

**ES 212\_303**

# **Earth and Environmental Sciences**

*(2<sup>nd</sup> and 3<sup>rd</sup> Year)*

**Dr. Venkata Dilip Kumar Pasupuleti**

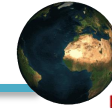
**Assistant Professor**

**School of Engineering Sciences**

**10<sup>th</sup> Jan 2019**



**Mahindra  
Ecole Centrale  
College of Engineering**



ES 212\_303

Earth and Environmental Sciences

(2<sup>nd</sup> and 3<sup>rd</sup> Year)



# Team

## Faculty

*Dr. Venkata Dilip Kumar P*

*Dr. Somsubhra Chattopadhyay*

## Research Assistant

*Bharat P*

*Rakesh K*



ES 212\_303

Earth and Environmental Sciences

(2<sup>nd</sup> and 3<sup>rd</sup> Year)

# Contents

- 1. The Earth System** *Earth in the solar system. Earth layers, Continental Drift Theory, Tectonic Plates, Earthquakes, Atmosphere and oceans: Origin and evolution; Atmosphere-ocean interaction; Ocean currents and waves. Lithosphere, Hydrosphere, Cryosphere and atmosphere and their Interactions.*
- 2. Environment and Environmental Studies** *Definition and Components of Environment, Relationship between the different components of Environment, Man and Environment relationship, Impact of technology on Environment, Environmental Degradation, Multidisciplinary nature of the Environment studies, its scope and importance in the present day Education System.*
- 3. Ecology and Ecosystems** *Ecology- Objectives and Classification, Concept of an ecosystem- structure and functions of ecosystem, Components of ecosystem- Producers, Consumers, Decomposers. Bio-Geo- Chemical Cycles- Hydrologic Cycle, Ocean currents and waves. Lithosphere, Hydrosphere, Cryosphere and atmosphere and their Interactions, Carbon cycle, Energy Flow in Ecosystem, Food Chains, Food webs, Ecological Pyramids Major Ecosystems: Forest Ecosystem, Grassland Ecosystem, Desert Ecosystem, Aquatic Ecosystem, Estuarine Ecosystem*



ES 212\_303

Earth and Environmental Sciences

(2<sup>nd</sup> and 3<sup>rd</sup> Year)

# Contents

**4. Population and Economic Growth** *The nature of human population growth, population parameters, industrialisation, urbanisation, sustainable development, sustainable consumption, health and the environmental impacts. Environmental pollution: Types of Environmental Pollution: Water Pollution: Introduction – Water Quality Standards, Sources of Water Pollution: Industrial Agricultural, Municipal; Classification of water pollutants, Effects of water pollutants, Eutrophication Marine pollution- Air Pollution: Composition of air, Structure of atmosphere, Ambient Air Quality Standards, Classification of air pollutants, Sources of common air pollutants like PM, SO<sub>2</sub>, NO<sub>x</sub>, Natural & Anthropogenic Sources, Effects of common air pollutants Land Pollution: Land uses Land degradation: causes, effects and control, soil erosion. Noise Pollution: Introduction, Sound and Noise, Noise measurements, Causes and Effects Thermal Pollution: Causes and effects, Role of individual in the prevention of pollution.*

**5. Social Issues and the Environment** *From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of non-governmental organization. Environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, and ozone layer depletion, nuclear accidents and holocaust, case studies. Wasteland reclamation – consumerism and waste products. Environment production act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.*



ES 212\_303

Earth and Environmental Sciences  
(2<sup>nd</sup> and 3<sup>rd</sup> Year)



# Evaluation of Course



- Minor-1  
15%
- Minor-2  
15%
- End Sem  
30%
- Project & Assignments  
30%
- Random quizzes  
10%



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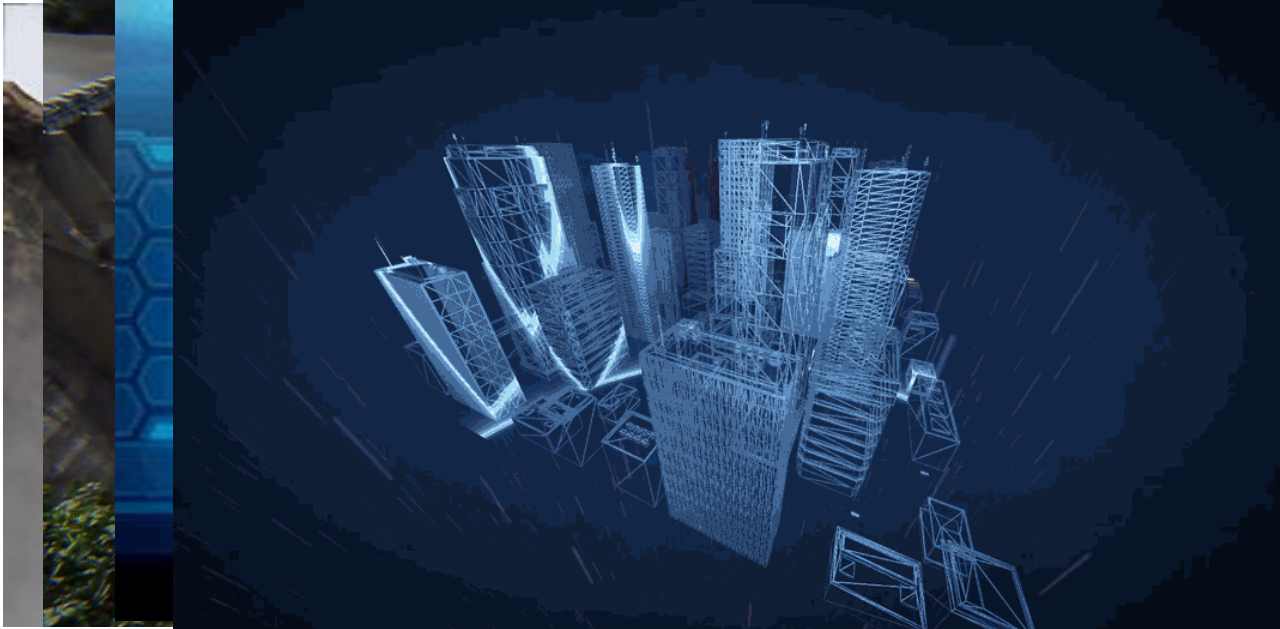
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(2<sup>nd</sup> and 3<sup>rd</sup> Year)



# What did we talk in the last class

- *Science*
- *Engineering*
- *Technology*
- *Art*



- *Management*

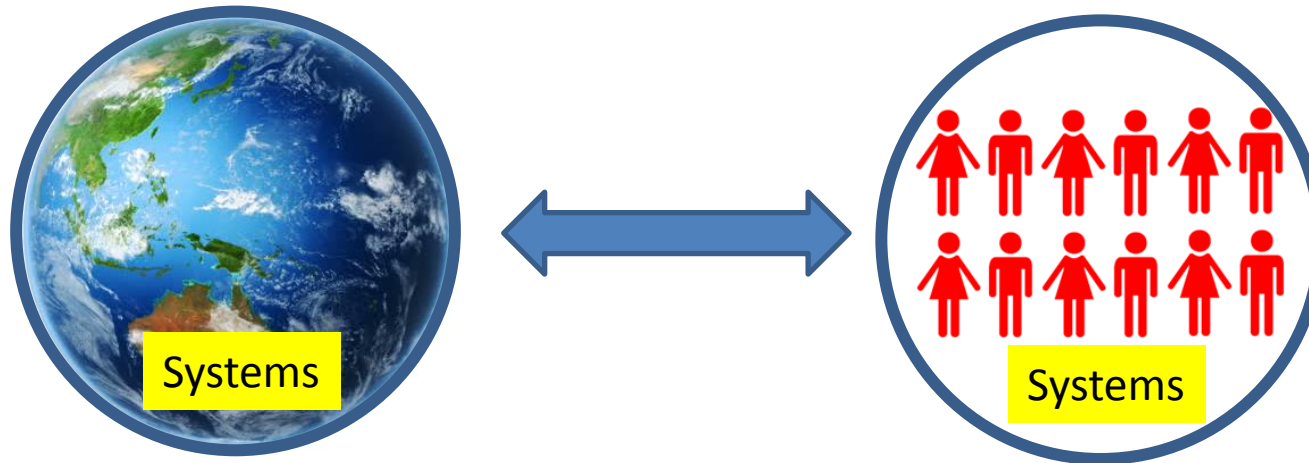


ES 212\_303

Earth and Environmental Sciences  
(2<sup>nd</sup> and 3<sup>rd</sup> Year)



# What is this Subject all about



<https://worldpopulationhistory.org/map/1/mercator/1/0/25/>

And that's gonna put Earth under lot of pressure...  
and understanding how that's work is incredibly important.

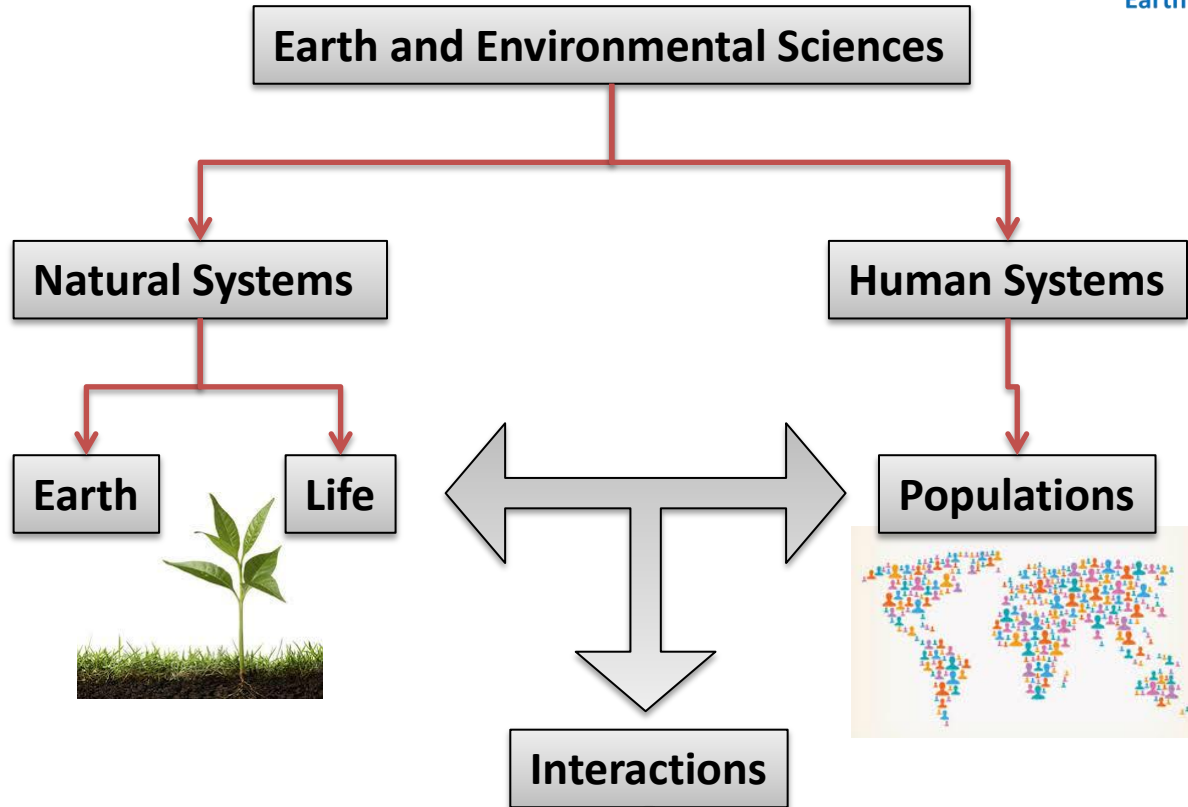




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(2nd and 3rd Year)



**Land**



**Water**



**Energy**



**Pollution**



**Global Changes**







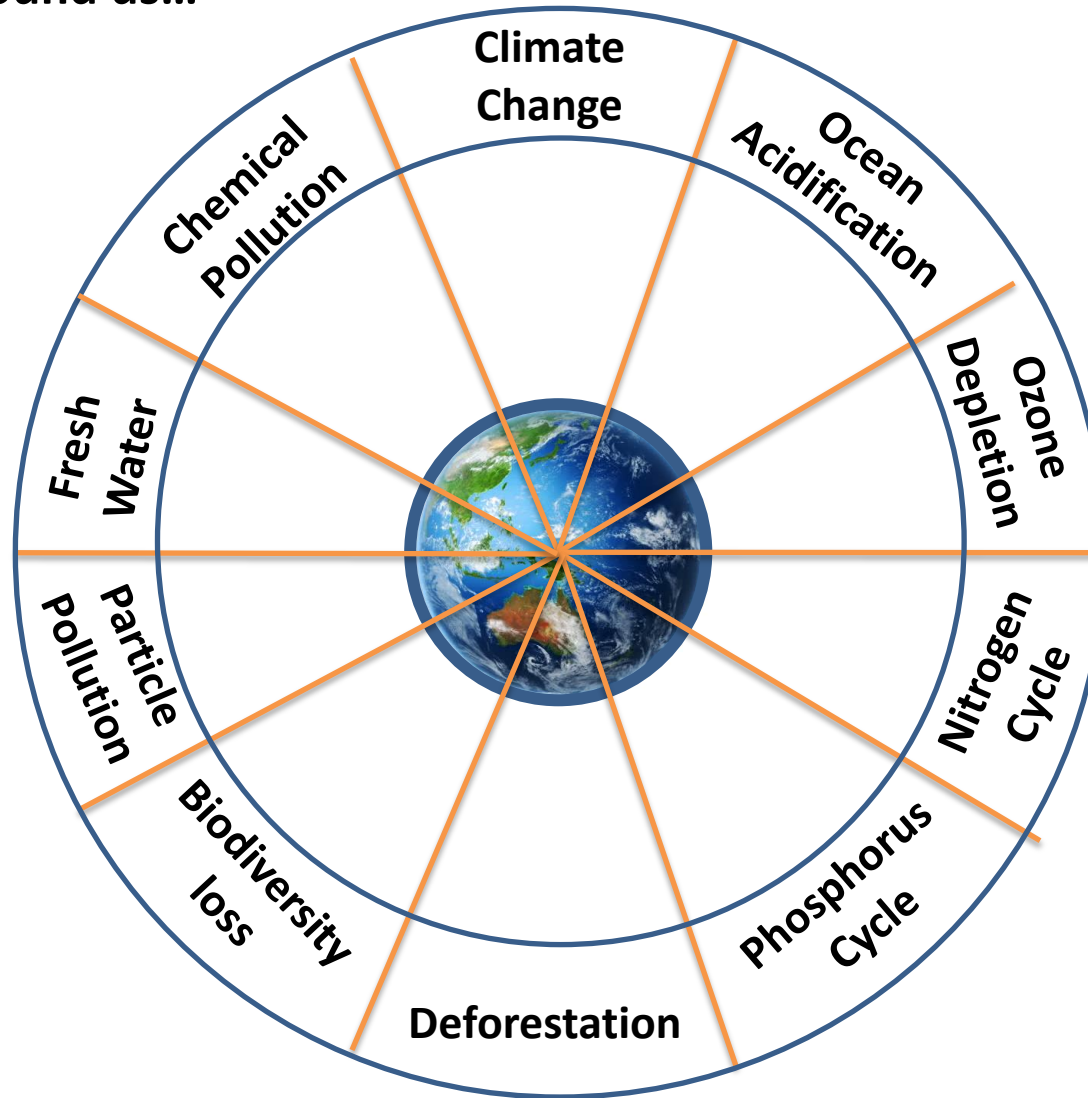
ES 212\_303

Earth and Environmental Sciences

(2<sup>nd</sup> and 3<sup>rd</sup> Year)



## Certain Issues around us...





ES 212\_303

Earth and Environmental Sciences

(2<sup>nd</sup> and 3<sup>rd</sup> Year)



## Certain Issues around us...

### Mass Fish Death In Shamirpet Lake (May, 2017)



### Ulsoor Lake, Bangaluru (March, 2016)

### Kankaria Lake, Ahmedabad (March, 2017)





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(2nd and 3rd Year)



# Certain Issues around us...



## SANITATION MATTERS

GHMC LIFTS  
3,400 TONNES OF  
GARBAGE DAILY  
FROM THE CITY

The city has  
only one  
dumping yard at  
Jawaharnagar

the **339-acre** Jawaharnagar  
facility too is heading  
towards saturation point

**200 acres** is minimum  
requirement for a  
dumping yard

**24,000 personnel**  
deployed for  
sanitation works

**548 VEHICLES** USED FOR GARBAGE LIFTING AND SHIFTING

**30** big and small sweeping  
machines in use

**18** more mechanised sweeping  
units to be acquired shortly

## FROM SKELETON TO POWDER HOW IS IT DONE

ANIMAL BODIES DUMPED AT AUTONAGAR  
DUMPYARD ARE NOT BEING TREATED PROPERLY.  
CONTRACTORS ARE VIOLATING RULES AND  
CLANDESTINELY SELLING BONES OF THESE  
ANIMALS TO BE CRUSHED INTO POWDER. THIS  
POWDER IS THEN USED IN TILE MANUFACTURING



Autonagar dump yard

➤ As per TCB norms,  
carcasses should be  
buried in deep trenches  
and treated chemically

➤ But contractors flout rules  
by burying them in shallow  
pits, drying the bones and  
then selling those

➤ Three tonnes of  
carcass is generated  
every day confirmed the  
GHMC officials

### MODUS OPERANDI

➤ Slaughter houses and dairy  
farms report dead animals to  
GHMC

➤ GHMC veterinary wing calls the  
contractor and the carcasses are  
taken to Autonagar dumpyard

➤ Instead of treating the  
carcasses scientifically in  
trenches using chemicals, the  
contractor removes flesh of  
animals and then dries the bones



➤ These bones are supplied to a third  
party to crush them into powder

➤ The powder is sold to tile  
manufacturing units, where it is used to  
provide shine to the tiles

➤ The powder also supplied  
to animal feed manufactures

➤ They use it as a feed  
supplement, as it contains  
phosphorus and calcium







ES 212\_303

Earth and Environmental Sciences

(2<sup>nd</sup> and 3<sup>rd</sup> Year)



## Certain Issues around us...



**Boy Swimming In Polluted Water In India**





ES 212\_303

Earth and Environmental Sciences

(2<sup>nd</sup> and 3<sup>rd</sup> Year)



## Certain Issues around us...





# Objective of this course...

- Sensitization related environmental issues
- Reasons behind the issues
- Try to get the laws passed that protect the environment
- How we can interact with environment for Sustainability.





ES 212\_303

Earth and Environmental Sciences

(2<sup>nd</sup> and 3<sup>rd</sup> Year)



# Lets Understand...

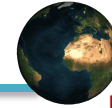


<https://www.youtube.com/watch?v=LE9KTG9PFho&vl=en>



# The Earth System

- *Earth in the solar system.*
- *Atmosphere and oceans: Origin and evolution;*
- *Atmosphere-ocean interaction;*
- *Air pollution, Greenhouse effect, Ozone layer;*
- *Ocean currents and waves.*
- *Lithosphere, Hydrosphere, Cryosphere*
- *Atmosphere and their Interactions.*



# The Earth System

- *Earth in the solar system.*

Origins of the Universe 101 | National Geographic

<https://www.youtube.com/watch?v=HdPzOWlLrbE>

Solar System 101 | National Geographic

<https://www.youtube.com/watch?v=libKVRa01L8>

Sun 101 | National Geographic

[https://www.youtube.com/watch?v=2HoTK\\_Gqi2Q](https://www.youtube.com/watch?v=2HoTK_Gqi2Q)

Earth 101 | National Geographic

<https://www.youtube.com/watch?v=HCDVN7DCzYE>

Nebular Hypothesis

[https://www.youtube.com/watch?v=tz-WQPkMj\\_o](https://www.youtube.com/watch?v=tz-WQPkMj_o)

[https://www.youtube.com/results?search\\_query=Atmosphere+and+oceans%3A+Origin+and+evolution+%2F+national+geographic](https://www.youtube.com/results?search_query=Atmosphere+and+oceans%3A+Origin+and+evolution+%2F+national+geographic)



ES 212\_303

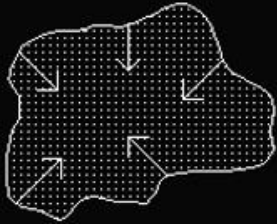
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(2nd and 3rd Year)



# Nebular Hypothesis

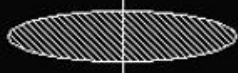
## Nebular Hypothesis



self-gravity contracts a gas cloud



conservation of angular momentum  
pulls cloud into a disk



disk begins to rotate



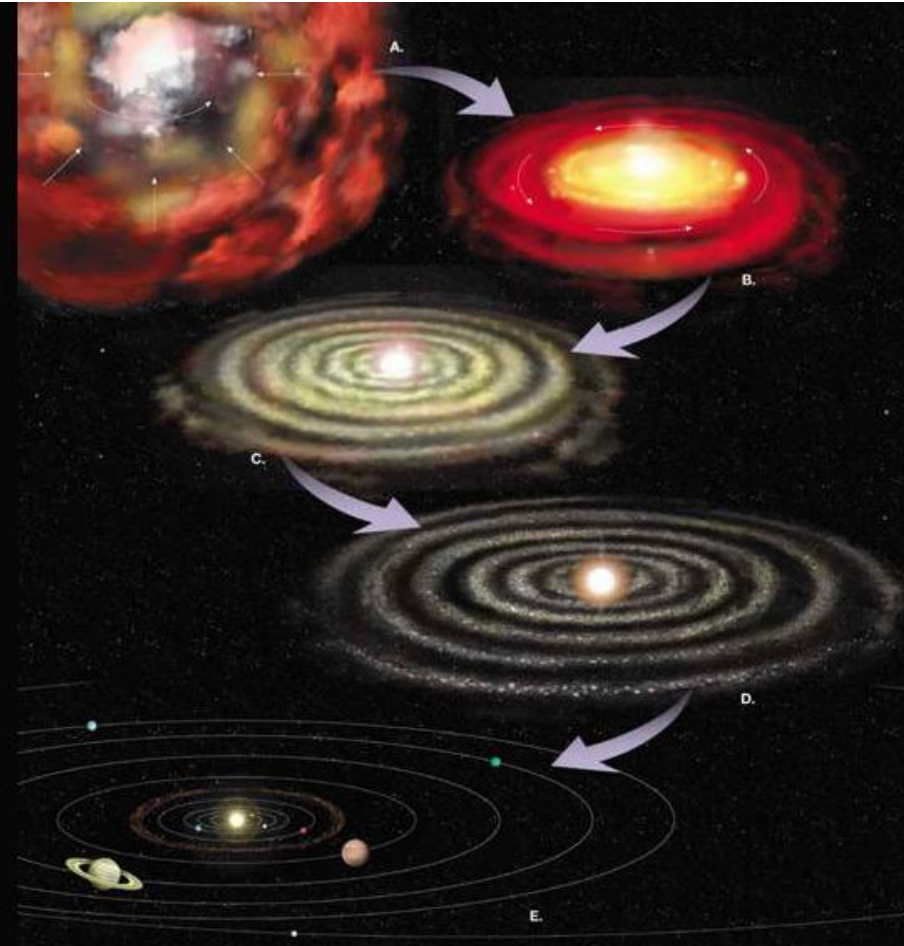
central mass forms (proto-Sun)



centrifugal force balances gravitational  
forces and a ring forms



ring forms into a planet



<https://www.nationalgeographic.com/science/space/universe/origins-of-the-universe/>

<https://www.youtube.com/watch?v=HdPzOWILrbE>



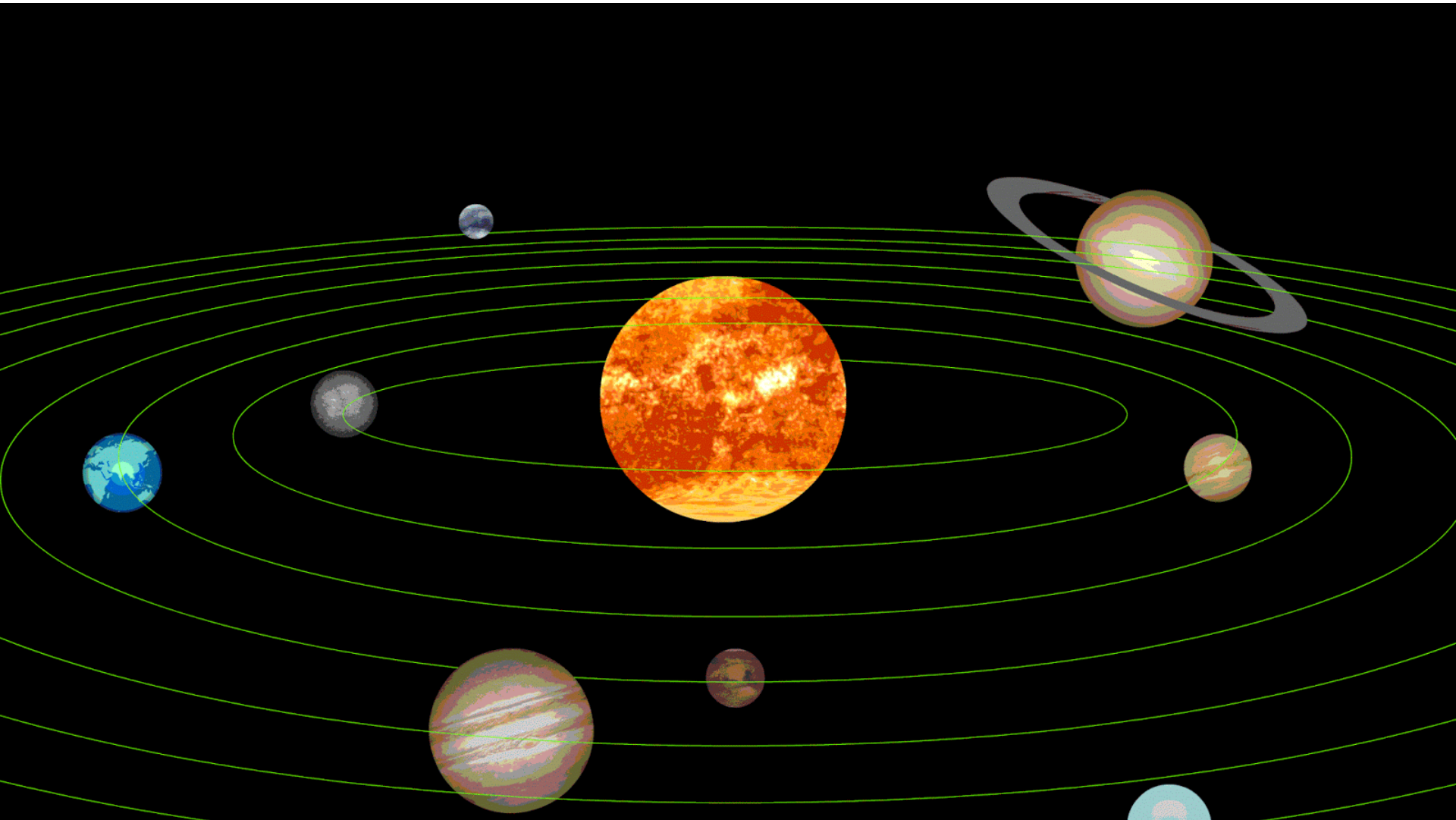
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Earth and Environmental Sciences

(2<sup>nd</sup> and 3<sup>rd</sup> Year)



# Solar System





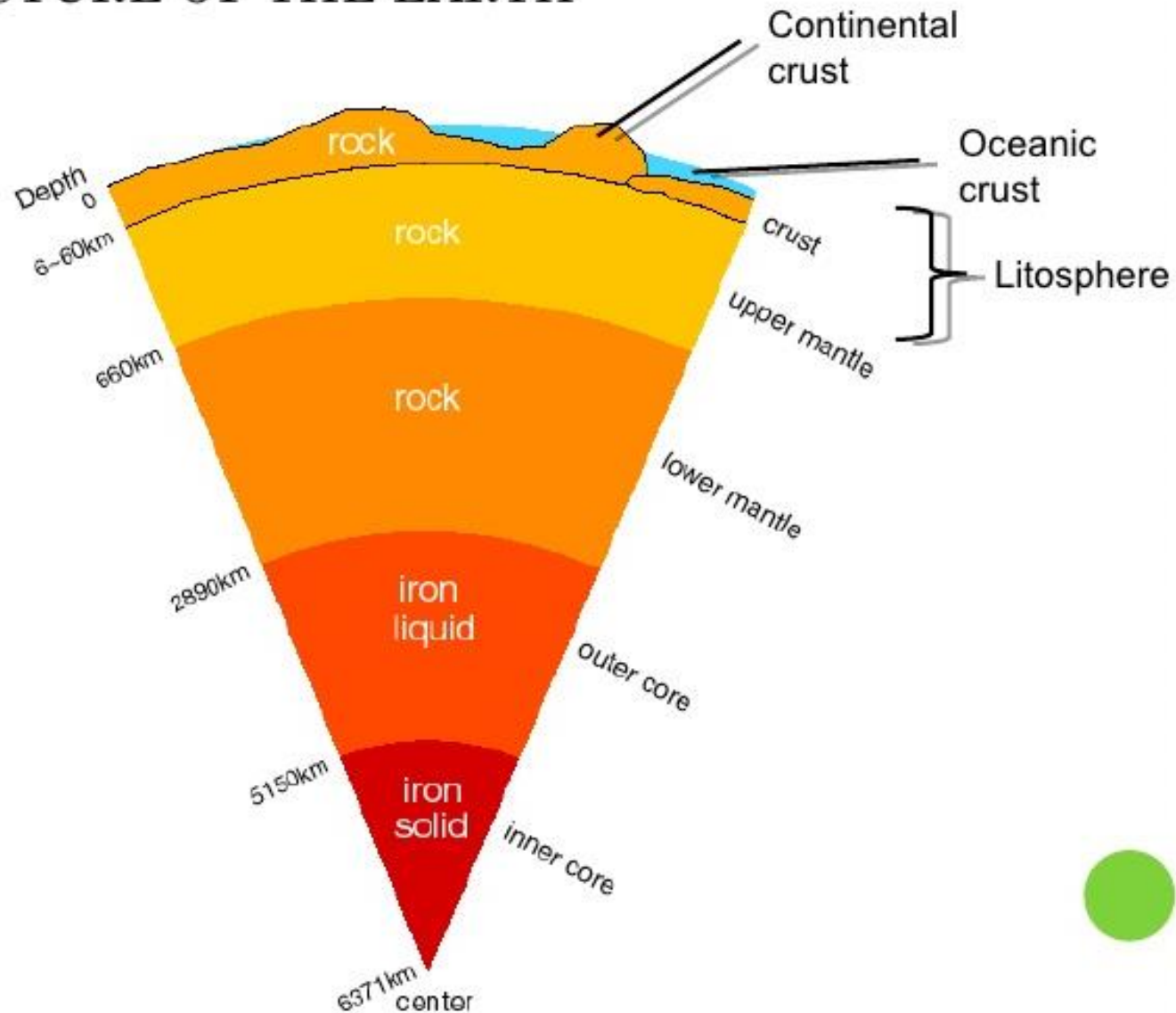
ES 212\_303

Earth and Environmental Sciences

(2<sup>nd</sup> and 3<sup>rd</sup> Year)



# STRUCTURE OF THE EARTH







ES 212\_303

Earth and Environmental Sciences

(2<sup>nd</sup> and 3<sup>rd</sup> Year)



# Any Questions



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ES 212\_303

Earth and Environmental Sciences

(2<sup>nd</sup> and 3<sup>rd</sup> Year)

