MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

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| **Module Information**  **معلومات المادة الدراسية** | | | | | | | |
| **Module Title** | Sequence Stratigraphy | | | | **Module Delivery** | | |
| **Module Type** | Core | | | | * **☒ Theory** * **☒ Lecture** * **☒ Lab** * **☐ Tutorial** * **☐ Practical** * **☐ Seminar** | | |
| **Module Code** | GEO31119 | | | |
| **ECTS Credits** | 5 | | | |
| **SWL (hr/sem)** | 125 | | | |
| **Module Level** | | III | **Semester of Delivery** | | | | Six |
| **Administering Department** | | Geophysics | **College** | College of Geophysics and Remote Sensing | | | |
| **Module Leader** | Dr. Rami M. Idan | | **e-mail** | Ramisc3@kus.edu.iq | | | |
| **Module Leader’s Acad. Title** | | Assistant Professor | **Module Leader’s Qualification** | | | | Petroleum geology |
| **Module Tutor** | Nul | | **e-mail** |  | | | |
| **Peer Reviewer Name** | | Null | **e-mail** |  | | | |
| **Scientific Committee Approval Date** | | 16 / 6 / 2023 | **Version Number** | | | 2 | |

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| **Relation with other Modules**  **العلاقة مع المواد الدراسية الأخرى** | | | |
| **Prerequisite module** | General Geology | **Semester** | One |
| **Co-requisites module** | Null | **Semester** | - |

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| **Module Aims, Learning Outcomes and Indicative Contents**  **أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية** | |
| **Module Aims**  **أهداف المادة الدراسية** | Sequence stratigraphy is now a well-established analytical tool for investigating sedimentary successions, with the aim of predicting the distribution of reservoir, source rock and seal lithologies. Over the last 20 years, concepts that were originally developed from seismic reflection data have been refined by application to wireline-log, core and reservoir production data sets. Several schools of sequence stratigraphic interpretation (and attendant jargon) have also evolved. In all of these data sets and approaches to interpretation, the goal is to elucidate chronostratigraphic relationships that enable sedimentation patterns to be robustly predicted.  This course will provide an introduction to the principles and methods of sequence stratigraphy as applied in subsurface prediction. The emphasis will be on selecting interpretation methods that are appropriate for particular data sets and purposes, in order to ensure that a sequence stratigraphic interpretation is meaningful and useful. |
| **Module Learning Outcomes**  **مخرجات التعلم للمادة الدراسية** | After completing this course, students should possess the following skills and knowledge:  1. An introduction to the processes and major controls on carbonate sediment production.  2. The evolution of this system through geological time  3. Understand the response of carbonates to changing sea level and accommodation space, and how this differs from clastic sedimentation in response to relative sea level change.  4. Understand the concepts of seismic and sequence stratigraphy and apply them to realistic datasets  5. Understand the basic concept of sequence-stratigraphic approach  6. The main features of carbonate sequence tracts  7. The characteristics of key surfaces as recognized in core, seismic and wireline logs  8. Case examples of mixed carbonate-clastic systems  9. Uses and abuses of carbonate sequence stratigraphy using case studies  10. Uses and abuses of clastic sequence stratigraphy using case studies |
| **Indicative Contents**  **المحتويات الإرشادية** | Through explanations and applications, using display screens, and presenting scientific films that explain the reality of what happens in nature. |

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| **Learning and Teaching Strategies**  **استراتيجيات التعلم والتعليم** | |
| **Strategies** | Class Lecture  Laboratory  Practical Training  Seminar |

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| **tudent Workload (SWL)**  **الحمل الدراسي للطالب** | | | |
| **Structured SWL (h/sem)**  **الحمل الدراسي المنتظم للطالب خلال الفصل** | 64 |  |  |
| **Unstructured SWL (h/sem)**  **الحمل الدراسي غير المنتظم للطالب خلال الفصل** | 61 |  |  |
| **Total SWL (h/sem)**  **الحمل الدراسي الكلي للطالب خلال الفصل** | 125 | | |

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| **Module Evaluation**  **تقييم المادة الدراسية** | | | | | |
| **As** | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) |  |  |
| **Assignments** | 2 | 10% (10) |  |  |
| **Projects / Lab.** | 1 | 10% (10) |  |  |
| **Report** | 1 | 10% (10) |  |  |
| **Summative assessment** | **Midterm Exam** | 2 hr | 10% (10) |  |  |
| **Final Exam** | 2hr | 50% (50) |  |  |
| **Total assessment** | | | 100% (100 Marks) |  |  |

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| **Delivery Plan (Weekly Syllabus)**  **المنهاج الاسبوعي النظري** | |
| **Week** | **Material Covered** |
| **Week 1** | Sequence stratigraphy in the historical context; advances in stratigraphy and process sedimentology |
| **Week 2** | Formation and architecture of sedimentary basins |
| **Week 3** | Overview of process sedimentology and depositional systems |
| **Week 4** | Basic principles of sequence stratigraphy: accommodation, chronostratigraphy, unconformities, scales of practice (outcrop, logs, cores and reflection seismic); introduction to stacking patterns and seismic reflection configurations and terminations |
| **Week 5** | Exam |
| **Week 6** | Sequence stratigraphy in the historical context; advances in stratigraphy and process sedimentology |
| **Week 7** | Formation and architecture of sedimentary basins |
| **Week 8** | Overview of process sedimentology and depositional systems |
| **Week 9** | Basic principles of sequence stratigraphy: accommodation, chronostratigraphy, unconformities, scales of practice (outcrop, logs, cores and reflection seismic); introduction |
| **Week 10** | to stacking patterns and seismic reflection configurations and terminations |
| **Week 11** | Exam |
| **Week 12** | terminations; seismic surfaces |
| **Week 13** | Systems tracts: principal and minor tracts |
| **Week 14** | Sequence stratigraphy of systems not defined by shelfal accommodation: fluvial, alluvial, |
| **Week 15** | Aeolian and slope (deep water) |
| **Week 16** | **Preparatory week before the final Exam** |

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| **Delivery Plan (Weekly Lab. Syllabus)**  **المنهاج الاسبوعي للمختبر** | |
| **Week** | **Material Covered** |
| **Week 1** | Time lag corrections |
| **Week 2** | Borehole environment and corrections of logs |
| **Week 3** | Lithology detection from logs |
| **Week 4** | Lithology and Fluids detection from logs |
| **Week 5** | Type of fluid(s) and identification |
| **Week 6** | Fluid amounts and Pay zone prediction |
| **Week 7** | Cross-plots |

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| **Learning and Teaching Resources**  **مصادر التعلم والتدريس** | | |
|  | **Text** | **Available in the Library?** |
| **Required Texts** | Emery, D., and Myers, K. J. (1996). Sequence Stratigraphy. Oxford, U. K., Blackwell, p. 297.  Catuneanu, O. [2006] Principles of sequence stratigraphy. Elsevier, Amsterdam. | Y |
| **Recommended Texts** | •Coe, A.L. (Ed.) [2003] The sedimentary record of sea-level change. Cambridge University Press.  •Emery, D. and Myers, K.J. (Eds.) Sequence stratigraphy. Blackwell Science, Oxford.  •Posamentier, H.W. and Allen, G.P. [1999] Siliciclastic sequence stratigraphy — concepts and applications. Society for Sedimentary Geology (SEPM), Concepts in Sedimentology and Paleontology 7.  •Van Wagoner, J.C., Mitchum, R.M., Campion, K.M. and Rahmanian, V.D. [1990] Siliciclastic sequence stratigraphy in well logs, cores and outcrops. American Association of Petroleum Geologists, Methods in Exploration 7. | y |
| **Websites** | <https://www.pdfdrive.com/search?q=principals+of+sequence+stratigraphy&pagecount=any&sortby=&searchin=en&r=1&more=true> | |

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| **Grading Scheme**  **مخطط الدرجات** | | | | |
| **Group** | **Grade** | التقدير | **Marks (%)** | **Definition** |
| **Success Group**  **(50 - 100)** | **A -** Excellent | **امتياز** | 90 - 100 | Outstanding Performance |
| **B -** Very Good | **جيد جدا** | 80 - 89 | Above average with some errors |
| **C -** Good | **جيد** | 70 - 79 | Sound work with notable errors |
| **D -** Satisfactory | **متوسط** | 60 - 69 | Fair but with major shortcomings |
| **E -** Sufficient | **مقبول** | 50 - 59 | Work meets minimum criteria |
| **Fail Group**  **(0 – 49)** | **FX –** Fail | **راسب (قيد المعالجة)** | (45-49) | More work required but credit awarded |
| **F –** Fail | **راسب** | (0-44) | Considerable amount of work required |
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| **Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. | | | | |