Preferred Textbooks : 1. Theory of open quantum systems by H.P. Breuer and F. Petruccione, 2. Modern quantum mechanics by J J Sakurai.

Reference Books : Lecture notes on quantum dynamical semigroups and applications by R. Alicki and k. Lendi (2nd edition 2007)

E-book Links : 1. https://books.google.co.in/books/about/The_Theory_of_Open_Quantum_Systems.html?id=0Yx5VzaMYm8C&redir_esc=y
2. https://link.springer.com/book/10.1007/3-540-70861-8

Grading Plan : (The table is only indicative)

Type of Evaluation	Weightage (in %)
Quiz-1	**10%**
Mid SemExam	**20%**
Quiz-2	**10%**
End Sem Exam	**30%**
Assignments	**10%**
Project	**20%**
Term Paper	**NA**
Other Evaluation	**NA**

Mapping of Course Outcomes to Program Objectives: (1 – Lowest, 2—Medium, 3 – Highest, or a '-' dash mark if not at all relevant). Program outcomes are posted at

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	3	1	1	1	2	2	1	2	1	1	1	1	1	1	1
CO2	1	1	2	1	1	1	2	1	1	3	1	1	1	1	1	1
CO3	1	2	2	2	1	1	1	1	1	1	1	1	1	3	1	2
CO4	1	1	1	1	1	1	2	1	1	1	1	1	2	1	1	1
CO5	1	1	1	1	2	1	1	3	3	1	2	2	1	2	1	2

Teaching-Learning Strategies in brief (4-5 sentences) :
The course is also self-evolving. Since this course is a pre-PhD level course, it is heavily dependent on the evolution of current research in said topics. Therefore, I have to modify and upgrade the course structure in regular intervals of a few years.

Title of the Course: **Operating Systems and Networks**

Name of the Faculty: Karthik Vaidhyanathan
Course Code: **CS3.301**
Name of the Academic Program: **B.Tech. in CSE**
L-T-P: **3-1-0**.

Credits: **4**
(L= Lecture hours, T=Tutorial hours, P=Practical hours)

1.Prerequisite Course / Knowledge:

Programming languages, Digital Logic Design, Computer Organization

2.Course Outcomes (COs)

After completion of this course successfully, the students will be able to,

CO-1. Extend the concepts of layering and modularity to build new software systems
CO-2. Develop appropriate scheduling/synchronization/memory management/ virtual memory/protection module for a new task-specific operating system.
CO-3: Implement an application on the top of given operating system in an efficient manner based on process and thread framework available in the given operating system.
CO-4. Architect the given system on the top of operating systems by exploiting the system calls of the given operating system services as far as possible.
CO-5. Develop a network-based application by exploiting networking related system calls.

3.Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs) – Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	2	1	1	2	-	-	-	3	2	2	3	3	2	1	2
CO2	3	3	3	2	2	-	1	-	2	2	2	3	2	1	2	2
CO3	3	3	3	2	2	2	1	-	3	2	2	3	3	2	1	2
CO4	2	2	3	2	2	3	2	-	3	2	2	2	3	3	2	3
CO5	3	2	1	1	2	-	-	-	3	2	2	3	3	2	1	2
CO6	3	3	3	3	2	2	1	-	2	2	3	2	3	3	3	3

Note ‘3’ in the box for ‘High-level’ mapping, 2 for ‘Medium-level’ mapping, 1 for ‘Low’-level’ mapping

4.Detailed Syllabus:

Unit 1: Introduction, Process and Memory Virtualization – Scheduling, Memory addressing and Paging, and Networking Overview (10 hours);

Unit 2: Concurrency – Threads and locking mechanisms, Common concurrency problems, Data transmission and Network Technologies (10 hours);

Unit 3: Persistence – File Systems, Protection, Network File Systems and basics of Network Security (6 hours);

Four mini projects and one overall project related to the above syllabus will be done by students in the laboratory

Reference Books:

1. Operating systems in three easy pieces by Andrea Arpaci-Dusseau and Remzi Arpaci-Dusseau, 2018 (https://pages.cs.wisc.edu/~remzi/OSTEP/)
2. Computer Networks (5th Edition) Andrew S. Tanenbaum, David J. Wetherall Prentice Hall, 2013
3. Wlliam Stallings, Operating Systems, Prentice-Hall, 2018.
4. Tanenbaum, A., Modern Operating Systems, Prentice-Hall, Second Edition (latest edition, 2015.

5. Teaching-Learning Strategies in brief

Lectures by integrating ICT into classroom teaching, weekly tutorials involving problem solving and active learning by students on a Unix-based OS like xv6 and Project-based Learning by doing 4 mini-projects and one overall project.

6.Assessment methods and weightages in brief (Tentative)

Component	Weightage
Final Exam	35%
Mid-term Exam	15%
Quizzes	10%
Mini-projects	25%
In-class activities	5%
Final Project	10%

Note: Instructor reserves the right to make any changes in the above distribution based on the progress of the course

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Title of the Course : Physics of Early Universe

Name of the Faculty : Diganta Das