

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| Module Information | | | |
|------------------------------------|--------------------|-------------------------------|---|
| معلومات المادة الدراسية | | | |
| Module Title | Medical Chemistry | | Module Delivery |
| Module Type | Support | | <input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar |
| Module Code | UOMU024017 | | |
| ECTS Credits | 7 | | |
| SWL (hr/sem) | 175 | | |
| Module Level | 1 | Semester of Delivery | 1 |
| Administering Department | MIET | College | CETE |
| Module Leader | Isaa Farhan | e-mail | isaa.farhan@uomus.edu.iq |
| Module Leader's Acad. Title | Assistant Lecturer | Module Leader's Qualification | Dr |
| Module Tutor | Issa Farhan | e-mail | isaa.farhan@uomus.edu.iq |
| Peer Reviewer Name | | e-mail | |
| Scientific Committee Approval Date | 19/11/2023 | Version Number | |

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

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|----------------------|---|----------|---|
| Prerequisite module | - | Semester | - |
| Co-requisites module | - | Semester | - |

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

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|---|---|
| Module Aims أهداف المادة الدراسية | <ol style="list-style-type: none">1- To write and balance chemical equation which many calculations depend on.2- To convert chemical formula to components composition percent or to conclude empirical formula depending upon composition percent.3- To predict about the economic pathway for specific reaction to happen depending upon stoichiometric calculations of balanced chemical equations.4- To Know how to prepare buffers with different ranges of pH using acids with suitable dissociation constant of acid.5- To understand the effect of common ions on equilibrium of reversible reactions.6- To focus on theoretical working principles of spectrophotometric instruments.7- to discuss the importance of isotopes in diseases treatment and diagnosis. |
| | <p>At ending of course, the student will:</p> <ol style="list-style-type: none">1- Able to give chemical compounds their systematic names and to write their chemical formulae.2- Know how to calculate concentrations of chemicals and to express them in various concentration terms. In addition to convert one term to another.3- Calculate the compound composition percent according to chemical formula or know empirical formula depending on compounds composition percent.4- Write chemical equations of different reactions and balance them and predict the limiting reactant in addition to the expected weight of products.5- Estimate the reaction direction according to calculation of equilibrium constant of reversible reactions.6- Know how to prepare buffers and how buffer work?7- Understand importance and wide application of slightly soluble salts.8- Perform the statistical treatment of analytical results and source of errors.9- Recognize the importance of galvanic cells in current generation and role of electrolytic cells in metallic electroplating.10- Consider zero, 1st and 2nd laws of thermodynamic processes, and evaluate thermodynamic functions of work, enthalpy, heat, internal energy and giving judgment of spontaneous process or not by entropy and Gibbs free energy.11- List the components of photometric determination techniques, in addition to principals of their works.12- Identify the photometric instrumentations such as FIS, FT-IR spectrophotometer, and mass spectrophotometry.13- Emphasize the vital role of isotopes in diagnosis and diseases treatment. |

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| Indicative Contents المحتويات الإرشادية | <p>Isotopes, Chemical formula, Units conversion (5 hr)</p> <p>Normality, Formality, Molarity, Molality, Mole fraction, Mill equivalent, ppm, ppb, mass percent, mass/vol percent. (10 hr)</p> <p>Stoichiometry (4 hr) Chemical equilibrium (4hr) dissociation constant (5 hr) pH (4 hr) Buffers (5 hr) common ion (4 hr)</p> <p>Solubility product constant (4 hr)</p> <p>Statistical treatment, average, range, standard deviation, variance, Absolute error, relative error. (6 hr)</p> <p>Redox reactions, Electrochemistry, electrolytes, Nernst equation, cell potential (6 hr).</p> <p>1st law of thermodynamic, Reversible and irreversible process, Heat capacities, adiabatic process, Isothermal processes (6 hr).</p> <p>2nd law of thermodynamic, entropy, Gibbs free energy (4 hr).</p> <p>Photochemistry, electromagnetic spectrum, Beer Lambert law (6 hr).</p> <p>IR Spectrophotometer, mass spectroscopy, FIS, FES (6 hr).</p> <p>Potentiometer, conductive meter, pH-meter (5 hr).</p> |
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| Learning and Teaching Strategies استراتيجيات التعلم والتعليم | |
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| Strategies | homework assignments, written exam, Quizzes, seminars, reports, practical tests and Online tests |

| Student Workload (SWL) الحمل الدراسي للطالب | | | |
|--|-----|---|---|
| Structured SWL (h/sem) الحمل الدراسي المنظم للطالب خلال الفصل | 94 | Structured SWL (h/w) الحمل الدراسي المنظم للطالب أسبوعيا | 6 |
| Unstructured SWL (h/sem) الحمل الدراسي غير المنظم للطالب خلال الفصل | 81 | Unstructured SWL (h/w) الحمل الدراسي غير المنظم للطالب أسبوعيا | 5 |
| Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل | 175 | | |

Module Evaluation

تقييم المادة الدراسية

| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
|-------------------------|--------------------|----------------------|----------------|--|--|
| Formative assessment | Quizzes | 15min/ 2 times | 20% (20) | 5 th , 12 th | LO# 1 st – 5 th LO# 10 th – 12 th |
| | Online Assignments | 5min/ 2 times | 10% (10) | 6 th ,13 th | LO# 1 st LO# 10 th |
| | Lab. | Each lab/ 5 times | 5% (5) | 3 rd , 4 th , 5 th , 6 th , 7 th | LO# 1 st -2 nd , LO# 3 rd LO# 4 th LO# 5 th LO# 6 th – 7 th |
| | Seminar | 10min/ One time | 5% (5) | 6 th | LO# 2 nd – 5 th |
| Summative assessment | Midterm Exam | 180 min/ one time | 10% | 8 th | LO# 1 st – 10 th |
| | Final Exam | 240min/ one time | 50% | 16 th | |
| Total assessment | | | 100% | | |

Delivery Plan (Weekly Syllabus)

المنهج الاسبوعي النظري

| | Material Covered |
|---------|--|
| Week 1 | Introduction, Units conversion, Isotopes, Chemical formula and chemical equation |
| Week 2 | Methods of expressing analytical concentrations: Normality, Formality, Molarity, Molality, Mole fraction, Mill equivalent, ppm, ppb, wt. and vol. percent ratio. |
| Week 3 | Stoichiometry |
| Week 4 | Chemical equilibrium |
| Week 5 | Acid-Base dissociation constant |
| Week 6 | pH-scale, buffer solution+ Solubility of precipitations, common ion effect |
| Week 7 | Mid-term Exam |
| Week 8 | Errors & statistical treatment of analytical data sources of errors, types of errors, average mode, range, average derivation, standard deviation, relative standard deviation, variance, method of expressing accuracy, Absolute error, relative error. |
| Week 9 | Redox reactions, balancing of redox equation |
| Week 10 | Electrochemistry: electrochemical cells, types of electrodes, electrolytes, Nernst equation, cell potential |

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| Week 11 | Thermodynamic, Zero and first law of thermodynamic, Reversible and irreversible expansion, Heat capacities, adiabatic expansion, Isothermal processes. |
| Week 12 | Second law of thermodynamic: spontaneous processes, entropy and Gibbs free energy. |
| Week 13 | Photochemistry (spectrophotometer analysis), Regions of electromagnetic spectrum, Absorption and emission of electromagnetic spectrum, Beer Lambert law, instrumentations components of spectrophotometer. |
| Week 14 | IR Spectrophotometer, mass spectroscopy, flame ionization spectrophotometry. |
| Week 15 | Potentiometer, conductive meter, pH-meter and some other applications of chemical sensors+ Preparatory week before the final Exam |

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الأسبوعي للمختبر

| | Material Covered |
|---------------|--|
| Week 1 | Principals of qualitative analysis. |
| Week 2 | Qualitative analysis of cations of 1 st and 2 nd groups. |
| Week 3 | Qualitative analysis of cations of 3 rd and fifth groups. |
| Week 4 | Introduction to Quantitative (volumetric) analysis and types of standard substance in titration, principles and calculations of titration. |
| Week 5 | How to prepare solution of primary standard materials and to standardize secondary standard substance of HCl, (acid-base titration) |
| Week 6 | Standardization secondary standard substance of NaOH and its application by determination of vinegar acidity. |
| Week 7 | Determination of residual chloride in tape water by titration against silver nitrate (precipitation titration). |

Learning and Teaching Resources

مصادر التعلم والتدریس

| | Text | Available in the Library? |
|--------------------------|---|----------------------------------|
| Required Texts | | |
| Recommended Texts | 1- ESSENTIALS OF GENERAL CHEMISTRY By EBBING GABBON RAGSDALE 2- CHEMICAL PRINCIPLES By Steven S Zumdahl - 4th edition | No |

| 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 |

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.