Course Title: Reverse Engineering  
Course code: (640397)

Course Level: 3rd year  
Course prerequisite(s) and/or corequisite(s):  
   Engineering Project (1) – (650390)

Lecture Time:  
Credit hours: 3  
Tutorial: 1 hour/Week

Course module description:
The course lays the foundation for acquiring the skills that when collectively applied are known as reverse engineering.

Course module objectives:
At Completing this module the student should be able to:
- Analysis of the product
- Generation of an intermediate level product description
- Human analysis of the product description to produce a specification
- Generation of a new product using the specification.

Course/ module components:
- Books (title, author(s), publisher, year of publication)
- Support material(s) (vcs,acs,etc).
- Study guide(s) (if applicable)
- Homework and laboratory guide(s) if (applicable).
Teaching methods:
Lectures, discussion in class, tutorials, and problem solving.
Duration: 16 weeks, 48 hours in total
Lectures: 48 hours, 3 per week + two exams (two hours)

Learning Outcomes:

A) Knowledge and understanding Skills:
Students will obtain knowledge and understanding of:
1) The structure of different communication systems.
2) The way of thinking and how to design.
3) The methods of developing the communication systems.
4) Design and simulate different communication system, and the electronic subsystems.
5) How to build, as hardware, different communication systems.

B) Intellectual Skills:
The students will acquire and develop the thinking skills that should enable them to:
1) Develop an ability to analyze communication and electronic engineering problems and synthesize solutions.
2) Understanding, designing and developing different communication and electronic systems for processing signals and data.
3) Analyze and identify the specifications and tools to design typical process control applications, applicable to data communications and its related electronics systems.

C) Practical Skills:
Students will acquire and develop the practical skills that should allow them to:
1) Use various laboratory equipment as diagnostic tool to detect a faults and identify a problem in electronics or/and communication system.
2) Analyze, design, evaluate, system behavior and test electronic or/and communication system using simulation or computer-based tool (engineering software tool).
3) Implement electronic circuit for communication system.

D) Practical and subject specific skills (Transferable Skills):
Students will acquire and develop the key transferable skills that will enable them to:
1) Use a range of technological equipment and systems.
2) Think logically and critically.
3) Work with a wide variety of people.
4) Manage tasks, and solve problems.

Assessment instruments:
• Short reports and/ or presentations, and/ or Short research projects
• Quizzes.
• Home works
• Final examination: 50 marks

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<thead>
<tr>
<th>Allocation of Marks</th>
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<tbody>
<tr>
<td>Assessment Instruments</td>
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<tr>
<td>First examination</td>
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<td>Second examination</td>
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<tr>
<td>Final examination: 50 marks</td>
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Documentation and Academic Honesty

Submit your homework covered with a sheet containing your name, number, course title and number, and type and number of the homework (e.g. tutorial, assignment, and project).

Any completed homework must be handed in to the classroom. After the deadline “zero” will be awarded. You must keep a duplicate copy of your work because it may be needed while the original is being marked.

You should hand in with your assignments:
1- A printed listing of your test programs (if any).
2- A brief report to explain your findings.
3- Your solution of questions.

For the research report, you are required to write a report similar to a research paper. It should include:

- **Abstract**: It describes the main synopsis of your paper.
- **Introduction**: It provides background information necessary to understand the research and getting readers interested in your subject. The introduction is where you put your problem in context and is likely where the bulk of your sources will appear.
- **Methods (Algorithms and Implementation)**: Describe your methods here. Summarize the algorithms generally, highlight features relevant to your project, and refer readers to your references for further details.
- **Results and Discussion (Benchmarking and Analysis)**: This section is the most important part of your paper. It is here that you demonstrate the work you have accomplished on this project and explain its significance. The quality of your analysis will impact your final grade more than any other component on the paper. You should therefore plan to spend the bulk of your project time not just gathering data, but determining what it ultimately means and deciding how best to showcase these findings.
- **Conclusion**: The conclusion should give your reader the points to “take home” from your paper. It should state clearly what your results demonstrate about the problem you were tackling in the paper. It should also generalize your findings, putting them into a useful context that can be built upon. All generalizations should be supported by your data, however; the discussion should prove these points, so that when the reader gets to the conclusion, the statements are logical and seem self-evident.
- **Bibliography**: Refer to any reference that you used in your assignment. Citations in the body of the paper should refer to a bibliography at the end of the paper.

**Protection by Copyright**

1. Coursework, laboratory exercises, reports, and essays submitted for assessment must be your own work, unless in the case of group projects a joint effort is expected and is indicated as such.

2. Use of quotations or data from the work of others is entirely acceptable, and is often very valuable provided that the source of the quotation or data is given. Failure to provide a source or put quotation marks around material that is taken from elsewhere gives the appearance that the comments are ostensibly your own. When quoting word-for-word from the work of another person quotation marks or indenting (setting the quotation in
from the margin) must be used and the source of the quoted material must be acknowledged.

3. Sources of quotations used should be listed in full in a bibliography at the end of your piece of work.

- **Avoiding Plagiarism.**
  Unacknowledged direct copying from the work of another person, or the close paraphrasing of somebody else's work, is called plagiarism and is
  
  1. a serious offence, equated with cheating in examinations. This applies to copying both from other students' work and from published sources such as books, reports or journal articles.
  
  2. Paraphrasing, when the original statement is still identifiable and has no acknowledgement, is plagiarism. A close paraphrase of another person's work must have an acknowledgement to the source. It is not acceptable for you to put together unacknowledged passages from the same or from different sources linking these together with a few words or sentences of your own and changing a few words from the original text: this is regarded as over-dependence on other sources, which is a form of plagiarism.
  
  3. Direct quotations from an earlier piece of your own work, if not attributed, suggest that your work is original, when in fact it is not. The direct copying of one's own writings qualifies as plagiarism if the fact that the work has been or is to be presented elsewhere is not acknowledged.
  
  4. Plagiarism is a serious offence and will always result in imposition of a penalty. In deciding upon the penalty the Department will take into account factors such as the year of study, the extent and proportion of the work that has been plagiarized, and the apparent intent of the student. The penalties that can be imposed range from a minimum of a zero mark for the work (without allowing resubmission) through caution to disciplinary measures (such as suspension or expulsion).

**Course/module academic calendar**

<table>
<thead>
<tr>
<th>week</th>
<th>Basic and support material to be covered</th>
<th>Homework/reports and their due dates</th>
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<tbody>
<tr>
<td>(1)</td>
<td>Basic Concepts In Reverse Engineering: What is Reverse Engineering, Benefit of R.E., R.E. as a quality function, Uses of R.E.</td>
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<tr>
<td>(3)+(4)</td>
<td>Prescreening and Preparation for the Four Stage Process: R.E. Teams, Engineering and Technical team Requirements, communication with project user, project tracking</td>
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<tr>
<td>(5)+(6)+(7)</td>
<td>Stage 1: Evaluation and Verification: Visual and dimensional inspection, discrepancy review versus available data, Failure analysis</td>
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quality evaluation report generation, Product cost estimate, R.E. project cost estimate, Risk assessment, overall recommendation, the Go/No-Go Decision

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<tr>
<th>(6) First exam</th>
<th>Home work every week</th>
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<tr>
<td>(8)+(9)</td>
<td>Stage 2: technical Data Generation: Technical data generation, developing engineering drawing, dimensional accuracy, engineering drawing types and applications, completion of a preliminary technical data package</td>
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<tr>
<td>(10)+(11)+(12)</td>
<td>Stage 3: design Verification: Prototype determination, prototype testing requirements, prototype failure analysis and redesign, Inspection criteria, Q.A. criteria</td>
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<td>(12) Second exam</td>
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<tr>
<td>(13)+(14)</td>
<td>Stage 4: project Implementation: The Delivery of Prototype, the Engineering and Economic report, Final technical data package approval, Final Implementation</td>
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<tr>
<td>(15)+(16)</td>
<td>Summary of R.E: Reverse Engineering is Summarized in a special projects, Review of the project as a successful R.E. Model</td>
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<tr>
<td>(16) Final Exam</td>
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**Expected workload:**

On average students need to spend 2 hours of study and preparation for each 50-minute lecture/tutorial.

**Attendance policy:**

Absence from lectures and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.
### Course references

#### Books:

4. Eldad Eilam, "Reversing: Secrets of Reverse Engineering" Amazon Textbooks