

MINOR IN SYSCON

Presentation by Vighnesh JR

3rd Year Aerospace



SYSCON ? WHAT'S THAT?

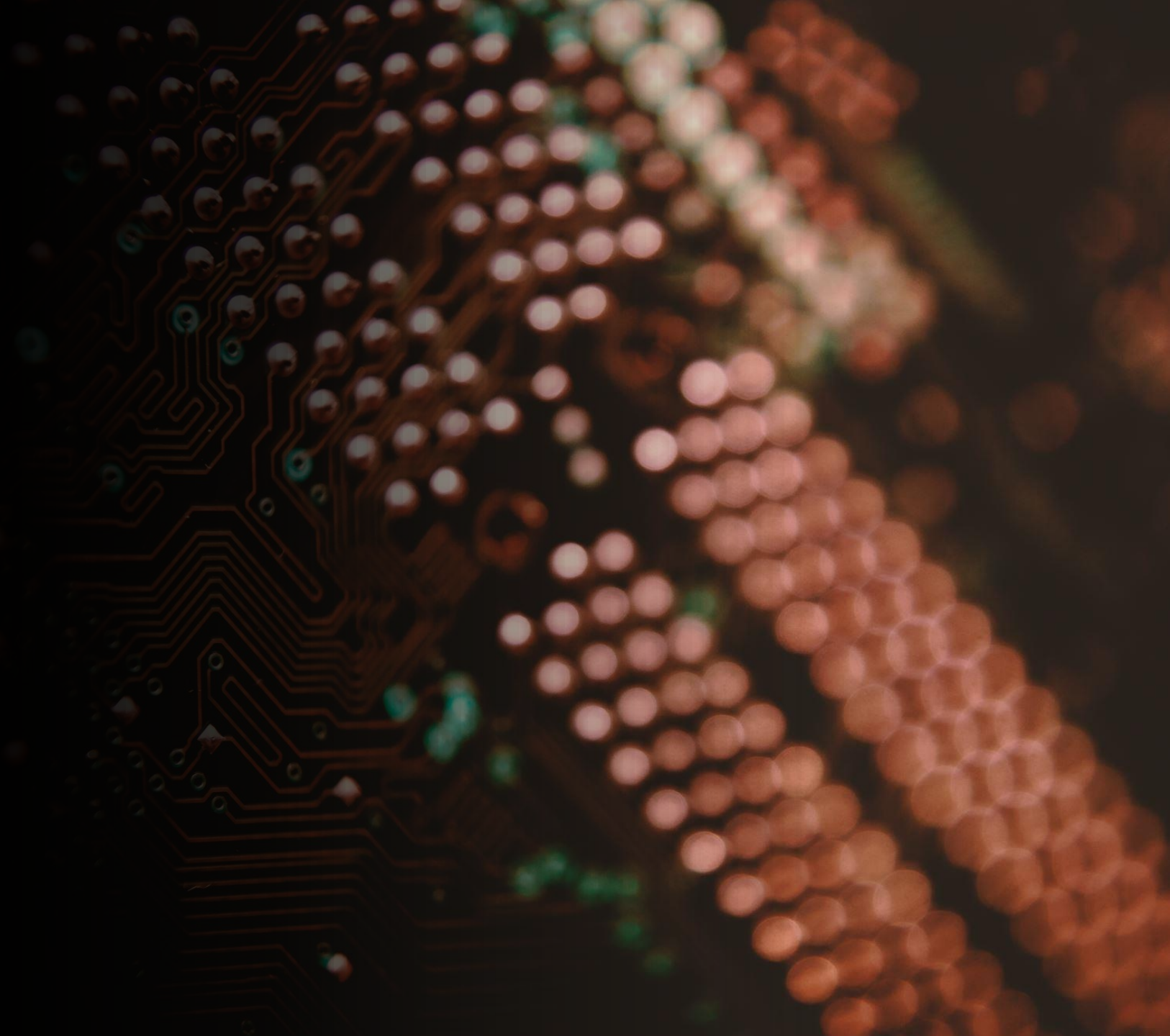
Literally means Systems and Controls.

- Model an object of Interest as a system.
- Apply controls to regulate its behavior



SYSTEM

- A **system** is a group of interacting or interrelated elements that act according to a set of rules to form a unified whole
- We model systems mathematically using equations





CONTROLS

In the system earlier we manipulate it using inputs to get a desired output or behavior

WORD BOMB

Tracking
Trajectory

BIJECTION

Optimisation

Control Loop

Feedback

State space

NON-LINEARITY

Stability

GAIN

Manifold

Topology

Mechanics

Perturbation

Mechanics

Algebra

Estimation

DYNAMICAL SYSTEMS

Calculus



APPLICATIONS OF SYSCON



Aerospace Engineering



Mechanical Engineering

COMMONLY APPLIED FIELDS



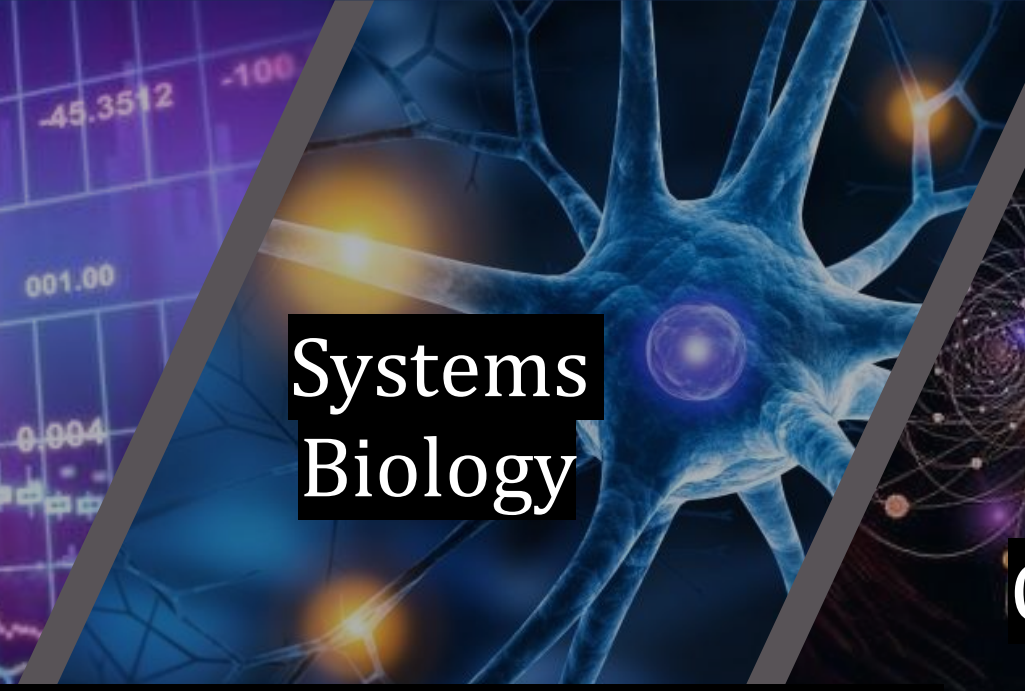
Chemical Engineering



Electrical Engineering



Economics

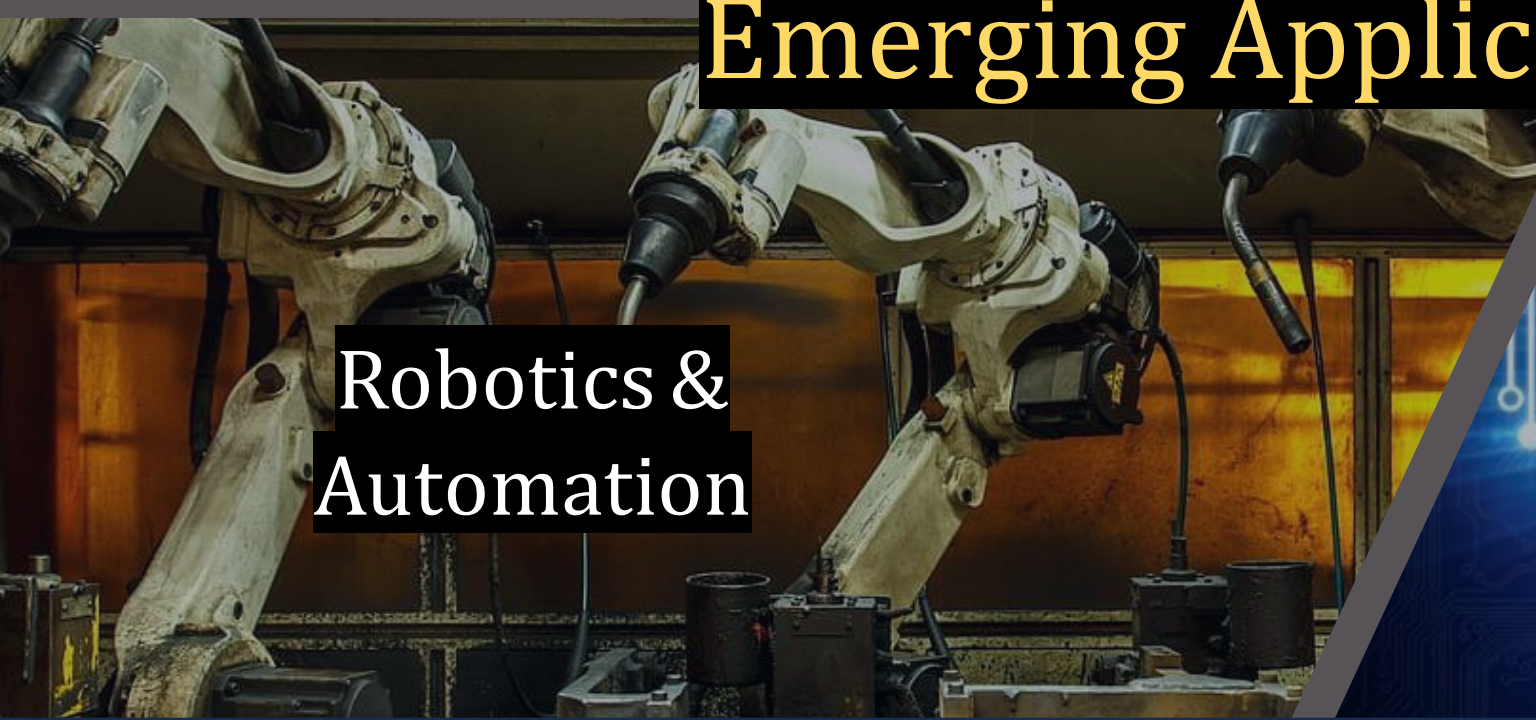


Systems
Biology

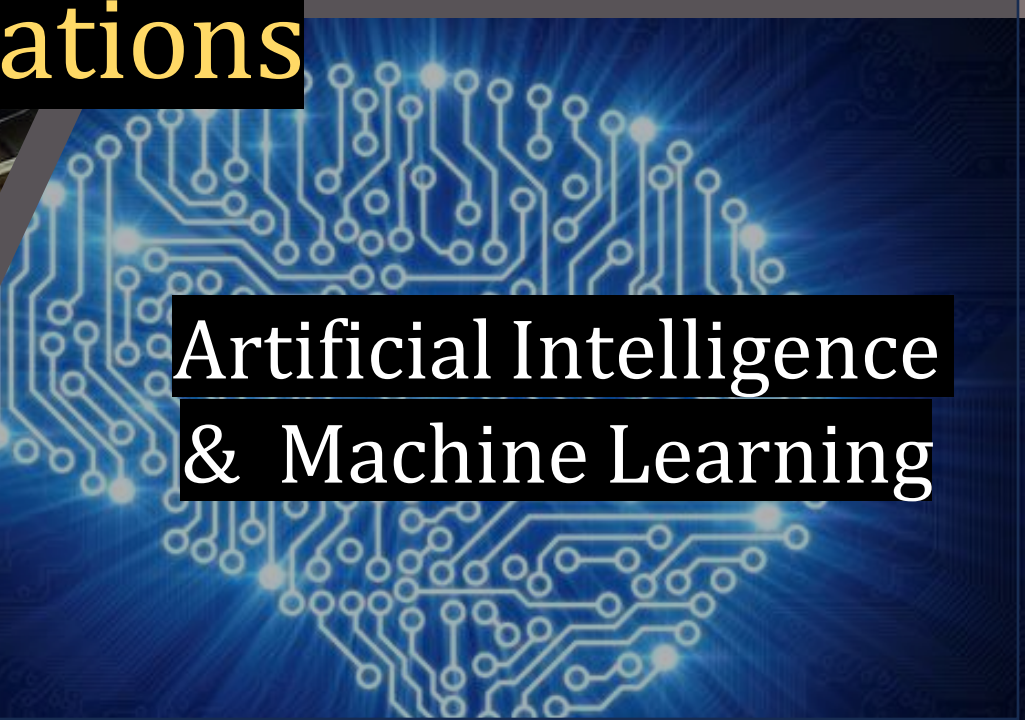


Quantum Control

Emerging Applications



Robotics &
Automation



Artificial Intelligence
& Machine Learning

LOGISTICS



**3 MANDATORY
COURSES**



2 ELECTIVES

MANDATORY COURSES

**SC 693
Mathematic
Structures for
Controls**



An abstract style recap of all math courses along real analysis and group theory



**SC 202
Signals and
Feedback System**



An Introduction to tools used in Signal processing like various transforms and feedback loops.



**SC 301
Linear and Non-
Linear Systems**



State space model, controllability , observability, Phase space diagrams, solutions, Lyapunov stability for both linear and non-linear systems

ELECTIVES

Syscon offers a wide range of electives that deal with most unique stuff among various engineering topics.

[To explore click the link](#)

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SOME EXTRA COURSES

- Apart from the standard SC courses, the following can be taken as electives.

- CL 692 - Digital Control
- CL 686 - Advanced Process Control
- EE 640 - Multivariable Control Systems
- EE 636 - Matrix Computations

A close-up photograph of a red dart hitting the bullseye of a dartboard. The dartboard has green and yellow segments with numbers. The background is dark and out of focus.

Tip and Points

For those who want and doesn't want to take Syscon
Opinions based on my personal experience

Why should You Take Syscon

- If you are a fan of heavy applied maths linear and abstract algebra and calculus.
- If you like exploring unique engineering and applications.
- If you are fascinated about automation, estimation, optimisation and control.
- If you want to attend interesting conferences where eminent researchers give lectures about emerging topics, they work on.

CAUTION !

- Although in DS bracket, Syscon is not directly helpful in AI ML but there are works going on in it.

In short: "**SYSCON MAY NOT A SUBSTITUTE FOR DS MINOR**"

- The 3 mandatory courses may share same syllabus with courses of electrical engineering department (as of 2022-2023), so it can turn out to be repetitive for them.
- Syscon is **Math heavy** , Esp a lot of linear algebra and calculus and that too abstract! So, think twice.

Q&A

with some samples.....





I am not into controls. Should I take SYSCON ?

Application of syscon go beyond controls. It can be used to model any phenomenon of concern using systems approach, a very useful tool. Moreover, the mathematical tools that we learn are often implemented in the parent branches.

The background of the slide is a collage of numerous colorful sticky notes in shades of blue, green, yellow, and purple. Each sticky note has a large, bold black question mark printed on it. The notes are layered and slightly offset from each other, creating a sense of depth and a busy, questioning atmosphere.

Any Prerequisites ?

Technically there are, but don't worry as you must have already covered them as your core courses in first year. It's advised to take courses in prescribed order, but you can create your own order provided its manageable

#OPINION

How is the teaching ?

The teaching is average in overall sense. Some courses the teaching was good, meanwhile others it was not up to the mark.



ANY
MORE QUESTIONS ?

Final Message

- All these inputs are my personal opinions, some based on technical facts
- Feel free to explore the academic freedom rather than taking it as a burden.
- Don't worry if you have selected the wrong minor. You can change to another minor and always keep an open mind.

Enjoy the upcoming academic years

All the best



THANK YOU