

Should be defined in terms of metrics (Actual value).

* Compliance
* Disaster recovery
* Efficiency (resource consumption for given load)
* Failure management
* Maintainability
* Performance / response time (performance engineering)
* Quality (e.g. faults discovered, faults delivered, fault removal efficacy)
* Recovery / recoverability (e.g. mean time to recovery – MTTR downtime?)
* Reliability (e.g. mean time between failures - MTBF)
* Safety or Factor of safety
* Stability

Keep river above X amount or percent capacity

Keep dam above X amount of capacity

Ensure dam is below Y amount capacity

# Deliverable 3

## State Diagram

## Sequence Diagram

## Diagram 3

## Diagram 4

# Deliverable 4

## Real Time System Code

# Deliverable 5

## Test Cases