



PROGRAMS AND BIBLIOGRAPHY

| Subject | |
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| Code | Name |
| QF431 | Physical Chemistry I |

| Vector |
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| OF:S-5 T:004 P:000 L:000 O:000 D:000 HS:004 SL:004 C:004 AV:N EX:S FM:75% |

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| Pre requirement | MA211 QG108 |
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| Summary |
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| The gaseous state: PVT properties of ideal and real gases. The van der Waals equation. The principle of corresponding states. Fundamental concepts of thermodynamics: First, Second and Third laws. Thermodynamic functions; thermochemistry; applications. Conditions for equilibrium, the phase rule. Systems with multiple components. Colligative properties, activity. |

| Program |
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| I. The concept of a system, the surroundings, thermodynamic variables, thermal equilibrium and properties. II. The gaseous state: ideal and real gases. Intermolecular interactions; gas-liquid transitions (liquefaction). III. The concept of internal energy, heat, enthalpy, heat capacity, generalized work, and reversibility. IV. First Law of Thermodynamics; applications to gaseous systems. V. Thermochemistry and calorimetry. VI. Second and Third laws of Thermodynamics: Entropy; statistical notions. VII. Fundamental relations for closed systems. VIII. Gibbs and Helmholtz functions. Concepts of fugacity and chemical activity. IX. Independent and natural variables, Maxwell relations. X. Fundamental relations for open systems; chemical potential. XI. Fundamental relations of chemical equilibrium and phase equilibrium; the Gibbs phase rule. XII. Phase diagrams for one component and the variation vapor pressure with temperature and pressure. XIII. Measurements of composition, partial molar quantities. XIV. Rault's and Henry's laws XV. Phase diagrams for systems with two and three components. Distillation. XVI. Colligative properties. |

| Bibliography |
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| 1. <i>Molecular Thermodynamics</i> , D. A. McQuarrie e J. D. Simon. Scientific Books. Grande parte do material pode ser encontrada também no texto " <i>Physical Chemistry: A Molecular Approach</i> " dos mesmos autores 2. <i>Physical Chemistry</i> , I. Levine. 3. <i>Physical Chemistry</i> (2a ed.), R. A. Alberty & R. J. Silbey 4. <i>Physical Chemistry</i> , P. W. Atkins 5. <i>Termodinâmica Química</i> , Aécio Pereira chagas, Ed. Unicamp, 1999 |

Evaluation criteria

Critérios de avaliação definidos pelo Professor, com base no disposto na Seção I – Normas Gerais, Capítulo V – Da Avaliação do Aluno na Disciplina, do Regimento Geral de Graduação. Frequência: 75 % (* O abono de faltas será considerado dentro do previsto no capítulo VI, seção X, artigo 72 do Regimento Geral de Graduação)