Semester	JAN 2022
Open to semester	14,22
Course code	**PH6212**
Course title	**Black holes**
Credits	/2
Course Coordinator & participating faculty (if any)	Suneeta Vardarajan
Nature of Course	Lectures
Pre-requisites	PHY 351 Gravitation and Cosmology or equivalent first course in General relativity. Also Quantum Field theory 1.
Objectives (goals, type of students for whom useful, outcome etc)	This is meant to introduce graduate students to Black holes such that it is useful for them while following current research in this area. There will be 12-14 lectures of 75 minutes each and one exam at the end of the course.
Course contents (details of topics /sections with no. of lectures for each)	The Schwarzschild and Kerr black holes, Geodesic congruences and Raychaudhuri equation, Mass and Angular momentum in general relativity, the laws of black hole mechanics (laws of thermodynamics), and time permitting, QFT in curved spacetime and Hawking radiation. Roughly two lectures on each topic
Evaluation /assessment	End-Sem Examination-100% Mid-Sem Examination-% Others-%
Suggested readings (with full list of authors, publisher, year, edn etc.)	We will follow Paul Townsend's lectures on black holes (available online). Useful books are: A Relativist's Toolkit by Eric Poisson, Cambridge University Press. Quantum fields in curved space, by Birrell and Davies, Cambridge monographs in mathematical physics, Cambridge university press.