L03 Semester advices

General Advices

- Start studying early (preferably with the beginning of the semester) to have plenty of time later for other stuff (don't just save this file and say I will start later and then you reopen it during the exams week) (I am telling you this because there's a lot stuff to cover during this semester).
- Study regularly even for small amounts of time, you know an apple a day keeps the doctor a way (or should I say "one hour a day keeps the make-up a way").
- Learn how to learn.
- You might hear everyone say that it's a hard semester, dude trust me it depends on your effort (everything is easy when enough effort is put into it).
- Ask old students (face to face) about the teachers and how they teach and deal with students (a very helpful advice because you 'll get different perspectives about everything and please know who to ask; don't just ask everyone you find in the main fountain of inelec).
- Attending lectures is a highly recommended thing (except for one module in this semester) and actually it will help you to know at least how a certain teacher thinks (it depends on you and your studying when it comes to this point).
- Know the module and then know the teacher and his methods (not the reverse way).
- Keep trying the techniques until you find the one that suits you (lectures, videos, books…).
- Don't jump directly into watching videos, put some time into reading and understanding lectures or old copybooks and doing some recitations (I didn't need to watch videos except for a certain module)
- Please do not underestimate the lectures and their content because they're so optimized for you.
- Always have digital textbooks, they're very useful and with them you can get a deep detail concerning a certain topic that lectures and YouTube won't give you.
- The worst thing you could ever do is trying to learn a complete module using scattered YouTube videos, instead of that take a playlist from a single channel and go through some videos then check if you did understand something or not.
- Solve all the labs and recitations on your own then check the solution (the important thing about a problem is not the solution; it's power we obtain when we undergo the process of thinking about it).
- Some exercises may sound pointless to you but trust me you have to know how to walk, in order to know how to run.
- Don't panic when you see some new fancy term or circuit for the first time, you 'll understand as you go along.
- Learn how to do simulations and preferably using different softwares (Multisim, Microcap, LTspice, Proteus…) and btw MATLAB/Octave is a great math tool and computation software to learn.
- Use old promotions Facebook groups to find solution to recitation and exams that don't exist on the L03 drive folder.
- Due to the different issues, for some modules it's impossible to finish the syllabus in a single semester and you won't be able to get to the last chapters which are very interesting and useful.
- Understand the fundamental modules because you 'll need them and you 'll continue to build upon them later.
- Get a fixed routine because it 'll help you a lot. (a routine is not a bloody prison you create to force yourself to study, it's a way of organizing your life and avoiding burn out).
- It's not just about studying, do other stuff but make sure you balance your time.
- Liking/Loving a teacher won't ever be a condition to study but respecting him always is (never hate the module because of the teacher).
- Never compare yourself with the others and say that guy have more ability to study and understand than me (humans are born with equal CPU capabilities, it's the practice that makes the difference).
- Sometimes we choose our problems (ex: procrastination) and sometimes we just don't (ex: covid-19, inelec issues, some teachers) but we definitely choose how to respond to our problems all the times (think, analyze, learn, put a plan in advance).
- Helping others is a great way to learn and never hide something useful away from your mates (never leave a friend behind you).

Exam Advices

- Don’t be afraid from a stupid exam or control (it’s important but it won’t change your life).
- Chill out my friend, when you do what you should do, exams will be so easy so just pass them and don’t worry.
- The exams are kind of computations extensive so prepare very well and never say this is easy, you’ll be surprised how hard trivial calculations are during the exam time.
- Preferably, you should be done with the studying phase of the module before the exam’s week because you ‘ll need that last night to practice and solve computations, exercises and old exams.
- Using old exams, you can easily do a reverse engineering of any teacher.

Lab Advices

- Prepare your labs. You ‘ll be fascinated how a 15 min preparation could speed up your work flow (at least read them and understand what you’re going to do before you enter to the lab room).
- Choose carefully the partners to work with (student that know what they’re doing and preferably responsible ones) and always stick to the same team.
- You have 3 Labs, so sharing the work is a great idea (only applicable if the last point is satisfied).
- Some labs may sound tedious but they’re essential in order to understand the big picture of the subject.
- Always start working on the reports early; do not procrastinate on them until the last night before submission date.
- Don’t just copy-past the lab reports. Trust me, when you do lab report from scratch you will learn more than the actual lab itself (you’ll learn how to write, do graphs, do simulations, …).
- When you copy-past a lab report at least read it don’t be an absolute idiot (a teacher once showed us a lab report with both this year front page and last year front page printed and clipped together).
- Know the instructor and how he thinks (i.e. ask old student “is he giving fair grades based upon work or not?”).
- We don’t have the best labs in the world but always something that works partially is better than nothing at all. (it depends in which room and instructor you ‘ll find).

EE102 Electrical Engineering

Overview:

This module is quite similar to EE102 (DC analysis) but using time-varying signals.

In the first chapter, you ‘ll see some waveforms (sine, square, triangle….) and their properties (peak value, period, frequency, RMS, power...).

In the second chapter, you will study the other two passive components “inductors” and “capacitors” and their behavior on DC circuits and their equations with initial conditions.

In the third chapter, you ‘ll move to do AC analysis and understand the concept of Phasors (which is a great math tool to deal with complex number and it simplifies our calculations) and Impedance (which you can think of it as a frequency dependent resistor).

In the fourth and fifth chapters you ‘ll redo the different techniques you did in DC analysis except you ‘re going to redo them with complex numbers (AC current divider, voltage divider Thevenin, superposition, Norton theorem, Thevenin theorem, source transformation and delta to wye transformations, mesh and nodal analysis and all that useful stuff).

In the sixth chapter, it's all about power and this time its splits up into reactive and real power defined by the power factor (useful stuff to optimize) and how to change it.

In the seventh chapter, it's all about the frequency response (how a certain voltage or current in a circuit behaves in different frequencies) and different filters (low pass, high pass, band pass) and in here you'd meet up with bode plots and transfer functions(a way of plotting how changing the frequency will affect a certain voltage) which are going to be very essential in the years to come (basically frequency as a variable instead of time).

And finally, in the last chapter you ‘ll be introduced to three phase circuits.

Some advices:

- A module mostly about practicing your calculations and techniques, nothing too challenging.
- Mr. Recioui is one of the best teachers I ever saw in inelec, I highly recommend that you follow the lectures with him.
- Do a lot of exercises to be familiar with them and to learn how to be efficient in doing them.
- Make sure you have a proper working Casio calculator with no bugs in the complex numbers, because if not it will ruin your results.
- Always do the calculations in the calculator and never take them out of it towards your head, humans are a source for errors in doing calculations.
- Sometimes it’s easier to solve 3*3 determinant than simplifying (baking) the equations.
- Always triple check your analysis equations before simplifying them because catching an error at first is better than catching it in the end of calculations.

Sources to study:

Here are some YouTube paylists that might be useful:

Jim Pytel: a good teacher with a channel about all basic electrical engineering stuff.
https://www.youtube.com/playlist?list=PLdnqjKaksr8pXF2SpDyyD7ouAVlz96_Ra

EE Academy: an Indian guy with a great playlist for this subject.
https://www.youtube.com/playlist?list=PLM3OZrlLZGFsu-ar5dELSbWQ8JHQ2fPV6

Extra: a playlist organized by a student.
https://www.youtube.com/watch?v=HyFdtbtBgbs&list=PLJUMDNSTXtwEiEMhJdhrmgYwTwy9xsUGd

EE241 Active Devices I

Overview:

In the first chapter, you 'll understand the characteristics of semiconductors (almost exclusively silicon) materials from a chemical point of view and then the doping process and finally creating a PN junction which is known as a diode.

In the second chapter, you will understand diodes (at circuit and engineering level) and their applications in rectifiers, clipper and clamper circuits, voltage multipliers etc. and finally an introduction to various other types of diodes (Zener, LED, Schottky, Tunnel etc..).

In the third chapter, you 'll move to study the basic operation principles and configurations of the Bipolar Junction Transistor (a fundamental component to build almost any useful circuit) and use to build some switching circuits.

In the fourth chapter you 'll try to create a model of the transistor in the AC (basically how the BJT behaves when you apply a small AC signal) and learn how to use this model to build interesting amplifier (a circuit to make the voltage or current bigger) with different input and output parameters.

In the fifth chapter, it's all about power amplifiers (circuits that supply bigger power to a certain load) and their classes(types) and the properties of each one of them (distortion, efficiency).

Some advices:

- A very important module, so make sure to understand it since it's a kind of chain (stuff build upon stuff).
- Do a lot of simulation if you want to truly know the behavior of each circuit.
- The exams are kind of focus challenge. You might know how a circuit is working but when you change a word or the direction of a certain component, you'll have to reanalyze it so don't just say this circuit do this without checking it.
- Always check your circuit and analysis equations before simplifying them because catching an error in first is better than catching it in the end of calculations.
- You probably won't get to the last chapter during the first semester but don't worry you 'll finish them in the second semester.

Sources to study:

Here are some YouTube paylists that might be useful:

Behzad Rezavi: a great teacher with a channel about all this module. But his course isn't quite compatible with our syllabus (he uses a different model in analyzing the BJT behavior) but I swear you 'll learn a lot from him especially practical application of the stuff given in this module, I recommend you just follow his video on the diode only.
https://www.youtube.com/playlist?list=PLiDoPUX9nLkJ8dnPgKoVEOiAb8BfulKRR

Neso Academy: an Indian dude with an extra huge playlist that is identical to our syllabus.
https://www.youtube.com/playlist?list=PLBlnK6fEyqRiw-GZRqfnlVIBz9dxrqHJS

All about electronics: an Indian guy with a huge playlist that is a copy of our syllabus.
https://www.youtube.com/playlist?list=PLwjK_iyK4LLBVM18VZ7JKW-q88FAtnr8_

EE Academy: an Indian guy with a playlist that is a similar to our program.
https://www.youtube.com/playlist?list=PLM3OZrlLZGFu5OAQ5E9OGnloH5240ndIm

Extra: a playlist organized by a student.
https://www.youtube.com/playlist?list=PLJUMDNSTXtwGlHHHXFx8h0QdAmJWiqHCx&fbclid=IwAR2kzDtVI3lNSW6aoAhlkMnURsYGN2qJPWRBGMTSdCl2y2rRpZ5Hxxy5ujY

EE221 Digital Systems I with VHDL

Overview:

This module is really nice to learn it might be boring at first but it's so cool once you start doing practical stuff.

Firstly, a simple introduction to the digital world and how we think on it (what's the deal with bits and 0s and 1s).

Secondly, you 'll understand the different counting system (perspectives to represent numbers) (Binary, Octal and Hexadecimal) and how to do transformation between them in addition to represent numbers using the floating-point notations (how real computers represent numbers inside them).

Thirdly, you 'll be introduced to Boolean Algebra with all its axioms and rules (basically what are operation we do with numbers represented only with 0 and 1 and how to do them) and the simplification of logic expressions (Boolean functions) using Karnaugh maps and some other method that only computers use.

Then, you 'll move to basic logic design and implement functions with logic gates and how to extract a Boolean function from a combination of logic gates or a truth table and vice versa.

Then, you 'll be introduced to VHDL design, which is a language that basically tells the computer what the circuit(the logic function) is supposed to look like and how it operates and then the computer makes and verifies it and then transfers (uploads) it to something called FPGA (some big pretty awesome reconfigurable chip) which will let you check the operation of your circuit physically (that's my best simple approximation to this process and I know it's so crude).

Lastly, you would make some circuits that do arithmetic and logic operations (addition, subtraction, comparison…) on numbers and other useful stuff and run them on the FPGA and play with lights.

Some advices:

- A very important module, so make sure to understand it since it's a kind of chain (stuff build upon stuff) and most of the second semester stuff will be based on it.
- Mr. Benzekri is one of the best teachers I ever saw in inelec, I highly recommend that you follow the lectures with him.
- This module is very beautiful especially when start building circuits on the lab.
- Do a lot of simulation if you want to truly know the behavior of each circuit.
- The exams are kind of a focus and time challenge so solve a lot of exercises and you 'll be fine.
- Always check your Boolean function and analysis equations before simplifying them because catching an error in first is better than catching it in the end of design.

Sources to study:

Here are some YouTube paylists that might be useful:

Brock Lameres: professor with a complete awesome channel dedicated to the digital stuff and it happens that he uses VHDL in his course for digital electronics.

https://www.youtube.com/playlist?list=PL643xA3Ie_Et2uM4xu1yFk-A5ZQQ8gQ5e

Neso Academy: an Indian dude with an extra huge playlist that is identical to our syllabus.

https://www.youtube.com/playlist?list=PLBlnK6fEyqRiw-GZRqfnlVIBz9dxrqHJS

Extra: a playlist organized by a student.

https://www.youtube.com/playlist?list=PLJUMDNSTXtwEmbBguy7WvLz2S8Yk-MqUq&fbclid=IwAR2oiAtbcyOu-HFDR1wZXGdOfwrHY04KaHDc2V9jDH03eZ2XXU-wcK0XD2o

EE273 Physics III (Vibrations and Waves)

Overview:

This module is mostly about oscillations, mainly mechanical ones (spring/mass systems or pendulums) but sometimes electrical ones as well (RLC circuits).

Firstly, you 'll study Simple Harmonic Motion (the same one you studied in high school) and its properties and the addition (superposition) of several SHMs.

Secondly, you would add "damping" to the oscillator which is either friction or resistances depending on the system. and identify three types of damping.

Thirdly, the system would be subjected to an external force. In here you would be introduced to Bandwidth, resonance, transient states, quality factor. Things that seem irrelevant to Electrical engineering but don't worry you 'll need them later (4^{th} semester and so on).

Then, you 'll learn about "coupled oscillations" which is fancy term that describes systems having two and more oscillations that are connected to each-other (basically I heard you like oscillations so I 'll added oscillations to your oscillations so it can oscillate while it oscillates).

Lastly, you will study waves which are in fact infinite coupled oscillations that travel through space.

Some advices:

- It's not a very challenging module but pretty straight forward and highly manageable with some effort put into it.
- This module used to have a recitation session but for scheduling problems it has been removed (I did find it better without a recitation)
- At first you might not understand how they solve differential equations but once you start digging your way through them it would become so easy.
- Always triple check your applied laws and signs (+ and -) before you go any further in simplification.

Sources to study:

Here are some YouTube paylists that might be useful:

Walter Lewin (MIT 8.03 Fall 2004): a great MIT professor which everyone should know.
https://www.youtube.com/playlist?list=PLyQSN7X0ro22WeXM2QCKJm2NP_xHpGV89

Ben Buchler: a good teacher with a complete playlist about this subject.
https://www.youtube.com/playlist?list=PLcuy9bv5A3s29qQVtZr8up6oTlzGNPUra

Physierge: a good teacher with a complete playlist about this subject.
https://www.youtube.com/playlist?list=PL9_sR6QqqcykIpaKEFoy3HNhEq9LVoORA&fbclid=IwAR0Q2Pp75Sy4gTGxJgaUln1AYrMFdpQw_claLqYrMSze8LUakz2QEbQg74g

EE271 Mathematics IV (Ordinary Differential Equations)

Overview:

This module is fairly easy but essential, it requires both Calculus and Linear Algebra to get a good grasp of it but nothing too sophisticated or extensive.

Firstly, you 'll continue with some left stuff from Linear Algebra (eigen-things and their applications).

Secondly, you 'll move to first order differential equations with four methods to solve them.

Thirdly, you 'll study some higher order linear diff equations and three more methods to solve.

Then, you 'll see an introduction to a very important mathematical tool the "Laplace Transform" to be used to use said diff equations (just know the basic rules of it and don't worry if you didn't understand it, you 'll do that in the second semester in a more proper way with a module called Linear Systems).

Some advices:

- It's not a challenging module and actually it's very straightforward (just think of it as a tool you need).
- Put some effort to solve all recitations.
- Always follow the teacher's details (I know sometimes it's just some stupid details they care about).

Sources to study:

Here are some YouTube paylists that might be useful:

Professor Leonard: an awesome math teacher with a complete channel dedicated to the different math courses.
https://www.youtube.com/playlist?list=PLDesaqWTN6ESPaHy2QUKVaXNZuQNxkYQ_

Gilbert Strang (MIT 18.009 Fall 2015): a great MIT professor with a complete course for this module.
https://www.youtube.com/playlist?list=PLUl4u3cNGP63oTpyxCMLKt_JmB0WtSZfG

3Blue1Brow: that almighty math guy (not particularly a playlist but some very wonderful and useful videos).
https://www.youtube.com/watch?v=p_di4Zn4wz4&list=PLZHQObOWTQDNPOjrT6KVlfJuKtYTftqH6

Extra: a playlist organized by a student.
https://www.youtube.com/playlist?list=PLJUMDNSTXtwEAJiZ1hYMIrXJu__MqcKcE&fbclid=IwAR02N2wPN9BU_oeOregJZOBZyLGssV2ahbvpqL3UHy3D7alxKorp4CcSm8w

EE203 Economics Engineering

Overview:

This module is fairly easy and I'm not sure why we should study it.

You 'll be introduced to some finance stuff (money, investment rate, ... I forget them) and then you 'll see how doing a certain type of investment will affect some money in the bank account and you do some buying and selling of a certain thing and you compare benefits and losses with different investment rates (Please excuse the poor quality of this overview, I did study this module only during the day before the exam).

Some advices:

- It's not a challenging module and actually it's very straightforward.
- Memorize the laws you 'll need them during the control and exam.
- Don't forget to bring that table of values and numbers from the "library"; you 'll also need it during the control and exam.

This whole file is based upon my own experience and some friends' thoughts on the L03 semester.

The given resources and playlists are just what a lot of people mentioned to me (not necessary I used or watched them).

All these resources need to be studied in parallel with the teacher's lectures so that get a proper idea about what you're studying and where the lectures are going.

You probably will need to reread this file several time during the semester to truly grasp those advices.

Please excuse any mistakes I know I've done a lot of awful ones.

Huge thanks to some student (promo 2017), I used some of his FB posts to write all of this.

Huge Thanks to my friend … (promo 2018) who verified this and helped me writing it.

Done by some student (promo2018) on 12/11/2020.
updated on 18/11/2020.

Good luck to everyone!!!