# SYLLABUS

**PSA 122 – GIS and GPS for Public Safety Professionals** Instructor: Dave Hobbins
Arts and Sciences Division 3 Credit Hours
**Fall Semester 2016** revised: 22 July 2016

**REQUIRED TEXTBOOKS:** (I suggest that you buy used books on-line)

Davis, B. 2001. *GIS: A Visual Approach, 2nd ed.* OnWord Press, Santa Fe. 438 p. ISBN: 978-0-7668-2764-6

Law, M. and A. Collins. 2015. *Getting To Know ArcGIS Desktop, 4th ed.* **for ArcGIS 10.2 and 10.3.** ESRI Press. 749 p. ISBN: 978-1-58948-382-8

Hobbins, D. 2015. *PSA122 Lab Exercises and Data*. Published to Blackboard.

**REQUIRED COMPUTER RESOURCES:**

High-speed Internet is strongly recommended. If you have dial-up, ask us to mail a lab data CD to you.

Computer Requirements: You must have a computer with a Windows Operating System.

**PREREQUISITES:** None. Be sure you know a Windows environment and can create and copy files and folders.

**CATALOG DESCRIPTION:** This course provides an introduction to the theory and application of Geographical Information Systems (GIS) and Global Positioning Systems (GPS) for public safety, introducing geographic theory, terminology and concepts, focusing on policing, crime, emergency services and emergency management. Students must have internet access and Word or WordPerfect software. High-speed internet is strongly recommended. The GIS software requires that your computer **must** have a Microsoft Windows Operating System. **For Crj, Emergency Management and PSA students or permission of instructor.**

**COURSE OBJECTIVES/BENEFITS:** My goal is to introduce you to the principles of geography, geographic information systems, the global positioning system, digital cartography, and integrated technologies, with a focus on public safety applications. GIS and GPS can be used to map and analyze data such as accidents or crime, and for emergency preparedness and response, as well as many other valuable applications. When integrated with other technologies these tools become even more powerful. Knowledge of GIS makes you a more valuable employee. With hands-on experience you could apply GIS and GPS on the job to collect data, map events and study their impact or importance. At the very least, you will understand their impact and importance in modern public safety disciplines.

**STUDENT LEARNING OUTCOMES.** At the conclusion of this course, a student should:

- Have an understanding of basic GIS and GPS terminology and concepts
- Develop a spatial perspective, understanding the basic tenants of geography
- Develop an understanding of the concepts of scale, distance, direction and area, and be able to apply them to GIS
- Understand the importance and use of coordinate systems and map projections in GIS

- Have an understanding of how GIS and GPS technologies can be applied in public safety
- Know how to download GIS data on-line, how to import various data into GIS, and how to create and update a spatial database
- Be able to complete basic ArcGIS operations, including information extraction
- Understand the data needs of emergency management applications
- Be able to evaluate the quality of GIS data
- Have a basic understanding of spatial database analysis
- Be able to evaluate the quality of a map product and create a quality map product

**METHODS OF INSTRUCTION:**
This course utilizes several approaches to instruction and learning including lecture, case studies, literature, assignments, and practical exercises.

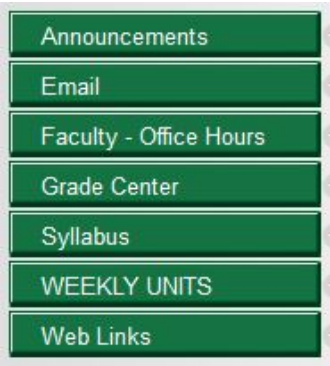
**1. How Does This Course Work?**
Class begins on Monday, August 29. Follow the Course Outline and Schedule ON-LINE in Blackboard (Weekly Units menu) or at the end of the syllabus. The semester is broken into weekly units with approximately two hours of lecture and two hours of lab. I expect to receive an embedded lecture assignment and a lab report each week. The bonus assignments are optional. Post them all to the Blackboard. Lab reports must be word processed documents. I am strict on deadlines.
**Each week begins on Monday**.

1) Review the study questions,
2) read the text,
3) **view the lecture** and take notes,
4) complete and submit the embedded assignment and bonus assignment to Blackboard,
5) study your notes and text, and answer the study questions.

Then, 7) complete your **weekly on-line quiz,** and
8) complete and submit your lab exercise to Blackboard.

**All work must be received prior to midnight (11:59pm) the following Monday!**

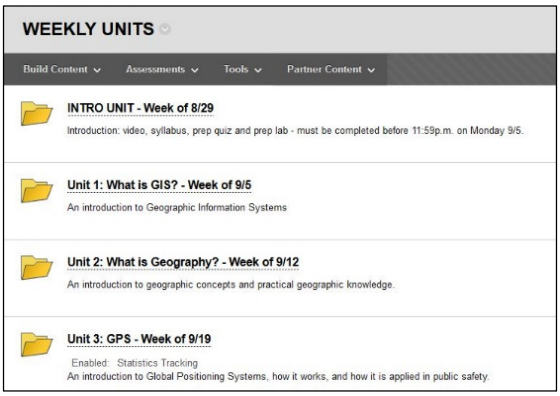
**2. DOCUMENTATION AND BLACKBOARD.**
As you can see at right, the menus in Blackboard contain a number of important course components such as announcements, your grades, and the syllabus. Check out the other menu options. However, **ALL** of the course content is located in the WEEKLY UNITS menu.

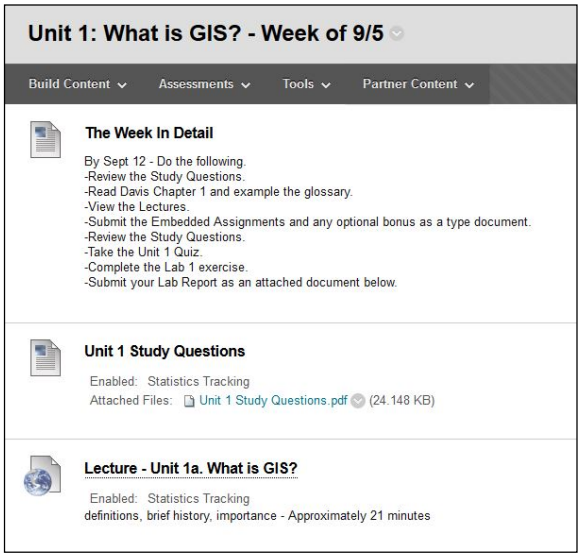



First, access and read the syllabus. The Davis and Law & Collins **textbooks** are outlined on page one of this document. Davis covers most of the assigned readings and is very easy to read. Law & Collins is the "lab manual." It contains the code needed for software and data download. Also in the syllabus, is a detailed "Course Outline and Schedule Section." Use that to organize your semester. Note the due dates.

All of your course content is organized by week and is posted in the WEEKLY UNITS menu.

Follow the detailed list for each week and be sure to note the due dates. See the images below.




Within each weekly unit is everything you need for the week from the study guide to the lectures, labs and assignments. All assignments have a due date and will disappear at 11:59 on Monday night. Get your work done well ahead of those dates and times. If you work full time or will be out of town, be sure to work a week ahead.

**3. LECTURES.**

**a. Lectures** are voiced-over PowerPoint presentations converted to mp4 files. They introduce terminology and concepts of GIS and GPS and relate them to public safety applications. They will work on any mobile device but be sure you watch them as they are filled with graphics to illustrate the topic. Your screen will look like that below.


**b. Weekly Embedded Assignments** are incorporated into each lecture unit. Most units have 3 or 4 but one has several more. You will need to listen to each lecture unit to obtain the assignments. These are easy and obvious pieces of information. Just type the information

directly into the Blackboard assignment (i.e. Submit Unit1 EA). Each unit also contains at least one bonus question for extra credit. Submit that with the embedded assignment.

**c. Each week begins and ends on Monday**. View the study questions. Then, read, view, study, and complete your weekly embedded assignment and on-line quiz **well before the next Monday at 11:59 p.m.**

**d. HELP: Blackboard** questions should be directed to Distance Ed: Logan at 834-7560. You may submit questions at helpdesk.umfk@maine.edu.
**Software installation** questions should be directed to IT at 207-834-7809.
**Lecture and laboratory** related questions should be directed to me at 207-834-7614.

**e. Office Hours:** Monday and Thursday from 2-4 p.m. (834-7614) I will be by the phone. I will check my e-mails every Monday, Tuesday and Thursday after 2pm. I am in the field (out of the office) every Monday, Wed, and Thursday morning and Wed and Friday afternoons.

**e. E-Mail:** Be sure to use Blackboard e-mail or **put PSA122 in the subject line** of other e-mail services. Without that subject, I cannot guarantee its safe receipt. If I do not acknowledge your e-mail within 48 hours, it may not have been received.

**f. Quizzes and Exams.** Each week you will complete an **on-line, timed quiz** relating to the study questions from that week's lecture and reading. Complete the quiz well before 11:59pm Monday. The quiz is timed, so watch your time. You will be penalized 5 points for every 5 points over the allotted time. Do not rely on open-book. If you know the answer to the study questions, you will do well.

The first quiz is all extra credit and covers your syllabus. Use that quiz to learn how the system operates. I will set up the first quiz so that you may try it several times. If you are having difficulties with the quiz, contact Logan (834-7560 or logan.oclair@maine.edu) in Distance Education for help.

There will be two **on-line exams, a mid-term and final**. Test material will be drawn from the study questions. The midterm will be available after 10/10 and must be completed by midnight 10/17. The final exam will be made available during the week beginning December 5 and must be completed no later than midnight on December 12. All deadlines are indicated in the "Course Outline and Schedule" section at the end of the syllabus.

**3. LABORATORY** exercises are self-guided and teach GIS using ArcGIS 10.3

**a. Computer and Software**. The first week will be used to get your software and data loaded and operating on your computer. You should the Law and Collins text (latest edition, new copy) with the computer code needed to download the ArcGIS software and data. Data for labs 9 through 12 are available on Blackboard. Contact UMFK IT for help with your software download if needed. Also, be sure to do a **Complete Download (including all extensions)** when loading ArcGIS or you will not have the extensions you need for the last lab.

You will need a zip extraction tool to download data from the internet. Windows XP and later versions have a tool embedded. If you are not using that software, you will need to download IZArc (for free) from the internet. For help with any software loading or computer operation questions, please call UMFK staff at 207/834-7809 or e-mail your request to helpdesk.umfk@maine.edu. However, contact me with GIS use questions.

**b. Lab Exercises.** For the first half of the course, you will complete GIS exercises from the Law and Collins lab manual. Also, you must print out supplementary notes (*Lab Instructions*). These supplementary notes indicate what chapters to use in the manual, alert you to problem areas, and provide instructions on what maps to export and what questions to answer for credit. The best way to approach this is to mark the Law & Collins lab manual at the places indicated in my notes. **Complete the exercises well before Monday.**

Create a "Lab Report" by typing your answers into a Word or WordPerfect document. A sample report is available with the PrepLab. All maps must be imported into the document and must be readable. Use a full page if necessary. Place your name, PSA122, the lab number, and the date in the top left of the lab "report." The prep lab exercise will walk you through the process. It illustrates the ArcGIS map export process and the import process for MS Word and WordPerfect. Submit your lab reports as documents to Blackboard. **The assignment and lab are not available after the due date.**

The second set of lab exercises cover public safety applications. Both instructions and data for these exercises can be downloaded directly from the Blackboard.

**Never cut and paste information** from the text, internet, or other sources (software help menu) into your lab report or other documents. Do your own work and use your own words. Cut and pasted material is not your work and will not be counted.

**c. On-Campus Lab Facility**. The GIS lab at UMFK is located in the Armory room A121 and is available to you. Currently, the lab is available on Thursday after noon. Some Friday afternoons are available in the first half of the semester. If you wish to use the lab, bring a thumb drive with a copy of the lab data on it. Save all of your work to the thumb drive. Do not use the computer C drive or everything will be lost.

**4. ACADEMIC HONESTY.** It is critical that all of the work that you submit be your own. Cheating, helping others on quizzes or exams, and using the words or ideas of another without properly crediting them, are examples of academic crimes that would result in course failure. Be familiar with the "Student Academic Integrity Policy" (a.k.a. plagiarism policy) available on page 15 of the *Student Handbook* on-line at http://www.umfk.edu/pdfs/studserv/studhndbk.pdf Ask me if you have questions about a particular practice.

**5. EVALUATION AND GRADING.**

| Evaluation Tools | Value | Grade 90-100% = A | 70-72% = C- |
|---|---|---|---|
| Weekly Quiz & Assignment (~10 pts/wk.) | 120 | 87-89% = B+ | 67-69% = D+ |
| Embedded Assignments | 70 | 83-86% = B | 63-66% = |
| Exams (mid-term and final) | 100 | 80-82% = B- | 60-62% = D- |
| Laboratory Exercises (10 pts each) | 120 | 77-79% = C+ | <60% = F |
| Total | 410 points | | 73-76% = C |

Your grade is based on a percentage of what you earn relative to the total possible points (points earned divided by the total possible points).

**6. CONTACT INFORMATION AND TECHNICAL ASSISTANCE.**

BlackBoard Questions:

Contact Logan at 834-7560 or logan.oclair@maine.edu

Help Uploading Software:

Contact Arthur at 834-7809, or
umfkit.support@maine.edu

Course Content/GIS Software Questions:

Dave Hobbins, UMFK, Nadeau Hall Room 234,

23 University Drive, Fort Kent, Maine. 04743
Office Hours: Monday and Thursdays 2:00-4:00 p.m. (834-7614)
e-mail dhobbins@maine.edu (use Blackboard or put PSA122 in the subject line of your e-mail system)
Other Information: www.umfk.maine.edu/distance/default.cfm

**COURSE OUTLINE and SCHEDULE: (required reading assignments from** Davis, 2001.)

| Week of | Topics |
|---|---|
| 8/29 | Introduction<br>- View the "Intro Video" - intro to course and syllabus (getting ready)<br>- Read Law/Collins Chapter 1 and Chapter 2.<br><br>Prep Quiz: Questions on Syllabus **(no later than 9/5)** |
| | Prep Lab: Complete the Prep Lab exercise **(due date 9/5).**<br>Submit your report in the *Submit Assignments* menu in Blackboard. |
| 9/5 | UNIT 1: What Is GIS? - An Introduction to Geographic Information Systems<br>**(Davis Chapter 1 and glossary)**<br>-unit 1a: definition, history, importance<br>-unit 1b: components of GIS<br>-unit 1c: example applications<br><br>Due: Unit 1 Quiz: What is GIS? And **embedded assignment (before 9/12)** |
| | Lab 1: Download the Lab 1 supplementary notes and<br>Complete Law/Collins Chapters 3 and 4, Exploring ArcGIS. **(before 9/12)** |
| 9/12 | UNIT 2: What is Geography? - How to Think Like a Geographer.<br>Understanding geographic concepts and applying them to public safety applications and crime analysis **(Davis pages 130-135)**<br>-unit 2a: spatial concepts, coordinate systems<br>-unit 2b: projections<br>-unit 2c: orientation, scale, place and space<br><br>Due: Unit 2 Quiz: What is Geography? And **embedded assignment (before 9/19)** |
| | Lab 2: Download the Lab 2 supplementary notes and<br>Complete Law/Collins Chapters 7 and 8 - Displaying Data **(due 9/19)** |
| 9/19 | UNIT 3: GPS.Where Am I? Intro to global positioning systems. **(Davis p. 123-126)**<br>-unit 3a: GPS concepts<br>-unit 3b: data collection basics<br>-unit 3c: application of GPS and associated technologies in public safety<br>-unit 3d: mapping-grade GPS demonstration video<br><br>Due: Unit 3 Quiz: GPS And **embedded assignment (before 9/26)** |
| | Lab 3: Download the Lab 3 supplementary notes and<br>Complete Law/Collins Chap 9 & 15 on Data Labels and Queries **(due 9/26)** |
| 9/26 | UNIT 4: Raster and Vector Data Formats - **(Davis Chapter 3)**<br>-unit 4a: data structure, raster data, data encoding |

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| | -unit 4b: raster coding problems<br>-unit 4c: vector data format, comparisons<br><br>Due: Unit 4 Quiz and **embedded assignment (before 10/3)** |
| | Lab 4: Download the Lab 4 supplementary notes and<br>Complete Law/Collins chapters 16 & 17 on Joins and Selection. **(due 10/3)**<br>I recommend you get it done before the break and then you can relax. |
| 10/3 | UNIT 5: Data Types and Data Sources - **(Davis Chapter 5)**<br>Where Can I Find Data?<br>-unit 5a: maps, tables, report, charts, GPS<br>-unit 5b: remote sensing, aerial photography<br>-unit 5c: satellite data<br>-unit 5d: applications in public safety<br><br>Due: Submit your **embedded assignment (before 10/10)** |
| | Lab 5: Download the Lab 5 supplementary notes and<br>Complete Law/Collins chapters 18 & 19 on Data Analysis. **(due 10/10)** |
| 10/10 | UNIT 6: View the GIS FILM *"The World in A Box."*<br>READ the Questions before viewing. Submit answer to questions before **10/17.**<br><br>**Mid-term Exam (due date 10/17) This exam includes the material from unit 5.** |
| 10/17 | UNIT 7: GIS in Emergency Management (read Cova, 1999 and Ertug-Gunes, 2000)<br>-unit 7a: Brief Introduction<br>-unit 7b: Phases<br>-unit 7c: Definitions<br>-unit 7d: Preplanning<br>-unit 7e: Hazards<br>-unit 7f: Information Infrastructure<br>-unit 7g: Conclusions<br><br>Due: Unit 7 Quiz on Emergency Mgnt **And embedded assignment (before 10/24)** |
| | Lab 7: Complete the Data Sources Lab **(due date 10/24)** |
| 10/24 | UNIT 8: How Good Is My Data? **(Davis Chapter 6)**<br>-unit 8a: data quality defined, components<br>-unit 8b: data quality components continued<br>-unit 8c: lineage, sources of error, ambiguity and uncertainty |

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| | Due: Unit 8 Quiz on Data Quality **And embedded assignment (before 10/31)** |
| | Lab 8: Download the Lab 8 supplementary notes.<br>Complete Law/Collins Chapter 14 on Geocoding. **(before 10/31)** |
| 10/31 | UNIT 9: Making The System Work - The Spatial Database **(Davis Chaps. 2 & 4)**<br>-unit 9a: the spatial database<br>-unit 9b: topology, the relational database model<br>-unit 9c: the object oriented database, db design, db operations<br><br>Due: Unit 9 Quiz on Spatial Database **And embedded assignment (before 11/7)** |
| | Lab 9: Complete the Emergency Management Data Sources Lab **(due date 11/7)** |
| 11/7 | UNIT 10: Understanding Data– Data Classification **(Davis p. 364-73, Boba p. 52-66)**<br>-unit 10a: definitions, why classify, aggregation, ecological fallacy, MAUP<br>-unit 10b: classification methods, misclassification, misrepresenting data<br><br>Due: Unit 10 Quiz on Classification **And embedded assignment (before 11/14)** |
| | Lab 10: Complete Flooding Analysis & Damage Assessment Lab **(before 11/14)** |
| 11/14 | UNIT 11: How To Communicate With a Map<br>**(Chapter 11; read the article)**<br>-unit 11a: basic map elements, cartographic design, composition, symbolization<br>-unit 11b: "cartographic pitfalls"<br>-unit 11c: example crime maps (using Velasco pp. 10- 30)<br><br>Due: Unit 11 Quiz on Cartography **And embedded assignment (before11/21)** |
| <br><br><br>11/21 | Lab 11: Download the Lab 11 supplementary notes and<br>Complete Law/Collins chapters 18 & 19 on presenting data. **(before 11/21)**<br><br>Thanksgiving Recess – no homework! |
| 11/28 | UNIT 12: Brief Intro to Crime Mapping & Police Applications<br>**(read the Boba article)**<br>-unit 12a: geography and crime, history of crime mapping, and application areas<br>-unit 12b: hotspot mapping<br>-unit 12c: case studies<br><br>Sue: Unit 12 Quiz on Crime Mapping **And embedded assignment (before 12/5)** |
| | Lab 12: Complete the Accident and Crime Database Lab **(due date 12/5)** |
| 12/5 | UNIT 13: Applications and End Notes.<br>-unit 13a: GIS Use by the Maine Forest Service. (tentative)<br>Guest: Joe Mints (Forest Ranger, Maine Forest Service)<br>-unit 13b: Issues in GIS and GPS relative to Public Safety<br>and closing comments<br>**(Davis pages 412-422, 177-179, 187-189)**<br><br>Due: Unit 13 Questions. Submit typed answers to questions. **(due 12/12)** |

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| | **Study for final exam.** |
| 12/12 | **Final Exam (due before 12/12 midnight)**<br><br>Complete the course evaluation. Your input is critical to the improvement of this course. Please provide honest and constructive criticism.<br>Thank you.<br><br>Final grades will be posted by Friday 12/16. |