

Course Title:	OBSERVATIONAL TECHNIQUES 2: RADIO ASTRONOMY
Course Lecturer:	Dr S.K. Sirothia (SARAO/RU)
Course credits:	1
Lecturer contact hours:	24
Tutorial/practical hours:	6

1) Course overview:

The course attempts to teach radio astronomy observational techniques and data processing (single dish). We introduce mathematical concepts related to signal processing, radiation fundamentals and emission mechanisms. The course builds on observational techniques with antenna fundamentals, radiometers, basics of radio interferometry and pulsar data. The lectures are complete with ipython tutorials and notes. The course practical uses scientific data from radio telescope (MeerKAT single dishes) and steps through a few concepts learned in lectures, thereby completing an overview of observational techniques in Radio Astronomy.

2) Course breakdown/syllabus:

- *Introduction to Radio Astronomy*
- *Fundamentals of Fourier Theory and Discrete Fourier Transform*
- *Radiation fundamentals and Emission Mechanisms*
- *Antenna fundamentals*
- *Radiometers*
- *Fundamentals of radio interferometry*
- *Introduction to Pulsars*

3) Resources:

Online and interactive resources for the course

Lecture notes

Ipython notebooks for some lectures

Lecture slides

4) Breakdown of practicals/tutorials:

Practicals using scientific data from radio telescope (MeerKAT single dishes) detailing concepts of data calibration, analysis and spectral channels.

5) Additional skills to be developed during the course:

Fundamentals of radio Astronomy observational techniques

Scientific data Processing using data from radio telescope (MeerKAT single dishes)

Use of Python programs for radio data processing

Scientific report and presentation

6) Assessment

Home work Assignments: 25%

Project with report and presentation: 25%

Final exam: 50%