<table>
<thead>
<tr>
<th>PART A</th>
<th>PART B</th>
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<tbody>
<tr>
<td>Carbonate-dominated coastal and continental margin environments and processes</td>
<td>Coastal morphodynamics, hydrodynamics and geomorphology</td>
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</tbody>
</table>

**Assoc. Prof. Jody Webster**  
Room 440 Madsen Building F09;  
Phone: +612 9036 6538,  
Fax: +612 9351 0184  
Email: jody.webster@sydney.edu.au  
Student consultation hours:  
Wednesday 1-2 pm

**Dr. Jak McCarroll**  
Room 423 Madsen Building F09  
Email: jak.mccarroll@sydney.edu.au  
Student consultation hours:  
Wednesday 10:00-11:00 am

**CLASS TIMES:**

**Lectures:** Tuesday 12:00-2:00 pm Slade Lecture Theatre (Rm 217), Physics Building (A28).  
**Practicals:** Tuesdays and Wednesdays 2:00-5:00 pm; PC Lab 302 Madsen Building (F09)
COURSE SYNOPSIS AND AIMS

The aim of this course is to introduce students to a variety of Coastal Environments and the major physical processes which control the morphodynamic evolution of these systems. The course offers a unique opportunity to learn about the full spectrum of marine sedimentary environments from siliciclastic, temperate and highly urbanised beach and estuarine systems to carbonate, tropical, pristine, and undeveloped/protected coastal and continental margin environments. This course is divided into two parts.

Part A: Assoc. Prof. Jody Webster – Weeks 1-6

Carbonate-dominated coastal and continental margin environments and processes: This part of the course covers the basic long-term morphodynamics and processes impacting these environments. We will cover the full spectrum of temperate to tropical carbonate systems. However, particular attention will be focused on tropical reefal and margin systems (including the Great Barrier Reef), and their geologic and biologic responses to past, present and future environmental changes. Subject to logistical and staffing resources, these systems may also be studied in the field at One Tree Island/Heron Island/Orpheus Island in the GBR. This fieldtrip is not compulsory but is strongly recommended as it will expose students first hand to a pristine, world class coral reef system.

*NOTE: Due logistic constraints spots are limited on this GBR field trip so be sure to sign up quickly once the field trip information is released. Please contact Assoc. Prof. Jody Webster for more details and to confirm your place ASAP. Final student selection will be subject availability, a first come-first go basis and then academic merit if needed.

Part B: Dr. Jak McCarroll – Weeks 7-13

Coastal morphodynamics, hydrodynamics, and geomorphology: This part of the course leads on directly from Part A, focusing on the short-term (days to decadal) hydrodynamic and morphodynamic processes affecting coastal systems, including beaches and coral reefs. Particular emphasis is placed on intermediate energy beaches typical of the NSW coastline.

The concept of morphodynamics is explored including a review of some of the fundamental conceptual and numerical coastal models including the morphodynamic model of beach evolution, surfzone hydrodynamics (e.g. wave breaking, rip currents), and coral reef and beach geomorphic change.

This section of the course includes a compulsory field trip to a Sydney beach where hydrodynamic and geomorphic data will be collected.
LEARNING OUTCOMES

The learning outcomes of this course are:

1. To understand the main carbonate-dominated coastal to continental margin environments (including reefal) and the major process influencing them.
2. To be able to relate the different types of reef environments with different physical, chemical and biologic factors (Asses. #1, 2).
3. To demonstrate the geologic development and sedimentary architecture of reefal systems in space and time to changes in past climate, sea level and tectonic regimes (Asses. #1, 2).
4. To establish the range of likely impacts of predicted future global climate changes on reef systems (Asses. #1).
5. To train students in different techniques in evaluating and interpreting remote sensing data used to characterise coastal and continental margin environments (Asses. #1, 2).
6. To learn about the morphodynamics of coastal systems (Asses. #3, 4).
7. To learn about processes that control coastal morphology (Asses. #3, 4).
8. To be able to define a beach system by its morphodynamic state and associated basic processes (Asses. #3, 4).
9. To learn about the nature of wave breaking, transformation and impact on coastal environments (Asses. #3, #4).
10. To establish scientific data analysis and interpretation techniques (using Excel, MATLAB, and ArcGIS) (Asses. #1,2,4)
11. To encourage students to develop the ability to identify and evaluate relevant environmental information from written and spoken scientific presentations (Asses. #2, 4).
12. To provide guidelines of how to address coastal studies in real-life situations (Asses. #2, 4).
ASSESSMENT

Both parts will be assessed separately, each contributing to 50% of the final mark of the unit. Note please see appendix for USYD mandated assessment criteria and policies.

Parts A (50% of UOS): Assessment will be in the form of:
40% Examination of practical and theoretical knowledge (online)
20% GIS, bathymetry, processes and reef growth modelling practical modules (online quiz (Asses. #1 due Week 3, March 17/18th)
30% Group Research Project presentation and poster (Asses. #2 presentation on Week 6, April 14/15th, and poster due Week 7, April 20th, 4:30 pm)
10% GBR field work project (due on field trip TBA)/Alternative Asses. (4:30 pm 22nd April)

Part B (50% of UOS): Assessment will be in the form of:
50% Examination of practical and theoretical knowledge (online)
20% Practical Quiz (Asses. #3 due Week 11, May 19/20)
30% Group Report (Asses. #4 due Friday Week 13, June 5)

FIELDWORK

Parts A: Includes a voluntary field trip to the Great Barrier Reef (One Tree/Heron/Orpheus Islands (dates TBA). More details on this field trip to be provided separately.

Parts B: Includes a compulsory field trip to a Sydney Beach (Week 8, Sat 2nd May). Data collected on this field trip will be used for the practical session in Part B of the course. More details on this field trip to be provided separately.

GENERAL READING LIST

Parts A and B

All references, course updates, and teaching materials will be provided on the GEOS3009 eLearning site.
# Lecture Outline

### Part A: Assoc. Prof. Jody Webster

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Lect A1-2. Intro &amp; Why do we care? Marine sediments 101; Carbonate vs. siliciclastic coastal and continental margin environments and processes (JW)</th>
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</thead>
<tbody>
<tr>
<td>Week 2</td>
<td>Lect A1-2. Intro &amp; Why do we care? Marine sediments 101; Carbonate vs. siliciclastic coastal and continental margin environments and processes (JW); Lect A3. Carbonate sediments and depositional systems in space and time (JW)</td>
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<tr>
<td>Week 3</td>
<td>Lect A4. Carbonate sediments and depositional systems in space and time (JW); Lect. A5. Coasts in space and time: sequence stratigraphy</td>
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<tr>
<td>Week 4</td>
<td>Lect A6-7 Advanced methods in the analysis of coastal and continental margin environments (SD, JW)</td>
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<tr>
<td>Week 5</td>
<td>Lect A8-9 Physical processes in carbonate environments (AVC); Vulnerable Islands: Climate Change, Tectonic Change and Changing Livelihoods in the Western Pacific (JC)</td>
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**Mid-Semester Break**

| Week 6 | Lect A10-11 Coral reefs and climate change: past, present and future (JW). |

### Part B: Dr. Jak McCarroll

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<tr>
<td>Week 8</td>
<td>No teaching in lieu of GBR and beach field trips.</td>
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<tr>
<td>Week 9</td>
<td>Lect B3-4 Wave generation and wave theory. Wave breaking, set-up and the swash zone (JM).</td>
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<tr>
<td>Week 10</td>
<td>Lect B5-6 Surfzone currents: longshore and rip currents. Sediment transport (JM).</td>
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<tr>
<td>Week 11</td>
<td>Lect B7-8 Beach state models, three-dimensional beach morphodynamics (JM).</td>
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<tr>
<td>Week 12</td>
<td>Lect B9-10 Sea-level rise, climate change and long-term coastal evolution (JM).</td>
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<tr>
<td>Week 13</td>
<td>REVIEW LECTURE and examination briefing for Parts A and B (JW, JM)</td>
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# Practical Outline

### Part A: Assoc. Prof. Jody Webster

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Practical Mod 1 (Intro ARCGIS &amp; Bathy data)</th>
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<tbody>
<tr>
<td>Week 2</td>
<td>Practical Mod 2 (SL &amp; reef growth)</td>
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<tr>
<td>Week 3</td>
<td>Practical Mod 3 (Quiz &amp; Project 1) - Project selection &amp; design</td>
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<tr>
<td>Week 4</td>
<td>Practical Mod 4 (Project 2) - Data reduction and interpretation</td>
</tr>
<tr>
<td>Week 5</td>
<td>Practical Mod 5 (Project 3) - Data reduction and interpretation</td>
</tr>
<tr>
<td>Week 6</td>
<td>Practical Mod 6 (Project 4) - Oral presentation of poster</td>
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### Part B: Dr. Jak McCarroll

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<thead>
<tr>
<th>Week 7</th>
<th>Practical B1 (Coastal recession and the shoreface profile)</th>
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<tbody>
<tr>
<td>Week 8</td>
<td>No teaching in lieu of field trips.</td>
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<tr>
<td>Week 9</td>
<td>Practical B2 (Offshore waves and the shoreface profile)</td>
</tr>
<tr>
<td>Week 10</td>
<td>Practical B3 (Surfzone waves, currents and morphology I)</td>
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<tr>
<td>Week 11</td>
<td>Practical B4 (Surfzone waves, currents and morphology II)</td>
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<tr>
<td>Week 12</td>
<td>Project Week - Data reduction for report</td>
</tr>
<tr>
<td>Week 13</td>
<td>Project Week - Data reduction for report.</td>
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*Please note: these timetables are flexible and only give an indication of progress through the semester*
APPENDIX

Particular points relevant to the assessment of this unit of study

1. Late work will incur a 5% penalty for every 24 hours after the submission deadline. It may be that special circumstances arise which may allow you to submit work after the submission deadlines. This will require that you obtain and submit the appropriate special-consideration form (http://sydney.edu.au/science/cstudent/ug/forms.shtml#special_permission) and submit it with appropriate supporting evidence with the piece of assessed work. The most common of these special circumstances is short-term illness which will require that a medical practitioner complete the professional practitioner's certificate which is included in the Faculty of Science special consideration form. This material should be submitted firstly at the Faculty Office within five days of your return to the campus. (Note that is usually a good idea to inform the Unit of Study coordinator prior to the submission date if you are affected in this way).

2. Marks for the assessment tasks and grades awarded for the unit will conform to the University's assessment policies and procedures. A recent change to this policy requires that marks be awarded relative to a set of standards that describe a graduated hierarchy of the levels of achievement. The marks assigned to the various grades pass, credit, distinction, high distinction remain as they were prior to the change in the policy. The grades are described below along with the criteria that will be used to identify the various levels of achievement.

In reference to these grades students should note that:

   a) all assessment tasks will normally contain an at least one item that will enable the full range of achievement levels to be demonstrated, although students should note that some, and perhaps the majority of the individual items, activities or questions presented in each of the assessment tasks will be intended to establish that students have achieved a pass or credit level of achievement.

   b) that distinctions and high distinctions would normally only be awarded to students who have performed at a high level in all assessment tasks – in this context 'performed at a high level in all assessment tasks' means that distinction students will have achieved a credit minimum in all individual items of assessed work and will have achieved a distinction level of achievement (or better) for the majority (>75%) of the assessment tasks. High distinction students will have achieved a distinction minimum in all individual items of assessed work and will have achieved a high distinction level of achievement (or better) for the majority (>75%) of the assessment tasks

Fail (Below 50%)

Work may fail for any or all of the following criteria:

- No answer or response is provided
- Does not address or otherwise answer the question
- Contains numerous minor errors or presents a significant misconception
- Presents irrelevant material
- No evidence of research or analysis
- Presents a significantly inaccurate or flawed argument
- The answer is incomprehensible or difficult to understand due to significant problems with grammar, expression or structure

Pass (Between 50% and 64%)

Work awarded a passing grade will usually achieve the following minimum standards or present the described characteristics:

- An appropriate but superficial answer or response is provided
- Presents relevant material in a superficial manner or in a simplistic descriptive style
• Correctly identifies key point or points (facts) but does not develop an appropriate explanation or argument if this is required
• Contains some minor errors or presents minor inaccuracies and misconceptions
• Little or no evidence of in-depth analysis or deep understanding of the concept
• Answers can be understood but may be poorly worded or somewhat flawed due to poor grammar, expression or structure

Credit (Between 65% and 74%)

Work awarded a credit grade will usually achieve the following minimum standards or present the described characteristics:

• An appropriate, accurate and reasonable detailed answer or response is provided
• Appropriate key point or points (facts) and/or concepts clearly presented without significant errors or misconceptions
• Presents relevant material concisely with facts clearly integrated into the explanation
• Accurate quotation and/or source identification when appropriate.
• Evidence of independent research or critical analysis of concept or problem
• Answers are easily understood with both clear expression and structure if appropriate

Distinction (Between 75% and 84%)

Work awarded a distinction grade will usually achieve the following minimum standards or present the described characteristics:

• Accurately answers the question in a convincing, confident manner
• Presents relevant material accurately in a concise manner or with the facts well-integrated into a comprehensive explanation or argument
• Accurate quotation and/or source identification when appropriate.
• Evidence of extensive independent research
• Evidence of extensive critical analysis of concept, and/or innovative perspective on the topic, and/or deep understanding of problem
• Answers are well written, with clear structure and cogent expression

High Distinction (Above 85%)

Work awarded a distinction grade will usually achieve the following minimum standards or present the described characteristics:

• Accurately answers the question in an impressive, compelling, or highly persuasive manner
• Presents relevant material accurately in a thoroughly convincing or forceful manner or with the facts well-integrated into an extended and comprehensive explanation or argument
• Accurate quotation and/or source identification when appropriate.
• Evidence of exhaustive independent research
• Evidence of extensive critical analysis of concept, and/or innovative perspective on the topic, and/or deep understanding of problem
• Answers demonstrate striking originality, an innovative approach, or impressive analytical skill
• Answers are exceptionally well written, with excellent structure expression
• Is otherwise exceptional in some way
Academic dishonesty policies

Academic dishonesty is discussed in the University's Policy for Academic Honesty in Coursework and you are responsible for upholding all components of the policy. There are some components that need clarification for this unit, due to the nature of the written assignments. Specifically:

Section 3. Academic dishonesty

1. The University procedures relating to academic dishonesty must be invoked where an examiner considers that the student has presented another person's ideas, findings or written work as his or her own by copying or reproducing them without due acknowledgment of the source and with the intent to deceive the examiner.

2. It is reasonable to consider that the student has intended to deceive the examiner where:
   (a) substantial portions of the work submitted for assessment were copied from another student, or from the work of a former student, in a manner which clearly exceeds the boundaries of legitimate co-operation or group work.

It is acceptable, and encouraged, to work with other students. Sometimes we learn things best from our peers. However, it is not acceptable to (1) submit work that is identical to that of another student who is currently or was previously enrolled in this unit of study and/or (2) use previously marked exercises to create your work. While the intellectual ideas that underlie your answers may be garnered as part of a group, you must independently create your own tables, graphs, and wording when answering questions for submitted work. You are advised that if you utilise old assignments from students who are enrolled in this unit or have previously taken this unit for assistance in their own work you will be "submitting another student's work". For the purposes of this course, students who use old assignments and the students who provide them violate the policy and will be disciplined to the full extent of the policy, which can include expulsion from the University. All other components of the policy are applicable as stated in the Policy on Academic Honesty in Coursework. Finally, in this UOS all written assignments may be subject to originality checking using software such as turnitin or similar.