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| **CIE 301** | | **Transportation Engineering** | | | | **Fall 2021** |
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| ***Instructor:*** | Dr. James S. Gidley | | | | [jsgidley@geneva.edu](mailto:jsgidley@geneva.edu) | |
|  | Office: | | | | Rapp 203 | |
|  | Office Phone: | | | | 724-847-6719 | |
|  | Home Phone: | | | | 724-846-3336 | |
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|  | You may call either number at any reasonable hour (before 10:00 PM and not on the Lord's Day.) When you call, please have your book and work handy and give a clear description of what you have already done. | | | | | |
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| ***Course Description:*** | Introduction to the primary modes of transportation. Main emphasis on planning, design, and operation of roadways, including traffic flow theory, highway capacity, traffic control, geometry, drainage, and design of pavements. | | | | | |
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| ***The Big Question:*** | How do we design infrastructure for transportation systems? (mostly highways, some coverage of railroads and airports) | | | | | |
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| ***Outcomes:*** | After successfully completing this course, the student will be able: | | | | | |
|  | Course Outcomes: | | | Relevant Program Outcomes: | | |
|  | 1. To identify modes of transportation and to discuss their relative efficiencies and effectiveness in moving people and goods. | | | 1. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, societal, ecclesiastical, and missionary context. | | |
|  | 1. To be able to analyze basic elements of street and highway systems, including: | | | 1. an ability to identify, formulate, and solve engineering problems | | |
|  | 2a. To lay out vertical and horizontal geometry for a highway. | | |  | | |
|  | 2b. To choose appropriate signal lengths at a simple signalized intersection. | | |  | | |
|  | 2c. To estimate capacity and quality of highway segments. | | |  | | |
|  | 2d. To estimate required pavement thickness for a given level of service. | | |  | | |
|  | 2e. To select an appropriate type and size of culvert passing under a roadway. | | |  | | |
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| ***Text:*** | Lester Hoel, Nicholas Garber, and Adel Sadek, *Transportation Infrastructure Engineering,* Cengage, 2006. ISBN-13: 978-0-534-95289-1 | | | | | |
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| ***References:*** | *HCM2010 Highway Capacity Manual,* 5th ed.,Transportation Research Board, Washington DC. | | | | | |
|  | *A Policy on Geometric Design of Highways and Street (The “Green Book”),* 6th ed., AASHTO, Washington DC, 2011. | | | | | |
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|  | Textbook Disclaimer  The textbooks for this course were chosen because their primary content directly relates to the objectives of this course. At times, there may be items or issues that are not presented from a proper Christian worldview. As such, the textbooks do not represent an endorsement by Geneva College or the relevant academic department at Geneva College. | | | | | |
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| ***Grading:*** | 3 Exams: | | 60% | | | |
|  | Final (comprehensive): | | 30% | | | |
|  | Homework: | | 10% | | | |
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| ***Grading System:*** | The grading scale is A, B, C, D, and F. Geneva includes pluses (+) and minuses (-) in the determination of the grade point average (GPA). Grade points are assigned for each semester hour of credit earned according to the following system:   |  |  |  |  | | --- | --- | --- | --- | | Letter Grade | Percentage\* | GPA | Explanation | | A+ | 97.00% - 100.00% | 4.0 | Outstanding | | A | 93.00% - 96.99% | 4.0 | Excellent | | A- | 90.00% - 92.99% | 3.7 |  | | B+ | 87.00% - 89.99% | 3.3 |  | | B | 83.00% - 86.99% | 3.0 | Good | | B- | 80.00% - 82.99% | 2.7 |  | | C+ | 77.00% - 79.99% | 2.3 |  | | C | 73.00% - 76.99% | 2.0 | Satisfactory | | C- | 70.00% - 72.99% | 1.7 |  | | D+ | 67.00% - 69.99% | 1.3 |  | | D | 63.00% - 66.99% | 1.0 | Less than Satisfactory | | D- | 60.00% - 62.99% | 0.7 |  | | F | < 60.00% | 0.0 | No Credit Given |   \*The percentage ranges may be lowered (i.e., in the students’ favor) at the instructor’s discretion. | | | | | |
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| ***Exams:*** | Typically I give two-part exams. The first part is closed book, closed notes, requiring recall and understanding of fundamentals. The second part is open-book, open-notes, consisting of problems and (maybe) essays. | | | | | |
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| ***Make-up Exams:*** | Notify me or the Engineering Office immediately if illness or some other legitimate reason prevents you from taking an exam. This notification must be before the exam if possible. | | | | | |
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| ***Homework:*** | Homework problems must be neatly solved and presented in the required format. Homework will be graded partly on the basis of its appearance. | | | | | |
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| ***Cooperation on Homework:*** | I expect each of you to solve the problems yourselves and to turn in your own papers. I do not condone copying. However, I encourage you to consult with each other on the homework as long as you honestly attempt the problems yourself and do not copy. | | | | | |
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| ***Due Date and Time:*** | All assignments are due at the beginning of class on the date that I tell you when I assign them. | | | | | |
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| ***Late Homework:*** | If you are delayed by illness or some other legitimate reason, notify me or the Engineering Office, if possible, before the class at which the assignment is due, or as soon as possible thereafter. | | | | | |
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| ***E-mail and eLearning:*** | I will communicate with you via e-mail. Often when a question comes up on HW or project work for one person, I email tips to the whole class as a result. I also post tips and useful information on the eLearning site. | | | | | |
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| ***Attendance:*** | The instructor will follow the *Excused Absence Policy* listed in the College Catalog for all students. If a student is going to miss a class for a campus event, they should inform the instructor in ***advance***.  In compliance with Pennsylvania Department of Health guidelines, attendance will be taken at every class period.  Students will also be required to maintain assigned seating.  Students should not physically attend class if they have a fever at or above 100.4oF or other **new** Covid-related symptoms (chills, cough, difficulty breathing, sore throat, headache, muscle or body aches, new loss of taste or smell, congestion or runny nose, nausea or vomiting, diarrhea).  All students, regardless of vaccination status, should report symptoms using the screening form available on myGeneva.  Students that report symptoms and follow campus protocols for testing, quarantine, and isolation as a result of Covid-19 will be granted excused absences for up to two weeks. Exceptions to this policy must be approved by the Provost. Per the excused absence policy, students will not be penalized for missing class during this period and will have access to course materials which may include notes, PowerPoint slides, or other material naturally generated during the delivery of the lesson. There will not be an option to participate in class via videoconference (i.e., “remote attendance”). | | | | | |
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| ***Classroom Recordings:*** | Geneva courses may occur on online platforms or in classrooms equipped with audiovisual telecommunications equipment that are capable of the audiovisual recording of each class session as it occurs. In order to provide the potential educational benefits of recorded classes to our students, we may decide to automatically record, and to archive for a limited period, all class sessions occurring in classrooms. The purpose of the recordings is to permit students enrolled in each recorded course to access the recordings outside of the regularly scheduled class period, according to rules established by the professor.  Access to recorded classes will be controlled via a secure course management platform and will be restricted to students enrolled in the recorded course, the professor, and those College IT personnel necessary to maintain the system. All recordings will be deleted following the conclusion of the semester in which the recorded course occurs (unless all identifying student images are edited out of the recording, in which case the professor and the College jointly may decide to retain the edited recording for other purposes). By registering for or attending Geneva courses, a student consents to the making and display of class recordings within the scope of this policy.  A student must not record activity in classrooms or other instructional settings without the express permission of the faculty member responsible for instruction in the course. **Recording audio without explicit permission of both parties is prohibited under Pennsylvania Law**. Authorized student-initiated recordings must be used only for the education of the students enrolled in the initiating student’s class during the period in which the student is enrolled in the class. In addition to the requirements in the preceding paragraph, an authorized student-initiated recording must not be made available to anyone outside of the students enrolled in the class in any fashion, including posting online or through other media without the express written consent of the faculty member responsible for the course. | | | | | |
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| ***Classroom Materials:*** | Original graded papers, assignments and projects will be returned to the student. The instructor may keep copies of student work for purposes of instruction or as examples for future courses. Course quizzes and examinations (questions and answers) are the property of the Professor and may be retained by the instructor. Examinations and other graded work completed at the end of the semester that is not returned to the student will be saved for one year before being discarded so that the student can refer to them or retrieve them. | | | | | |
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| ***Learning and Physical Disabilities Policy:*** | Geneva College values diversity and inclusion and recognizes disabilities as an aspect of diversity. Our shared goal is to create learning environments that are accessible, equitable, and inclusive; ultimately leading to the success of our students in and beyond college. Therefore, Geneva College complies with the ADA as well as Section 504 of the Rehabilitation Act, by affording reasonable accommodations to qualified students with disabilities.  Any student with a disability who needs academic accommodations should contact Geneva’s Student Success Center (SSC) to arrange a confidential appointment with the Director of the SSC before or during the first week of classes.  (Some accommodations may take time to put into place, so it is advised to request this as early as possible.)  Legally, no retroactive accommodations can be provided.  Accommodations for disabilities are available only as recommended by the SSC. For more details, visit Geneva’s website, call 724.847.5005, or stop by the office. They are located on the second floor of the Student Center. Students who have questions about their right to benefits or have grievances under these statutes should contact the Director of the SSC.  Geneva College also offers professional counseling services for students who are experiencing concerns with their overall mental health, either chronic or acute.  These services are confidential and free of charge and are provided by Health and Counseling Services.  Students can schedule an appointment through MyGeneva:  [https://my.geneva.edu/ICS/Student\_Information/Health\_and\_Counseling\_Services.jnz](https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fmy.geneva.edu%2FICS%2FStudent_Information%2FHealth_and_Counseling_Services.jnz&data=04%7C01%7CMSTEPHEN%40geneva.edu%7C697904c70a6a47733edc08d92c42ca95%7Ca06b982c1ee449fb8852e58e93308381%7C1%7C0%7C637589487653538589%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=L6%2B45JvwS%2F0gi9II5mj1oEk%2FDX3LbH07z7c6%2B%2FvCTbo%3D&reserved=0)  or contact Counseling Services at 724-847-4081. | | | | | |
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| ***Policy on Academic Honesty:*** | Because honesty is expected in all college relationships, any form of cheating on exams or any plagiarism in formal written work is punishable by failure in the course. Repeated violations may result in expulsion from the college. Please read the *Academic Integrity Policy* in the College Catalog.  Students may appeal any disciplinary action by following the procedure laid out in the College’s Policy on Academic Integrity.  Students are encouraged to visit [www.plagiarism.org](http://www.plagiarism.org) in order to clarify what constitutes plagiarism as well as a number of other academic standards. This website also provides directives as to how to avoid committing this act and how to properly cite academic sources. | | | | | |
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| ***Academic Grievance:*** | For grievances related to grading and other course academic policies, the student should follow the published *Academic Grievance Policy* in the College Catalog. | | | | | |

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| **CIE 301** | | | **Tentative Schedule** | | | **Fall 2021** | |
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| Date | | Day | | Topic | Mile-stones | | Reading\* |
| Aug | 31 | T | | Introduction; History of Transportation; Transportation Systems |  | | Ch. 1, pp. 1-20 |
| Sep | 2 | H | | Graphical Methods, Regression, and Probability Theory |  | | Ch. 2, pp. 23-60 |
|  | 7 | T | | Queueing Theory |  | | Ch. 2, pp. 60-75 |
|  | 9 | H | | Human Characteristics; Vehicle Characteristics and Dynamics |  | | Ch. 3, pp. 85-107 |
|  | 14 | T | | Train Dynamics, Airplanes, Airports, Braking and Stopping Distances |  | | Ch. 3, pp. 107-134 |
|  | 16 | H | | Transportation Capacity, Level of Service |  | | Ch. 4, pp. 139-151 |
|  | 21 | T | | Transportation Capacity: Interrupted Flow |  | | Ch. 4, pp. 151-161 |
|  | 23 | H | | Intersection Level of Service; Transit Capacity |  | | Ch. 4, pp. 161-190 |
|  | 28 | T | | Transit, Rail, Pedestrian, and Airport Capacity; Transportation Planning |  | | Ch. 4, pp. 190-232 |
|  | 30 | H | | Transportation Planning; Geometric Design |  | | Ch. 5, pp. 243-284,  Ch. 6, pp.289-310 |
| Oct | 5 | T | | ***EXAM I: Chapters 1-4*** | ***Exam 1*** | |  |
|  | 7 | H | | Geometric Design: Vertical Alignment of Highways |  | | Ch. 6, pp. 325-340 |
|  | 12 | T | | Geometric Design: Vertical and Horizontal Alignment of Highways |  | | Ch. 6, pp. 341-355, 365-372 |
|  | 14 | H | | Geometric Design: Highways and Rail Lines |  | |  |
|  | 19 | T | | **FALL BREAK** |  | |  |
|  | 21 | H | | Geometric Design: Rail Lines, Airports |  | | Ch. 6, pp. 355-365, 372-388 |
|  | 26 | T | | Structural Design of Travelways: Design Loads |  | | Ch. 7, pp. 393-408 |
|  | 28 | H | | Structural Design of Travelways: Soil Properties and Material Selection |  | | Ch. 7, pp. 409-439 |
| Nov | 2 | T | | ***EXAM II: Chapters 5-6*** | ***Exam 2*** | |  |
|  | 4 | H | | Structural Design of Travelways: Structural Components, Streets and Highways |  | | Ch. 7, pp. 439-453 |
|  | 9 | T | | Structural Design of Travelways: Rigid Pavements |  | | Ch. 7, pp. 462-474 |
|  | 11 | H | | Rigid Pavements, Runways, Railroads |  | |  |
|  | 16 | T | | Highway and Rail: Drainage Flows |  | |  |
|  | 18 | H | | Highway and Rail: Drainage Culverts and Channels |  | |  |
|  | 23 | T | | Culvert Hydraulics |  | |  |
|  | 25 | H | | **THANKSGIVING BREAK** |  | |  |
|  | 30 | T | | Culvert Hydraulics using HY-8 |  | |  |
| Dec | 2 | H | | ***Exam III: Chapter 7 and Drainage*** | ***Exam 3*** | |  |
|  | 7 | T | | Highway Safety |  | | Chapter 8, pp. 523-556 |
|  | 9 | H | | Information Technology |  | | Chapter 9, pp. 583-619 |
|  | 16 | H | | FINAL EXAM – 1:00 – 2:50 PM | ***Final Exam*** | |  |
|  |  |  | | \*reading assignments should be completed before the class date | | |  |