DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPALLI
SEMESTER-5 GUIDELINES BY PRAJWAL SUNDAR

A. Courses

Programme Core Courses

CSPC51	Computer Architecture	4 credits
CSPC52	Database Management Systems	3 credits
CSPC53	Computer Networks	3 credits
CSPC54	Artificial Intelligence and Machine Learning	4 credits

Laboratory Courses

CSLR51	Database Management Systems Laboratory	2 credits
CSLR52	Computer Networks Laboratory	2 credits
CSPC54	AIML Laboratory (theory + lab integrated)	[4 credits]

Programme Electives

CSPE51	Augmented and Virtual Reality	3 credits
CSPE56	Cloud Computing	3 credits

NPTEL Courses

CSOC01	Responsible and Safe AI Systems	3 credits
CSOC02	Ethical Hacking	3 credits

Total Credits = (4+3+3+4) + (2+2) + (3+3) = 14+4+6 = **24 credits**
In case you are doing an extra elective, 24 + 3 = **27 credits**

B. Guide to choose number of electives per semester

- *Minimum Electives*: In Semester 5, you are required to choose a *minimum* of *2 electives*.
- *When to overwork yourself in the 3rd year*: If you are planning to go for higher studies, and need to do research extensively, and dedicate time towards preparing for competitive examinations like GATE and GRE, it is advised to take 3 electives now, in order to be able to dedicate adequate time in your 4th year.
- *When to chill and take it slow*: If you are planning to get placed immediately after college, please chill in your 3rd year, and do not rush up courses. Your 3rd year will already be extremely hectic. Focus on getting yourself a good internship offer, and once you get an internship, put full efforts in converting that into a PPO offer, so that your 4th year can be relatively tension free. Then, you can invest time in finishing your electives requirement during your 4th year.

C. Guide for choosing and studying electives (restricted to those offered by the CSE Department)

- Summary: Ensure that you take at least *one PE* (either ARVR or CC), and the other one can be another PE or an NPTEL or an elective from another department, known as an *open elective*.

- Augmented and Virtual Reality: This is a very interesting subject. Dr M Sridevi has an expertise in this domain, and generally handles this course. Now coming to the course, ARVR is a math-intensive and theory-intensive course, but extremely interesting at the same time. In general, majority of the population opts for this elective. The project which will have to be done in Unity with C# is extremely interesting. I would strongly recommend all of you to try out this course, you will enjoy it.
  Link to Sridevi Mam's online lectures: CSPE51 ARVR Sridevi Mam
  [PDFs and other study resources attached]

- Cloud Computing: Cloud Computing is a course, that is 90% theory, and only 10% conceptual. You will just have to remember all points in the power-point presentation – mug up and get good marks. You might also have to learn bit of coding in Scala (we were made to do that) – but it might differ based on the professor. The advantage of taking cloud computing is that the cloud computing tools which you are introduced to here might come handy while working in companies – I remember learning concepts of AWS, Kubernetes, and many other concepts which I am happy I learnt. But please do not take this course if you hate theory – these topics can always be learnt conceptually later on without the need of mugging up.
  [PDFs and other study resources attached]

- Ethical Hacking: This is an NPTEL course – you can sit in the comfort of your rooms, watch lectures and score marks. But you need to put a lot of effort into this course in particular – it contains a lot of concepts which you need to learn and understand. Some concepts overlap with Computer Networks and Cryptography.
  All Weekly Assignment Solutions: NPTEL Ethical Hacking July 2023 Assignment Solutions
  Strong Advice: I am not sure if assignment questions will remain same or change this year. But whatever be the case, please study properly, and ensure you finish videos as the week goes. DO NOT stash all videos and try finishing all of them 2 days before the final NPTEL exam. Also, regarding weekly assignments, yeah, please refer solutions and mark, as wrong marking will lead to reduction in marks – but do not just blindly mark – try solving once, then checking out solution, then mark on the website. Overall, have a nice experience with Ethical Hacking NPTEL!

- Responsible and Safe AI Systems: As this course wasn't offered before, I do not have much to comment on this elective. Follow the general NPTEL instructions given above for ethical hacking and have a blast!

- General advice while choosing open electives: Generally, open electives are chosen with the intent of chilling and getting a good grade. Before proceeding, remember to ask your seniors about a course before taking it – how the professor is, how strict is the professor about attendance, how the exams are, and how good the grading is. Another important advice is that your transcript will contain the list of courses you have taken – so take some good course that you will be proud of – which you can claim that it was really of use to you, in case someone asks.

D. Guide to study programme core courses

- Computer Architecture: This is a course completely based on concepts. It is *heavily dependent on your Computer Organization course* from semester 3. Ensure to revise the concepts of clock cycles, pipelining and caching before entering this course. My only advice for this course, would be to solve all book-back questions, and refer random YouTube videos for simple concepts here and there.
  One good playlist (only for reference, not all topics are covered) would be an NPTEL course of the same name: Computer Architecture NPTEL IIT Guwahati
  Do not stress a lot on this subject, do smart work, and you can easily score good grades here.
  [study resources attached]

- Database Management Systems: This is the most interesting, and one of the easiest courses in this semester. Please note that is an important course and is one of the core subjects in CSE. The key to studying this subject is *self-study* – sit and spend time on going through all the PPTs, understanding each slide one by one, and grasping the concept.
  For the *Database Design Unit* however, I would recommend all of you to watch Jenny's Lectures on YouTube: DBMS Jenny's Lectures – I have also attached my notes as a PDF, you can keep them side by side while watching these lectures, will be of use to you.
  Link to Brindha Mam's online lectures: CSPC52 DBMS Brindha Mam
  Also refer this Playlist: DBMS NPTEL IIT Kharagpur
  [study resources attached]

- Computer Networks: This is another interesting course, not necessarily easy, but quite interesting and conceptual in nature. It is an extremely important course in the CSE core subject list. Please try loving this subject while studying it. Refer various textbooks, various playlists and learn concepts which you will remember always. Note that if you want to do NS2 simulations for the laboratory component properly, your theoretical knowledge on this subject must be extremely good, otherwise you will not be able to understand the simulations.
  Link to Nithya Mam's online lectures: CSPC53 Networks Nithya Mam
  Also refer Gate Smashers: Computer Networks Gate Smashers
  [study resources attached]

- Artificial Intelligence and Machine Learning: This is one of the tough courses in this semester. Study all given PPTs with an open mind [do not try understanding everything to the fullest, things are quite complicated].
  This course can be broadly divided into two parts – AI and ML.
  Refer PPTs and random YouTube videos to study AI. Ensure you get all your concepts right – you should be able to solve basic to medium level of questions in all concepts – without any issue.
  For ML, please solve ALL QUESTIONS from this playlist: Machine Learning by Mahesh Huddar [will also be useful for ML elective in Semester 6]
  Link to Rajeshwari Mam's online lectures: CSPC54 AIML Rajeshwari Mam
  Overall, this course will be a bit hectic, but it is doable.
  [study resources attached]

E. Guide for laboratory courses

- DBMS Laboratory: This laboratory course is one of the most interesting and easiest laboratory courses you would have and will ever have. You just need to learn all SQL commands and features.

  Execution in the laboratory: In the laboratory, you will be made to execute all commands purely inside the command prompt.

  Practice: It is always better to have a GUI, a user interface, wherein it is easier to visualize. Personally, I used *XAAMP* and *PHPMyAdmin* interface, wherein I was easily able to execute commands and create functions, view tables, in an interface format, instead of just having one command prompt wherein you need to execute *SELECT* command just to view your table. An alternative to this would be using *MySQLWorkBench*.

  How to Study: Take a genuine interest in the subject and prepare. Refer SQL Tutorial (w3schools.com) and try out all the commands. Do not restrict yourself while studying, learning more commands might help you out later, if not for the end-semester.

  How to code in the Lab: Generally, the professor will give you the topic before the lab itself. Prepare yourself and ensure you know all SQL commands in that topic. In the laboratory, *do not waste time* talking to others, *focus on completing* the question given in a laboratory within the same laboratory – labs have continuous assessment marking – not completing code within that lab might cost you marks, so mind it.

  XML and XQuery: Brindha Mam gives this as an additional task during the last 2 labs or so. Just like how in SQL, data is stored in tables of databases and SQL (Structured Query Language) is used to work with those data, in this case, data is stored in XML, and XQuery is used to work with them. A complete XQuery guide given by mam is also attached, so please go through it carefully.

MongoDB: Sivasankar sir gives MongoDB coding with NodeJS also in the laboratory. This is the general web development domain, so learn MERN stack, and you will be good to go.

[My Lab Questions, along with Solutions, are attached]

- Networking Laboratory: This is a lab which you might / might not like based on your personal preferences.

  Socket Programming: This is the relatively easier part of this lab. You need to code server and client programs, as specified by your professor. Refer this tutorial: Python Socket Programming Tutorial for Beginners - YouTube. Also, ensure you go through all questions given by my professor (Dr Nithya) and try coding it yourself, before referring to the solutions.

  NS2: Here comes the actual fun. You need to learn to write TCL files, produce NAM outputs, trace files, and plot graphs – graph shape will determine if your simulation is correct or not – so do not try to scam, and learn NS2 properly and get proper graphs. Refer my code, random internet sources and random YouTube videos to get a clear understanding.

  [My Lab Questions, along with Solutions, are attached]

Dear Juniors,

With this, I would like to conclude the document. I wish you all the best for your 5th semester [and the upcoming semesters].

Wishing you guys all the best for your internship season! Hope all of you get wonderful internship opportunities from the best of companies!

For any issues, feel free to contact me anytime [my number: +917010460164]. I prefer introduction via text and if needed, you can also call anytime. Once again, all the best!
