A. COURSE INFORMATION

Course number/section: COSC-3346/001
Class meeting time: TR 09:30 a.m. – 10:45 a.m.
Class location: Online
Course Website: bb9.tamucc.edu

B. INSTRUCTOR INFORMATION

Instructor: Dr. Dulal Kar
Office location: CI-321
Office hours: 1:00 p.m. – 2:00 p.m. (TR) and 3:00 p.m. – 4:00 p.m. (MWF)
Telephone: 361-825-5878
e-mail: dulal.kar@tamucc.edu
Appointments: By e-mail

C. COURSE DESCRIPTION

Catalog Course Description
Introduction to operating systems concepts, principles, and design. Topics include: processes and threads, CPU scheduling, mutual exclusion and synchronization, deadlock, memory management, file systems, security and protection, networking, and distributed systems. Selected existing operating systems are discussed, compared, and contrasted.

Extended Course Description
None

D. PREREQUISITES AND COREQUISITES

Prerequisites
COSC 2334 (Computer Architecture) and COSC 2437 (Data Structures). Strong knowledge of C/C++. If you do not have the prerequisites (or equivalents from another university) shown on your TAMUCC records, you may be dropped from class at any time.

Corequisites
None

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES

Required Textbook(s)
Optional Textbook(s) or Other References
None

Supplies
None

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT
Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

By the end of this course, students should be able to:

1. Identify functions, basic operations, and services of operating systems
2. Distinguish designs of various operating systems, system calls, kernel and user modes, operating system structures, virtual machines, and the system boot process
3. Implement the concepts of processes, process scheduling and inter-process communication in programs.
4. Implement the concepts of threads and multi-threading models in programs.
5. Determine throughputs and compare of CPU scheduling algorithms.
6. Check various aspects of process synchronization including the critical section problem and utilize hardware and software solutions to solve synchronization problems in programs.
7. Identify deadlocks and apply methods of handling deadlocks for prevention, avoidance, detection, or recovery in programs.
8. Analyze memory management techniques such as swapping, paging, and segmentation to improve performance and memory utilization.
9. Analyze how virtual memory can improve performance through various techniques such as demand paging, page replacement algorithms, and frame allocations.
10. Evaluate and improve performance of file systems.
11. (Time Permitting) Identify various types of security vulnerabilities in operating systems and determine protection mechanisms.

Assessment of objectives will be conducted through exams, quizzes, homework assignments, and projects.

G. INSTRUCTIONAL METHODS AND ACTIVITIES
This course will be a mixture of online lectures, demonstrations of programs, and example problems. The student is expected to join the class on time on every scheduled day. The
student is also expected to read the book carefully if he or she has any difficulty understanding the topics covered from the slides. Comprehension or review questions will be posted online to self-check understanding of topics covered in the course. Questions in exams and quizzes will be based on the comprehension questions, example problems, and assignments.

**H. MAJOR COURSE REQUIREMENTS AND GRADING**

This is a high-level core course. This is a difficult course that demands all students attend all classes! Regular completion of all reading, homework, and other outside assignments, are essential for success in this course. Your course grade will be decided on your performance in the homework assignments, quizzes, projects, and three exams. The distribution of points is as follows:

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<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
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<tbody>
<tr>
<td>Exams</td>
<td>45</td>
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<tr>
<td>Quizzes</td>
<td>10</td>
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<tr>
<td>Homework Assignments</td>
<td>5</td>
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<tr>
<td>Programming Projects</td>
<td>40</td>
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**Homework Assignments and Quizzes:** Approximately 2-3 homework assignments will be given. A student will be required to solve numerical or algorithmic problems in homework assignments. Partial credit will be given for incomplete assignments. In addition, there will be quizzes.

**Projects:** There will be approximately 4-5 programming projects. Unless otherwise directed, the programming projects must be written in C/C++.

**Exams:** The first exam will be given on September 22, 2020, the second exam will be given on October 27, 2020 during the scheduled class time, and the final exam will be given on the day and time as scheduled by the university.

**I. COURSE CONTENT/SCHEDULE**

| Week 1: | Course overview, Introduction, Chapter 1  
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<tbody>
<tr>
<td></td>
<td>Chapter 2: Operating System Structures</td>
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<tr>
<td>Week 2:</td>
<td>Chapter 2: Operating System Structures, HW1</td>
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<tr>
<td>Week 3:</td>
<td>UNIX System Calls, Signals, Project 1</td>
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<td>Week 4:</td>
<td>Chapter 3: Processes</td>
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<td>Week 5:</td>
<td>Chapter 4: Threads, <strong>Project 2</strong></td>
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<td>Week 6:</td>
<td><strong>Exam 1</strong>&lt;br&gt;Chapter 5: Process Synchronization</td>
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<td>Week 7:</td>
<td>Chapter 5: Process Synchronization&lt;br&gt;Chapter 5: Process Synchronization, <strong>HW2</strong></td>
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<td>Week 8:</td>
<td>Chapter 6: CPU Scheduling, <strong>Project 3</strong></td>
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<td>Week 9:</td>
<td>Chapter 7: Deadlocks</td>
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<td>Week 10:</td>
<td>Chapter 8: Main Memory</td>
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<td>Week 11:</td>
<td><strong>Exam 2</strong>&lt;br&gt;Chapter 9: Virtual Memory, <strong>Project 4</strong></td>
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<td>Week 12:</td>
<td>Chapter 9: Virtual Memory&lt;br&gt;Chapter 10: File System Interface</td>
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<td>Week 13:</td>
<td>Chapter 11: File System Implementation, <strong>HW3</strong></td>
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<td>Week 14:</td>
<td>Chapter 15: Security</td>
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<td><strong>Final Exam</strong></td>
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Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

**J. COURSE POLICIES**

**COVID-19**
Face Coverings—Face coverings (cloth face covering, surgical mask, etc.) must be properly worn in all non-private spaces including classrooms, teaching laboratories, common spaces such as lobbies and hallways, public study spaces, libraries, academic resource and support offices, and outdoor spaces where 6 feet of physical distancing is difficult to reliably maintain. Extra masks will be made available if needed.

**Attendance/Tardiness**
You must attend all classes and labs. While in class or lab attendance will not directly affect the grade, you are responsible for any materials covered or handed out or announcements made for the tests and assignments in your absence. Records of your
attendance will be maintained and reported to the university. Students found missing classes without the instructor's permission will be automatically withdrawn from the course.

**Late Work**
All assignments are to be submitted online using Blackboard by midnight on the due date. Late assignments will be counted 20% off for each day after the due time. No credit will be given if an assignment is submitted after 5 days. If you have not completed your assignment by the due date, you should submit the work you have done for partial credit. No work will be accepted once the graded work or the solution has been disclosed to the class, except for unusual circumstances.

**Extra Credit**
There is no EXTRA CREDIT.

**Missed Exam**
In the event, if you cannot attend the class to take the exam due to some emergency or some unavoidable situation (such as serious illness, death in the family, participation in university sports, religious observations, and so on) you must notify me as soon as possible before the exam and also you must validate your absence by providing me a document (e.g., with a letter from your doctor). Once your cause is validated a make-up exam will be given.

**Grading Error**
All questions concerning a test score or grading of a returned test or assignment must be resolved within one week. It is always a good idea to keep all of your work until the end of the semester. In case of any recording errors or doubts, you may produce them for correction or verification.

**Academic Honesty Policy**
You are expected to avoid all forms of academic dishonesty as defined in Catalog. In addition, students are expected to behave in an ethical manner in all class activities. If you feel uncertain about a particular activity, please speak to me BEFORE problems arise. Ethical behavior is a requirement for passing this course. All work submitted for grading must be the student's own work. Plagiarism will result in a score of 0 (zero) for the work or dismissal from the course and the Dean of Students office will be notified. No copying from another student's work, of any class, is allowed. It is the student's duty to allow no one to copy his or her work. Anyone found cheating and/or copying, in the exams or assignments, in the instructor's opinion, will receive an automatic F for the course.

**Collaboration**
If two or more people collaborate on an assignment assigned it should be notified on the assignment and each student should submit his or her solutions for grading. The grade obtained on such an assignment is the total points obtained for the assignment divided by the square of the number of people who collaborated on the assignment (e.g., if 3 people
collaborate on an assignment and the grade for that assignment is 90 out of 100, then each student receives a grade of \( \frac{90}{3^2} = 10 \). If you do not notify me of such collaboration it will be treated as copied and action will be taken as discussed under the academic honesty policy.

K. COLLEGE AND UNIVERSITY POLICIES

- **Academic Integrity (University)**
  University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.

- **Classroom/Professional Behavior**
  Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

- **Statement of Civility**
  Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high-quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

- **Deadline for Dropping a Course with a Grade of W (University)**
  I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. Please consult with your academic advisor, the Financial Aid Office, and me, before you decide to drop this course. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Please consult the Academic Calendar (http://www.tamucc.edu/academics/calendar/) for the last day to drop a course.
• **Grade Appeals (College of Science and Engineering)**
  As stated in University Procedure 13.02.99.C0.03, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is required to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C0.03, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at [http://academicaffairs.tamucc.edu/rules_procedures/assets/13.02.99.c0.03_student_grade_appeals.pdf](http://academicaffairs.tamucc.edu/rules_procedures/assets/13.02.99.c0.03_student_grade_appeals.pdf). For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

• **Disability Services**
  The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

  If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

  [http://disabilityservices.tamucc.edu/](http://disabilityservices.tamucc.edu/)

• **Civil Rights Complaints**
  Texas A&M University-Corpus Christi is committed to fostering a culture of caring and respect that is free from discrimination, relationship violence and sexual misconduct, and ensuring that all affected students have access to services. For information on reporting Civil Rights complaints, options and support resources (including pregnancy support accommodations) or university policies and procedures, please contact the University Title IX Coordinator, Sam Ramirez (Samuel.ramirez@tamucc.edu) or Deputy Title IX Coordinator, Rosie Ruiz (Rosie.Ruiz@tamucc.edu) x5826, or visit website at Title IX/Sexual Assault/Pregnancy.

  **Limits to Confidentiality.** Essays, journals, and other materials submitted for this class are generally considered confidential pursuant to the University’s student record policies. However, students should be aware that University employees, including
instructors, are not able to maintain confidentiality when it conflicts with their responsibility to report alleged or suspected civil rights discrimination that is observed by or made known to an employee in the course and scope of their employment. As the instructor, I must report allegations of civil rights discrimination, including sexual assault, relationship violence, stalking, or sexual harassment to the Title IX Coordinator if you share it with me.

These reports will trigger contact with you from the Civil Rights/Title IX Compliance office who will inform you of your options and resources regarding the incident that you have shared. If you would like to talk about these incidents in a confidential setting, you are encouraged to make an appointment with counselors in the University Counseling Center.

- **Statement of Academic Continuity**
  
  In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

L. **OTHER INFORMATION**

- **Academic Advising**
  
  The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

**GENERAL DISCLAIMER**

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.