3.1.3 Coastal systems and landscapes

This section of our specification focuses on coastal zones, which are dynamic environments in which landscapes develop by the interaction of winds, waves, currents and terrestrial and marine sediments. The operation and outcomes of fundamental geomorphological processes and their association with distinctive landscapes are readily observable. In common with water and carbon cycles, a systems approach to study is specified.

Student engagement with subject content fosters an informed appreciation of the beauty and diversity of coasts and their importance as human habitats. The section offers the opportunity to exercise and develop observation skills, measurement and geospatial mapping skills, together with data manipulation and statistical skills, including those associated with and arising from fieldwork.

3.1.3.1 Coasts as natural systems

Systems in physical geography: systems concepts and their application to the development of coastal landscapes – inputs, outputs, energy, stores/components, flows/transfers, positive/negative feedback, dynamic equilibrium. The concepts of landform and landscape and how related landforms combine to form characteristic landscapes.

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3.1.3.2 Systems and processes

Sources of energy in coastal environments: winds, waves (constructive and destructive), currents and tides. Low energy and high energy coasts.

Sediment sources, cells and budgets.

Geomorphological processes: weathering, mass movement, erosion, transportation and deposition.

Distinctively coastal processes: marine: erosion – hydraulic action, wave quarrying, corrasion/ abrasion, cavitation, solution, attrition; transportation: traction, suspension (longshore/littoral drift) and deposition; sub-aerial weathering, mass movement and runoff.

3.1.3.3 Coastal landscape development

This content must include study of a variety of landscapes from beyond the United Kingdom (UK) but may also include UK examples.

Origin and development of landforms and landscapes of coastal erosion: cliffs and wave cut platforms, cliff profile features including caves, arches and stacks; factors and processes in their development.

Origin and development of landforms and landscapes of coastal deposition. Beaches, simple and compound spits, tombolos, offshore bars, barrier beaches and islands and sand dunes; factors and processes in their development.

Estuarine mudflat/saltmarsh environments and associated landscapes; factors and processes in their development.

Eustatic, isostatic and tectonic sea level change: major changes in sea level in the last 10,000 years.

Coastlines of emergence and submergence. Origin and development of associated landforms: raised beaches, marine platforms; rias, fjords, Dalmatian coasts.

Recent and predicted climatic change and potential impact on coasts.

The relationship between process, time, landforms and landscapes in coastal settings.

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3.1.3.4 Coastal management

Human intervention in coastal landscapes. Traditional approaches to coastal flood and erosion risk: hard and soft engineering. Sustainable approaches to coastal flood risk and coastal erosion management: shoreline management/integrated coastal zone management.

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3.1.3.5 Quantitative and qualitative skills

Students must engage with a range of quantitative and relevant qualitative skills, within the theme landscape systems. These should include observation skills, measurement and geospatial mapping skills and data manipulation and statistical skills applied to field measurements.

3.1.3.6 Case studies

Case study(ies) of coastal environment(s) at a local scale to illustrate and analyse fundamental coastal processes, their landscape outcomes as set out above and engage with field data and challenges represented in their sustainable management.

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3.1.3.6 Case studies

Case study of a contrasting coastal landscape beyond the UK to illustrate and analyse how it presents risks and opportunities for human occupation and development and evaluate human responses of resilience, mitigation and adaptation.