COURSE DATES, MODALITY, AND LOCATION
June 1st, 2020 – July 24th, 2020
This is a 100% online course and uses the A&M-Central Texas Canvas Learning Management System [https://tamuct.instructure.com/].

INSTRUCTOR AND CONTACT INFORMATION
Instructor Rahul Dwivedi, PhD
Office Founders Hall 323N
Phone: 254 – 519 – 5784 (not the preferred mode of communication with current COVID-19 scenario)
Email: rahul.dwivedi@tamuct.edu (preferred) or Canvas inbox.

Office Hours
Since the course is 100% online, concerns of students will be addressed via email. Students can send emails with their concerns or questions related with any aspect of the course any time between 9 AM – 5 PM Monday to Thursday. If there’s something which needs to be addressed via virtual face-to-face meeting, students can request WebEx (https://tamuct.onecampus.com/task/all/webex) meeting(s) as well.

Student-instructor interaction
I check my University email many times a day and typically responds within 24 hours of receiving emails on weekdays. Email is also the best mode of communication.

Mode of instruction and course access
This a 100% online course that makes extensive use of the TAMUCT Canvas Learning Management System (https://tamuct.instructure.com). The course syllabus, schedule, supplemental readings, class announcements, power point slides, video lectures, learning modules, homework assignments, exams and other course related documents will be posted on Canvas throughout the week. Each student is responsible for the posted material and should check Canvas several times a week for updates.

WARRIOR SHIELD
Emergency Warning System for Texas A&M University-Central Texas
Warrior Shield is an emergency notification service that gives Texas A&M University-Central Texas the ability to communicate health and safety emergency information quickly via email, text message, and social media. All students are automatically enrolled in Warrior Shield through their myCT email account.
Connect to Warrior Shield by 911Cellular [https://portal.publicsafetycloud.net/Account/Login] to change where you receive your alerts or to opt out. By staying enrolled in Warrior Shield, university officials can quickly pass on safety-related information, regardless of your location.

COURSE INFORMATION
Course Overview and description

Data visualization makes it easier to understand the data. The goal of this course is to introduce students to data visualization including both the principles and techniques. Students will learn the value of visualization, specific techniques in data visualization and will understand how to best leverage visualization methods. The course will focus on fundamental concepts and best practices for effective communication with data.

Course Objective or Goal
Student Learning Outcomes

Successful completion of this course should enable student to:

- Choose an appropriate visual display depending on the context for visualizing data
- Understand and describe Gestalt principles of visual perception
- How to use preattentive attributes in data visualization
- Explore affordances, accessibility and aesthetics in the context of visualizing data
- Use R’s default graphics for exploring and visualizing data
- Create a variety of bar graphs, line graphs, and scatter plots
- Summarize data distributions with histograms, density curves, and box plots
- Provide annotations to help viewers interpret data
- Control the overall appearance of graphs

Competency Goals Statements (certification or standards)
None

Required Reading and Textbook(s)

Required Texts:

2. R Graphics Cookbook, Winston Chang, O’Reilly, Winston Chang, ISBN 13: 9781491978603 (a free online version of this text is available at https://r-graphics.org/). This text is referred to as RGC in the course calendar.
Note: A student of this institution is not under any obligation to purchase a textbook from a university-affiliated bookstore. The same textbook may also be available from an independent retailer, including an online retailer.

Reading Assignments: All assigned chapters will be used for class and/or canvas discussions. Students are expected to study the assigned readings before each class session.

Supplementary Material: The course textbook will be supplemented with other materials that may include research articles, case studies, industry articles, videos including TED talks, power point presentations etc.

COURSE REQUIREMENTS

Examinations: There will be two examinations. One midterm and one final exam. Each exam is worth **30 points**. Both exams will be online via Canvas and timed. The exams will be open book / open notes. Multiple attempts are not allowed for any of the exams. The exams will have two parts: multiple-choice questions including true/false; and programming questions. These exams will be available for 24 to 48 hours starting from Monday noon and available till Tuesday noon or mid night. Students must finish the exam in a single session. For example, once a student starts an exam, they will get 120 or 180 minutes (exact duration might differ, more on this will be announced later) to attempt it. The first exam will cover material from the first four chapters of both the texts. The second exam will cover material from chapters 5 to 8 of Storytelling with Data and chapters 5 and 6 of R Graphics Cookbook. For the exams, you will be required to know not only the material from the textbook chapters, but also material from the class lectures such as power point slides and any supplementary/additional material provided as well.

Semester long individual programming project (more details to follow): Each student is required to choose a secondary dataset, analyze it using a variety of data visualization techniques covered in the course and write a paper based on the findings. The aim of this paper is to carry out what is known as exploratory data analysis using data visualization. Students may choose any data which interests them. A list of some of the freely available sources of data available on the Web will be provided during the second week of the course. You may choose a data source from this list or may choose any other data source of interest to you. This paper must be 12 to 15 pages in length (not more than 20 pages, double-spaced APA format, and 12-point Times New Roman font) excluding bibliography, table of contents, graphics, tabular or illustrative material. References should include current sources and must conform to APA style 6 or 7 [https://owl.purdue.edu/owl/research_and_citation/APA_style/APA_formatting_and_style_guide/general_format.html](https://owl.purdue.edu/owl/research_and_citation/APA_style/APA_formatting_and_style_guide/general_format.html). You may want to use Microsoft Word plugin for a freely available citation and bibliography generation software such as Mendeley [https://www.mendeley.com/?interaction_required=true](https://www.mendeley.com/?interaction_required=true) or Zotero [https://www.zotero.org/]. You may also use the citation tool that comes with Microsoft Word. Use of Wikipedia or the class text as a reference will cause a serious loss of points. The individual research paper is worth **20 points**. Late submissions are not allowed for individual research paper. The strict deadline to
submit individual paper is last day of class i.e. July 24\textsuperscript{th}, 2020.

**Individual Homework assignments:** There will be two individual homework assignments. Each homework is worth 10 points. Students are required to visualize one or more dataset provided by the instructor and answer respective questions (if any). Students will get two weeks to work on the homework. Homework turned in after due date is considered late. 2 points will be deducted for each day the homework is late.

**Grading Criteria Rubric and Conversion**

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Points</th>
<th>Total/Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examinations</td>
<td>2</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>Individual Programming</td>
<td>1</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Project</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homework</td>
<td>2</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

Exams, quizzes, assignments and individual term project will receive a numeric score (0-100) each. These scores will be converted to points and totaled to ultimately be converted to letter grade of A, B, C, D, or F as shown in the example below:

<table>
<thead>
<tr>
<th>Item</th>
<th>Percent earned by student</th>
<th>Maximum points</th>
<th>Points / percent to be added to the final grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>80%</td>
<td>30</td>
<td>24</td>
</tr>
<tr>
<td>Exam 2</td>
<td>77%</td>
<td>30</td>
<td>23.1</td>
</tr>
<tr>
<td>Individual project</td>
<td>75%</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td>Homework 1</td>
<td>76%</td>
<td>10</td>
<td>7.6</td>
</tr>
<tr>
<td>Homework 2</td>
<td>82%</td>
<td>10</td>
<td>8.2</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

89.5 – 100 = A  
79.5 – 89.49999 = B  
69.5 – 79.49999 = C  
59.5 – 69.49999 = D  
Below 59.5 = F

Grades will not be curved (in the above example, the student with 77.9 will receive a C NOT a B).

**Posting of Grades**

All student grades will be posted on the Canvas Grade Book and students should monitor their grading status through this tool. Grades will be posted within 7 days after the due date.
Grading Policies
Refer to late policy for individual homework’s. Late submits are not allowed for individual project.

Plagiarism policy: Students are strongly advised not to copy and paste material from websites, study guides (such as Chegg, Course Hero, etc.), research articles, industry articles, blog posts, any other online resources or from peers. Students must rephrase and properly cite any of the material used in their submits. All your submitted writings including programming homework’s will be checked using an automated plagiarism check software already built into Canvas available from the University. Following point deductions will apply to your submitted writings:

- More than 30% plagiarized – Not acceptable and students will not earn any points
- 21% to 30% plagiarized – 70% points deducted with warning to be more careful with future submits
- 11% to 20% plagiarized – 60% points deducted with warning to be more careful with future submits
- 0% to 10% plagiarized – Acceptable with warning to be more careful during future submits

The above policy will be followed during the course along with the standard University policy of Student academic conduct as briefly explained below.
## COURSE OUTLINE AND CALENDAR
### Complete Course Calendar (subject to change)

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Chapters</th>
<th>Due at mid night</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>June 1, 2020</td>
<td>Syllabus, Chapter 1 of SWD and Chapter 1 of RGC</td>
<td></td>
<td>Video lectures based on syllabus and chapters available. R basics and installing R and RStudio.</td>
</tr>
<tr>
<td>2</td>
<td>June 8, 2020</td>
<td>Chapter 2 of SWD and Chapter 2 of RGC</td>
<td>Homework 1 available</td>
<td>Video lectures based on chapters available</td>
</tr>
<tr>
<td>3</td>
<td>June 15, 2020</td>
<td>Chapter 3 of SWD and Chapter 3 of RGC</td>
<td>Individual project guidelines available</td>
<td>Video lectures based on chapters available</td>
</tr>
<tr>
<td>4</td>
<td>June 22, 2020</td>
<td>Chapter 4 of SWD and Chapter 4 of RGC</td>
<td>Homework 1 due at midnight of June 22. Exam 1 will cover the first four chapters of both the texts.</td>
<td>Video lectures based on chapters available</td>
</tr>
<tr>
<td>5</td>
<td>June 29, 2020</td>
<td>Chapter 5 of SWD and Chapter 5 of RGC</td>
<td>Homework 2 available. Exam 1 available on Canvas at 12 noon on June 29 and due at midnight of June 30.</td>
<td>Video lectures based on chapters available</td>
</tr>
<tr>
<td>6</td>
<td>July 6, 2020</td>
<td>Chapter 6 of SWD and Chapter 6 of RGC</td>
<td></td>
<td>Video lectures based on chapters available</td>
</tr>
<tr>
<td>7</td>
<td>July 13, 2020</td>
<td>Chapters 7 and 8 of SWD.</td>
<td>Homework 2 due at midnight of July 13. Exam 2 will cover chapters 5-8 of SWD and chapters 5-6 of RGC.</td>
<td>Video lectures based on chapters available</td>
</tr>
<tr>
<td>8</td>
<td>July 20, 2020</td>
<td>Chapters 7, 8 and 9 of RGC (if time permits). Material covered in these chapters may be used in individual project.</td>
<td>Exam 2 available on Canvas at 12 noon on July 20 and due at midnight of July 21. Individual project due at July 24th midnight</td>
<td>Video lecture based on chapters available</td>
</tr>
</tbody>
</table>
Important University Dates
Refer to: https://www.tamuct.edu/registrar/academic-calendar.html

TECHNOLOGY REQUIREMENTS AND SUPPORT

COURSE SPECIFIC SOFTWARE REQUIREMENTS

Successful completion of this course requires students to learn how to create visualization on secondary data using R programming language. The R programming code will be written using RStudio Integrated Development Environment. Hence, all students are required to download and install R programming language (available from https://www.r-project.org/) as well as RStudio (available from https://rstudio.com/products/rstudio/download/). Students are also required to interpret the resulting visualizations / graphics which requires them to understand visualized data or graphics. Detailed instructions on how to install R, RStudio and related R graphics packages will be provided during the first week of course.

Apart from R programming language and RStudio students must have Microsoft Office Word installed on their computers/laptops to write and submit individual homework assignments, individual project and exams. Students are also required to properly cite the references used in their individual project. Hence, they may want to download and install any free citation software (such as EndNote, Mendeley, RefWorks or Zotero) or may also use Microsoft’s insert citation option under References tab.

Technology Requirements
This course will use the A&M-Central Texas Instructure Canvas learning management system. We strongly recommend the latest versions of Chrome or Firefox browsers. Canvas no longer supports any version of Internet Explorer.

Logon to A&M-Central Texas Canvas [https://tamuct.instructure.com/] or access Canvas through the TAMUCT Online link in myCT [https://tamuct.onecampus.com/]. You will log in through our Microsoft portal.

Username: Your MyCT email address. Password: Your MyCT password

Canvas Support
Use the Canvas Help link, located at the bottom of the left-hand menu, for issues with Canvas. You can select “Chat with Canvas Support,” submit a support request through “Report a Problem,” or call the Canvas support line: 1-844-757-0953.
For issues related to course content and requirements, contact your instructor.

Online Proctored Testing
A&M-Central Texas uses Proctorio for online identity verification and proctored testing. This service is provided at no direct cost to students. If the course requires identity verification or
proctored testing, the technology requirements are: Any computer meeting the minimum computing requirements, plus web camera, speaker, and microphone (or headset). Proctorio also requires the Chrome web browser with their custom plug in.

**Other Technology Support**
For log-in problems, students should contact Help Desk Central
24 hours a day, 7 days a week
   Email: helpdesk@tamu.edu
   Phone: (254) 519-5466
   Web Chat: [http://hdc.tamu.edu](http://hdc.tamu.edu)

*Please let the support technician know you are an A&M-Central Texas student.*

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**UNIVERSITY RESOURCES, PROCEDURES, AND GUIDELINES**

**Drop Policy**
If you discover that you need to drop this class, you must complete the Drop Request Dynamic Form through Warrior Web.
[https://dynamicforms.ngwebsolutions.com/casAuthentication.ashx?InstID=eaed95b9-f2be-45f3-a37d-4692816bc10&targetUrl=https%3A%2F%2Fdynamicforms.ngwebsolutions.com%2FSubmit%2FForm%2FStart%2F53b8369e-0502-4f36-be43-f02a4202f612].

Faculty cannot drop students; this is always the responsibility of the student. The Registrar’s Office will provide a deadline on the Academic Calendar for which the form must be completed. Once you submit the completed form to the Registrar’s Office, you must go into Warrior Web and confirm that you are no longer enrolled. If you still show as enrolled, FOLLOW-UP with the Registrar’s Office immediately. You are to attend class until the procedure is complete to avoid penalty for absence. Should you miss the drop deadline or fail to follow the procedure, you will receive an F in the course, which may affect your financial aid and/or VA educational benefits.

**Academic Integrity**
Texas A&M University -Central Texas values the integrity of the academic enterprise and strives for the highest standards of academic conduct. A&M-Central Texas expects its students, faculty, and staff to support the adherence to high standards of personal and scholarly conduct to preserve the honor and integrity of the creative community. Academic integrity is defined as a commitment to honesty, trust, fairness, respect, and responsibility. Any deviation by students from this expectation may result in a failing grade for the assignment and potentially a failing grade for the course. Academic misconduct is any act that improperly affects a true and honest evaluation of a student’s academic performance and includes, but is not limited to, working with others in an unauthorized manner, cheating on an examination or other academic work, plagiarism and improper citation of sources, using another student’s work, collusion, and the abuse of resource materials. All academic misconduct concerns will be referred to the university’s
Office of Student Conduct. Ignorance of the university’s standards and expectations is never an excuse to act with a lack of integrity. When in doubt on collaboration, citation, or any issue, please contact your instructor before taking a course of action.

For more information regarding the Student Conduct process, [https://www.tamuct.edu/student-affairs/student-conduct.html].

If you know of potential honor violations by other students, you may submit a report, [https://cm.maxient.com/reportingform.php?TAMUCentralTexas&layout_id=0].

**Academic Accommodations**

At Texas A&M University-Central Texas, we value an inclusive learning environment where every student has an equal chance to succeed and has the right to a barrier-free education. The Office of Access and Inclusion is responsible for ensuring that students with a disability receive equal access to the university’s programs, services and activities. If you believe you have a disability requiring reasonable accommodations please contact the Office of Access and Inclusion, WH-212; or call (254) 501-5836. Any information you provide is private and confidential and will be treated as such.

For more information please visit our Access & Inclusion Canvas page (log-in required) [https://tamuct.instructure.com/courses/717]  

**Important information for Pregnant and/or Parenting Students**

Texas A&M University-Central Texas supports students who are pregnant and/or parenting. In accordance with requirements of Title IX and related guidance from US Department of Education’s Office of Civil Rights, the Dean of Student Affairs’ Office can assist students who are pregnant and/or parenting in seeking accommodations related to pregnancy and/or parenting. Students should seek out assistance as early in the pregnancy as possible. For more information, please visit Student Affairs [https://www.tamuct.edu/student-affairs/index.html]. Students may also contact the institution’s Title IX Coordinator. If you would like to read more about these requirements and guidelines online, please visit the website [http://www2.ed.gov/about/offices/list/ocr/docs/pregnancy.pdf].

Title IX of the Education Amendments Act of 1972 prohibits discrimination on the basis of sex and gender—including pregnancy, parenting, and all related conditions. A&M-Central Texas is able to provide flexible and individualized reasonable accommodation to pregnant and parenting students. All pregnant and parenting students should contact the Associate Dean in the Division of Student Affairs at (254) 501-5909 to seek out assistance. Students may also contact the University’s Title IX Coordinator.

**Tutoring**

Tutoring is available to all A&M-Central Texas students, on a remote online basis. Visit the Academic Support Community in Canvas to view schedules and contact information. Subjects tutored on campus include Accounting, Advanced Math, Biology, Finance, Statistics,
Mathematics, and Study Skills. Tutors will return at the Tutoring Center in Warrior Hall, Suite 111 in the Fall 2020. Student success coaching is available online upon request.

If you have a question regarding tutor schedules, need to schedule a tutoring session, are interested in becoming a tutor, success coaching, or have any other question, contact Academic Support Programs at (254) 501-5836, visit the Office of Student Success at 212F Warrior Hall, or by emailing studentsuccess@tamuct.edu.

Chat live with a tutor 24/7 for almost any subject from on your computer! Tutor.com is an online tutoring platform that enables A&M-Central Texas students to log in and receive online tutoring support at no additional cost. This tool provides tutoring in over 40 subject areas except writing support. Access Tutor.com through Canvas.

**University Writing Center**
The University Writing Center (UWC) at Texas A&M University–Central Texas (TAMUCT) is a free service open to all TAMUCT students. For the Summer 2020 semester, all services will be online as a result of the COVID-19 pandemic. The hours of operation are from 10:00 a.m.-4:00 p.m. Monday thru Thursday with satellite hours online Monday thru Thursday from 6:00-9:00 p.m. This summer, the UWC is also offering hours from 12:00-3:00 p.m. on Saturdays starting June 27th and ending July 18th.

Tutors are prepared to help writers of all levels and abilities at any stage of the writing process. While tutors will not write, edit, or grade papers, they will assist students in developing more effective composing practices. By providing a practice audience for students’ ideas and writing, our tutors highlight the ways in which they read and interpret students’ texts, offering guidance and support throughout the various stages of the writing process. In addition, students may work independently in the UWC by checking out a laptop that runs the Microsoft Office suite and connects to WIFI, or by consulting our resources on writing, including all of the relevant style guides. Whether you need help brainstorming ideas, organizing an essay, proofreading, understanding proper citation practices, or just want a quiet place to work, the UWC is here to help!

Students may arrange a one-to-one session with a trained and experienced writing tutor by making an appointment via WCOnline [https://tamuct.mywconline.com/]. In addition, you can email Dr. Bruce Bowles Jr. at bruce.bowles@tamuct.edu if you have any questions about the UWC and/or need any assistance with scheduling.

**University Library**
The University Library provides many services in support of research across campus and at a distance. We offer over 200 electronic databases containing approximately 250,000 eBooks and 82,000 journals, in addition to the 85,000 items in our print collection, which can be mailed to students who live more than 50 miles from campus. Research guides for each subject taught at A&M-Central Texas are available through our website to help students navigate these resources. On campus, the library offers technology including cameras, laptops, microphones, webcams,
and digital sound recorders.

Research assistance from a librarian is also available 24 hours a day through our online chat service, and at the reference desk when the library is open. Research sessions can be scheduled for more comprehensive assistance, and may take place on Skype or in-person at the library. Assistance may cover many topics, including how to find articles in peer-reviewed journals, how to cite resources, and how to piece together research for written assignments.

Our 27,000-square-foot facility on the A&M-Central Texas main campus includes student lounges, private study rooms, group work spaces, computer labs, family areas suitable for all ages, and many other features. Services such as interlibrary loan, TexShare, binding, and laminating are available. The library frequently offers workshops, tours, readings, and other events. For more information, please visit our Library website [http://tamuct.libguides.com/index].

OPTIONAL POLICY STATEMENTS

A Note about Sexual Violence at A&M-Central Texas
Sexual violence is a serious safety, social justice, and public health issue. The university offers support for anyone struggling with these issues. University faculty are mandated reporters, so if someone discloses that they were sexually assaulted (or a victim of Domestic/Dating Violence or Stalking) while a student at TAMUCT, faculty members are required to inform the Title IX Office. If you want to discuss any of these issues confidentially, you can do so through Student Counseling (254-501-5955) located on the second floor of Warrior Hall (207L).

Sexual violence can occur on our campus because predators often feel emboldened, and victims often feel silenced or shamed. It is incumbent on ALL of us to find ways to actively create environments that tell predators we don’t agree with their behaviors and tell survivors we will support them. Your actions matter. Don’t be a bystander; be an agent of change. For additional information on campus policy and resources visit the Title IX webpage [https://www.tamuct.edu/compliance/titleix.html].

Behavioral Intervention
Texas A&M University-Central Texas cares about the safety, health, and well-being of its students, faculty, staff, and community. If you are aware of individuals for whom you have a concern, who are exhibiting concerning behaviors, or individuals causing a significant disruption to our community, please make a referral to the Behavioral Intervention Team. Referring your concern shows you care. You can complete the referral online [https://cm.maxient.com/reportingform.php?TAMUCentralTexas&layout_id=2].

Anonymous referrals are accepted. Please see the Behavioral Intervention Team website for more information [https://www.tamuct.edu/student-affairs/bat.html]. If a person’s behavior poses an imminent threat to you or another, contact 911 or A&M-Central Texas University Police.
OTHER POLICIES

INSTRUCTOR POLICIES

Policies related to absence, grading, etc.

- You are responsible for all class material presented during an absence.
- Homework's must be submitted through Canvas and due on the mid night (11:59 PM) of specified due date/time. No email submissions will be accepted except under unforeseen circumstances.
- Late penalties will be applied to items submitted after due dates. Refer to late submission policy for individual homework. Late submissions are not allowed under any circumstances for individual project and exams.
- The exams will be available for 36 or 48 hours on Canvas as explained above (although you will get only a limited time to take the exam(s)) and multiple attempts will not be allowed under any circumstances for any of the exams.
- Plagiarism check will be carried out using plagiarism check software built into Canvas available from University. Homework assignments with more than 30% plagiarized material will receive no grade or a grade of zero.

My personal statement

- You will receive feedback in the form of graded assignments within one week after the due date. I want you to read the feedback that I provide to you (your personal grading notes and Canvas emails).
- I am almost always available via email and typically respond within 24 hours except on weekends. Student may also request WebEx meeting(s), is required.
- I prefer email to phone conversations.
- I reserve the right to modify the course syllabus during the semester for the benefit of the students.
- I reserve the right to supplement materials presented in the text with additional course material that may help the students to understand the topic better.
- I reserve the right to modify grading policy rubrics. Any change to grading rubrics will be applied to current and possible future assignments.

Copyright Notice

Students should assume that all course material is copyrighted by the respective author(s). Reproduction of course material is prohibited without consent by the author and/or course
instructor. Violation of copyright is against the law and Texas A&M University-Central Texas’ Code of Academic Honesty. All alleged violations will be reported to the Office of Student Conduct.