The course is designed to help student-teachers achieve the following goals:

- Developing the student's ability to deal with the concepts of crystal structure, thermal properties and magnetic properties of materials.
- Building solid foundation forthcoming developments in the domain of solid state.

2) Operational learning objectives of the course

By the end of this course, student teachers are expected to achieve the following objectives:

A) Knowledge and Comprehension:

The student have to recognize the following:

a.1 Lattice vibration and thermal properties of materials.
a.2 Band theory of solids.
a.3 Types of junctions.
a.4 Dielectrics and their types.
a.5 Radiation detection and detectors.
a.6 Radiation doses and dosemetry.

B) Cognitive Skills:

b.1 Electrical properties of solids.
b.2 Interaction of radiation with matter.
b.3 External and internal hazards of radiation sources.
C) Practical Skills:

- c.1 Structure of solids and applications of X-ray crystallography.
- c.2 Types of Crystal imperfections
- c.3 Magnetic properties of materials and types of magnetism.
- c.4 Optical properties of solids.

D) Enabling Skills:

- d.1 The students have to recognize the role of external and internal hazards of radiation sources and radiation protection.
- d.2 Create and maintain an educational environment in which conceptual understanding will occur for all science students.
<table>
<thead>
<tr>
<th>عدد الساعات</th>
<th>محاضرة</th>
<th>عمل</th>
<th>شفوي</th>
<th>المجموع</th>
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<tr>
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<td>Lattice vibration Interatomic forces and classification of solids.</td>
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<td>8 -</td>
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<td>4</td>
<td>Thermal properties: classical Einstein and Debby theories of heat capacity.</td>
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<td>السادس</td>
<td>8 -</td>
<td>4</td>
<td>4</td>
<td>Thermal conductivity and thermal expansion.</td>
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<td>السابع</td>
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<td>Magnetic properties and classical theory.</td>
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<tr>
<td>الثامن</td>
<td>8 -</td>
<td>4</td>
<td>4</td>
<td>Types of magnetism: Dia-, para- and ferromagnetism.</td>
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</tbody>
</table>

*Solving and discusses problem sets.*
*Submission and class presentation of term papers.*
*Computer aided and web based assignments and assessment.*
*Visits to industrial and medical institutions and submission of subsequent reports.*
*Laboratory work, group discussions, and reports on: volumetric analysis, precipitation, complexometric and redox titrations.*
*Lectures.*
*Laboratory experiments.*
*Problems and essay assignments.*
- Semester activities including classroom interactions and Quizzes.
- Mid-term exam
- Lab performance evaluation.
- Final exam.

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**Summative Evaluation table**

<table>
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<tr>
<th>Assessment</th>
<th>Score</th>
<th>Weight</th>
<th>التقييم</th>
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<td>Final exam</td>
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<td>Fifteenth Week</td>
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<td>Final written exam</td>
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**References**

- "Physics Principles with applications", D.C Giancoli, USA.
- "University physics", F.W. Sears, M.W. Zemasky and H.D. Young, Wesley series in physics, USA.
- Physics by Joseph W. Kane, Morton M. Sternhein. John wiley and sons.
- "Introduction to solid state physics", C.Kittel, John Wiley & son, Inc.
- "Introduction to solids", L.V Azaroff, McGrew- Hill
- "An Introduction to solid state Physics", R.J Elliot and A.F. Gibson.
- "Introduction to solid state physics", C.Kittel, John Wiley & Sons, Inc.
- "Introduction to Solids", L.V. Azaroff, McGrew – Hill.
"An Introduction to solid state physics", R.J.Elliot and A.F.Gibson, Macmillan Press, LTD.

References
Textbooks
Handouts and problem sets.
Electronic, web, and multimedia based resources.
Lab work.

الإمكانات المطلوبة للتعليم والتعلم

- منسق المقرر:
- رئيس القسم:
- التـاريخ: