

TOPIC PRESENTATION

GEOG 3000 Fluvial Processes

University of Guelph

Department of Geography

LEARNING OUTCOMES

This is a group assignment where the students will be teaching key concepts to the class.

This will enforce them to:

- Be proficient enough in a particular aspect of fluvial process so that they can effectively communicate it and engage in higher-level conversations of the topic; and,
- Practice presentation and communication skills in science and philosophy.

PROJECT OUTLINE

Each group of students (3 or 4) will be responsible for coordinating, understanding and delivering a presentation (e.g. lab, video, lecture, field trip) on core concepts relating to:

- River channels
- Aquatic habitats
- Human impacts
- River mechanics
- Erosion and sediment transport
- Bedforms

Each topic will have 2-3 primary concepts that the students will be responsible for delivering. These concepts will be provided by the lecturer. The lectures will each last 45mins and the groups are responsible for having any presentation materials (e.g. a PowerPoint) available to the class by 12pm the day prior.

The groups will have access to the instructor, past lecture notes and resources that will support the groups' presentations. The students are also responsible for providing 5 questions for a quiz component.

DELIVERABLES

- 45 min "presentation" of core concepts of an individual topic (described above)
- 5 questions for a quiz

EVALUATION CRITERIA

The presentation will be worth 10 percent of the final grade for this course.

Rubric:

- Content (/6)
 - Were key concepts delivered
 - Were they technically sound and free from errors in fact or logic
 - Was the information presented authentically, i.e. did they show a comfort in the material and its application
- Presentation skills (/1)
 - Delivery: Clear and memorable, but not talked down to
 - Risk and creativity: did they go out of their comfort zone to ensure that something was communicated clearly
- Engagement (/3)
 - Inspiring (but not sentimental): Were you enrolled and engaged in the conversation
 - Were they able to connect concepts to real-world application

CORE CONCEPTS FOR EACH TOPIC

TOPIC 2: RIVER CHANNELS (Chapter 1, 2, 5)

Group 1

- Controls on river morphology (1.2 + notes)
- Space and time considerations (2.1 + notes)
- Appreciate different hydrological modelling approaches (theoretical, physical, numerical)
- Introduction to dimensional characters (1.1.2)
- Introduction to the “five” equations (1.1.3)

Group 2

- Catchments and flow through an environment (Notes)
- Channel patterns (5.1)
- Water properties (Notes)
- Different methods of measuring velocity and discharge in rivers (Notes)

TOPIC 3: AQUATIC HABITATS (Chapter 6)

Group 1:

- Water movement through a basin and the impact that this transfer has on stream flows (Notes)
- Understanding the components of a hydrograph (Notes)
- Introduction to morphological units (6.1.1)
 - Vegetation (6.1.2)
 - Fish beds (6.1.4)
 - Benthic beds (6.1.3)
 - Table 6.1

Group 2:

- Impact of discharge variation, sediment supply and sediment transport on invertebrate fauna and fish communities (Notes)
- Impact of channel morphology on habitat and flow (Notes)
- Hyporheic Zone (6.4)
 - Introduction (6.4.1)
 - 6.4.2
 - 6.4.3

- Complexity of aquatic habitats, vegetation and hyporheic zone (I would recommend case studies)

TOPIC 4: HUMAN IMPACTS

Group 1:

- Land-use and influence on hydrology
- Engineered modification on a river course (channels, reservoirs, levees, flow diversion and channel improvements)

Group 2:

- Agriculture impacts (biochemical, sediment and overland flow impacts)
- Temperature impacts
- Buildings on floodplains and in high risk areas
- New paradigm in stream restoration (naturalization and ecological engineering)

TOPIC 5: RIVER MECHANICS (Chapter 2)

Group 1:

- Water properties recap (Notes 3)
- Conservation concepts (Notes 3)
- Energy – magnitude, duration, frequency as they relate to driving landscapes
- Bernoulli's equation (Notes 3)

Group 2:

- Types of flow (Notes 3)
- Turbulence, drag force, shear stress and stream power (Notes 3)
- Learning to read a river (classifications, bank and mid-channel geomorphic unit)
- Channel types – in terms of stability, transport mechanisms and work/energy

TOPIC 6: EROSION AND SEDIMENT TRANSPORT (Chapter 3)

Group 1:

- Definition of alluvial, semi-alluvial and non-alluvial streams
- Slope, discharge and sediment transport
- Bernoulli 2 – more in depth

Group 2:

- Types of flow
- Turbulence, drag force, shear stress and stream power
- Sediment properties
- Non-cohesive and cohesive sediments

TOPIC 7: BEDFORMS (Chapter 4)

Group 1:

- Entrainment of sediment
- Different types of sediment transport
- Methods for measuring sediment transport

Group 2:

- Geometry of sand bedforms (4.2.1)
- Small-scale bedforms (specifically, transverse ribs, step-pools, cluster, riffle-pool)
- Sediment transport equations fundamental to modelling sediment transport