

# Course Syllabus

## Pedology (SOCR 440)

Fall 2018

Lecture: PL SCI W212; Recitation: Walnut 108

### Instructor and Teaching Assistant Contact Information

**Instructor:** Suellen Melzer, Ph.D.  
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**Office Location/ Hours:** C-019 PL SCI/ M,W,F 12:00-1:00; open door policy or by appointment

### Course Description

Pedology is the branch of soil science that addresses soils, their properties, origins, distribution and occurrence on the landscape, as well as their evolution through time. It is the study of soils as naturally occurring phenomena taking into account their composition, distribution and method of formation (Schaetzl & Anderson 2005). This is a 4-credit hour senior level course emphasizing soils as a natural component of ecosystems and will focus on the process of soil formation, characterization, classification, and soil survey methods.

### General Course Objectives & Outcomes

Upon successful completion of this course students shall have insight into the complex relationships of the soil ecosystem by understanding soil forming factors and pedological processes and properties.

Specifically, the students should be able to:

1. identify and properly describe the morphological characteristics/properties of soil profile development in the context of external factors and internal processes.
2. technically interpret and judge the soil for classification and land use recommendations.
3. assess the landscape-scale distribution of soils as a function of factors and processes.
4. distinguish soil-landscape patterns and geomorphology to make predictions about soil properties.

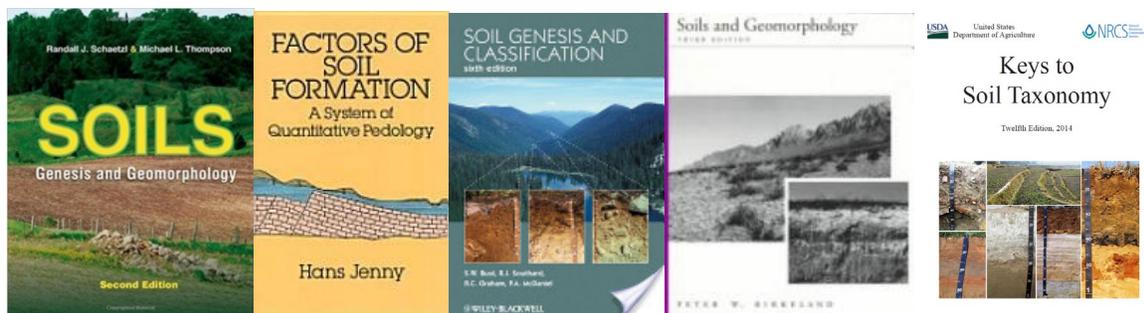
### Course Materials

#### *Required Texts:*

1. Schaetzl R.J. and Thompson, M.L. (2015) Soils: Genesis and Geomorphology. 2<sup>nd</sup> edition. Cambridge University Press, 778p. (ISBN: 13 978-1107016934)
2. Jenny H. (1994) Factors of Soil Formation: A System of Quantitative Pedology. Dover Publ. Inc., New York 281p. (ISBN: 0-486-68128-9).  
<http://www.soilandhealth.org/01aglibrary/010159.Jenny.pdf>

#### *Reference Texts:*

3. Buol S.W., Southard R.J., Graham R.C., and McDaniel P.A. (2008) Soil Genesis and Classification. 5<sup>th</sup> edition. Wiley, John & Son Inc. 483p. (ISBN: 0813828732)
4. Birkland P.W. (1999) Soils and Geomorphology. Oxford University Press. 430p. (ISBN: 0195078861)
5. United States Department of Agriculture Natural Resources Conservation Service (2014) Keys to Soil Taxonomy by Soil Survey Staff. 12<sup>th</sup> edition. 360p.  
[http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/nedc/training/soil/?cid=nrcs142p2\\_053580](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/nedc/training/soil/?cid=nrcs142p2_053580)



6. Amundsen, R. and H. Jenny, 1991. The place of humans in the state factor theory of ecosystems and their soils. *Soil Science*, 151-1, p. 99-109.

### Methods of Instruction

This is a 4-credit hour course that will meet M, W, F. Two hours per week will be spent in class learning course material, three hours per week will be spent in the field for hands on learning, and 1 hour per week will be spent in recitation for more in-depth clarification/ reviews and quizzes. Tests are included in the 6 hours/week dedicated to this class. However, chapter readings, course assignments, and final project are homework and require time spent outside of class. Students are responsible for regularly reviewing the course schedule and completing all required assignments. There will be:

Assessment	Graded Points	Percent of Final Grade
Unit Exams (2 @ 150 pts. ea.)	300	30
Laboratory Assignments (9 @ 40 pts. ea.)	360	36
Group Project (1)	150	15
Unit Assignments (2 @ 70 pts. ea.)	140	14
Quizzes (5 @ 10 pts. ea.)	50	5
<b>Total</b>	<b>1000</b>	<b>100%</b>

Grading Scale			
Grades	Percentage		
Grade = A	90-100+%	Grade = B	80-89%
Grade = C	70-79%	Grade = D	60-69%
Grade = F	59% and below		

### Course Schedule and Assignments

**Quizzes** – There will be 5 quizzes worth 10 points each and you will be allotted 15 minutes to complete each. Quizzes will be administered during the recitation hour of the selected weeks.

**Exams** – There will be 2 unit exams worth 150 points each. They may be formatted as multiple choice, short answer, fill in the blank, labeling diagrams and essay.

**Assignments** – Access and submit assignments using the assignments tool in Canvas on the appropriate due date. Instructions and grading of assignments will be provided per assignment.

- *Assignment #1 – Interview (DUE Sunday, Sept. 9<sup>th</sup>) (7%)*

First, please read Amundson, R. “Soil preservation and the future of Pedology” available in your Canvas folder. Then, conduct a brief interview of two separate members of the community with different occupations (e.g. engineer, water treatment plant worker, miner, scientist/professor, etc.). The interview should include ~5-8 questions each. Please submit your interview questions with responses and follow with a summary paragraph comparing and contrasting the perspectives

of your interviewee's on the importance of soil. Include a second paragraph relating these perspectives to those highlighted in your reading of the article by Amundson.

- *Assignment #2 – Mass Balance (Started in class on Nov. 14th and DUE Sunday, Nov. 18<sup>th</sup>) (7%)*  
Read, Chadwick O.A., Brimhall G.H., and Hendricks D.M. (1990) From a black to a gray box- a mass balance interpretation of pedogenesis. *Geomorphology* 3: 369-390, and any other supporting material in your text or elsewhere (Chiquet et al.) to help you interpret and examine the mass balance analysis provided to you. Compare and contrast your interpretation of these two profiles by creating depth-plots for strain and for transport (T<sub>j,w</sub>) of 3 different elements (e.g. Fe, K, Ca) of your choice. Note that the two locations are in Colorado, from Fraser Experimental Forest (FEF) and the Shortgrass Steppe (SGS). What do these data (e.g. plots) tell you about the soil processes occurring at these two sites with regard to your three chosen elements? How is the elemental cycling within the depth of the soil influenced by weathering losses, atmospheric inputs, and the overlying vegetation?

**Laboratories** – There will be 9 laboratories consisting of primarily field excursions and a few indoor exercises. Field reports written for assessment of the field excursions **MUST be written and submitted in Canvas as a WORD** document and will be graded according to the rubric below (also found separately in Canvas). Field lab reports will be **DUE the Sunday (midnight) following the respective M/ W lab periods**. The following is a guideline of how to format your report:

1. Name, Date, Location and Title (representing/describing the theme of the field trip).
2. Introduction
3. Body: Include pictures to guide the following discussion
  - Accurate descriptions of what you observed on the trip, in your own words (be specific).
  - Clear explanations of the scientific concepts and principles illustrated by what you observed.
  - An explanation of what you found scientifically valuable and informative about the trip, in your own words. Incorporate questions posed on working sheets into your explanation.
4. Conclusion/Summary
5. Other guidelines: 1-2 pages double spaced, 11 point, Arial Font...although I am far more interested in clarity of writing and accuracy of concepts than in length

Indicators of Effective Content	Pedology Field Trip Report Rubric			
	Accomplished (40-36 points)	Competent (35-32 points)	Developing (31-28 points)	Beginning (27-24 points)
<b>Science content/ field notes</b>	All topics are addressed and all questions answered. Student demonstrates superior knowledge of required content and uses professional terminology.	All topics are addressed and most questions answered. Student demonstrates strong knowledge of required content and mostly uses terminology appropriately.	Most topics are addressed, and some questions answered. Student demonstrates general knowledge of required content and sometimes uses terminology correctly.	One or more topics were not addressed. Student does not demonstrate knowledge of content, does not have knowledge of terminology, and does not fulfill assignment tasks.
<b>Quality of information</b>	Information clearly relates to the main topic. It includes several supporting details and/or examples. Student weaves together experiences with information studied in class.	Information clearly relates to the main topic. It provides 1-2 supporting details and/or examples. Student occasionally links experiences with information studied in class.	Information clearly relates to the main topic. No details and/or examples are given. Student make no clear connections between experiences and information studied in class.	Information has little or nothing to do with the main topic. No examples are provided. Student shows no connection between experience and classroom information.
<b>Organization/ Format (see syllabus)</b>	Information is very organized with well-constructed paragraphs and subheadings. Student demonstrates superior knowledge of using word processing software.	Information is very organized with well-constructed paragraphs. Student demonstrates a competent level of knowledge of using word processing software.	Information is basically organized, but paragraphs are not well-constructed. Student makes number of mistakes with word processing.	The information is disorganized. There is not clear paragraphing nor links between topics. Student does not demonstrate knowledge of using word processing.
<b>Mechanics</b>	No grammatical, spelling or punctuation errors. Student has clear command of language and standard American English and conventions.	Almost no grammatical, spelling or punctuation errors. Student mechanics demonstrate basic knowledge of standard American English and conventions.	A number of grammatical, spelling or punctuation errors. Student writing is difficult to follow in many areas. Knowledge of standard American English is not at a competent level.	Many grammatical, spelling or punctuation errors. Student writing is problematic and does not demonstrate any clear implementation of standard American English.
<b>Participation</b>	Completed appropriate number of hours and demonstrated overall focus.	Completed almost all hours and demonstrated moderate focus.	Missed hours of observation, but recapped with group.	Missed hours of observation.
<b>Timely</b>	Appropriate submission format and timely.	Report submission format was followed, but was 1 day late.	Report submission format was followed, but was >1 day late.	Report was not submitted following guidelines and was late.

**Final Project** – The final course project is to collect (field/lab, 25 pts), analyze (25 pts) and present (100 pts) data from Rist Canyon given a chosen question/hypothesis. Other raw data sets or mined data will be used depending on group’s proposed question. Data will be compiled into a provided handbook with leading questions. Completion and submission of handbook is *DUE Friday, Nov. 30<sup>th</sup>*. Presentation of work will be in the form of a powerpoint presentation that is *DUE Friday, Dec. 7<sup>th</sup>* and given to the class during the final week of class and during exam week (if necessary). This is a group (groups of 3) exercise worth 150 points. Details will be provided.

### Course Attendance and Participation Policy

Regular, active, and meaningful participation in learning activities is a critically important component of this course and is essential to your success. Frequency and quality of participation may affect your grade.

- **Participation:** Active participation is expected of all students in this course.
- **Attendance Policy:** Please familiarize yourself with CSU's Attendance Policy.  
<http://catalog.colostate.edu/general-catalog/academic-standards/academic-policies/>

Read and refer to this document regularly. It will tell you what assignments you should complete, and how and when you will be assessed.

Week	Lecture Topics	Laboratory & Field Trips	Assignments & Assessments
<b>Week 1:</b> Aug 20 <sup>th</sup> -26 <sup>th</sup>	<ul style="list-style-type: none"> <li>• Introduction to Pedology</li> </ul>	NO LAB/FIELD	<b>Read 1:</b> ch 1-3
<b>Week 2:</b> Aug 27 <sup>th</sup> -Sept 2 <sup>nd</sup>	<ul style="list-style-type: none"> <li>• Soil morphology</li> </ul>	<i>Lab:</i> Morphology <sup>(#1)</sup>	<b>Read 1:</b> ch 7 <b>Complete:</b> <ul style="list-style-type: none"> <li>• Lab #1 (<i>Due Aug 31<sup>st</sup> in recitation</i>)</li> </ul>
<b>Week 3:</b> Sept 3 <sup>rd</sup> -9 <sup>th</sup>	<ul style="list-style-type: none"> <li>• No class Monday/ Labor Day</li> <li>• Soil classification</li> </ul>	NO LAB/FIELD	<b>Complete:</b> <ul style="list-style-type: none"> <li>• Quiz 1</li> <li>• Assign 1: Interview (<i>Due Sept 9<sup>th</sup> 11:59 pm</i>)</li> </ul>
<b>Week 4:</b> Sept 10 <sup>th</sup> -16 <sup>th</sup>	<ul style="list-style-type: none"> <li>• No F2F class Monday-meet online</li> <li>• Soil composition/ mineralogy</li> </ul>	<i>Field:</i> Ardec & Carr <sup>(#2 &amp; 3)</sup>	<b>Read 1:</b> ch 4, 9 <b>Complete:</b> <ul style="list-style-type: none"> <li>• Lab #2/3: Report (<i>Due Sept 16<sup>th</sup> 11:59 pm</i>)</li> </ul>
<b>Week 5:</b> Sept 17 <sup>th</sup> -23 <sup>rd</sup>	<ul style="list-style-type: none"> <li>• Soil chemistry</li> <li>• Soil weathering</li> </ul>	<i>Field:</i> Masonville <sup>(#4)</sup>	<b>Read 1:</b> ch 9,10,11 <b>Complete:</b> <ul style="list-style-type: none"> <li>• Quiz 2</li> <li>• Lab #4: Report (<i>Due Sept 23<sup>rd</sup> 11:59 pm</i>)</li> </ul>
<b>Week 6:</b> Sept 24 <sup>th</sup> –Sept 30 <sup>th</sup>	<ul style="list-style-type: none"> <li>• Soil Geomorphology</li> </ul>	<i>Field:</i> PLC, Greeley <sup>(#5)</sup>	<b>Complete:</b> <ul style="list-style-type: none"> <li>• Quiz 3</li> <li>• Lab #5: Report (<i>Due Sept 30<sup>th</sup> 11:59 pm</i>)</li> </ul>
<b>Week 7:</b> Oct 1 <sup>st</sup> -7 <sup>th</sup>	<ul style="list-style-type: none"> <li>• Pedogenic processes</li> <li>• Exam Review</li> </ul>	<i>Field:</i> Rist Canyon; <b>Final Project, Part I: <u>Field Data Collection</u> (no official lab report this week)</b>	<b>Read 2:</b> ch 6, 7 <b>Complete:</b> <ul style="list-style-type: none"> <li>• Final project: field data</li> <li>• Final project topic development and prep samples for moisture (<i>in recitation</i>)</li> </ul>

<b>Week 8:</b> Oct 8 <sup>th</sup> -14 <sup>th</sup>	<ul style="list-style-type: none"> <li><b><u>Exam Oct. 8<sup>th</sup> (Mon)</u></b></li> </ul> Models of Soil Formation 1) Climate	Lab: Climosequence <sup>(#6)</sup>	<b>Read 1:</b> ch 11 <b>Read 2:</b> ch 1,4 <b>Complete:</b> <ul style="list-style-type: none"> <li>Lab #6: worksheet (Due Oct 14<sup>th</sup> 11:59 pm)</li> </ul>
<b>Week 9:</b> Oct 15 <sup>th</sup> -21 <sup>st</sup>	Models of Soil Formation 2) Organisms	Field: CPER, Nunn Chronosequence <sup>(#7)</sup> (Optional: collect samples)	<b>Read 2:</b> ch 5, 3 <b>Complete:</b> <ul style="list-style-type: none"> <li>Quiz 4</li> <li>Lab #7: Report (Due Oct 21<sup>st</sup> 11:59 pm)</li> </ul>
<b>Week 10:</b> Oct 22 <sup>nd</sup> -28 <sup>th</sup>	Models of Soil Formation 3) Parent Material	Field: Environmental Learning Center—Final field assessment <sup>(#8)</sup> (Optional: collect samples)	<b>Read 7</b> <b>Complete:</b> <ul style="list-style-type: none"> <li>Lab #8 (Due Oct 28<sup>th</sup> 11:59 pm or in class Monday)</li> </ul>
<b>Week 11:</b> Oct. 29 <sup>th</sup> – Nov 4 <sup>th</sup>	4) Topography 5) Time	Class Ex Lab: Toposequence <sup>(#9)</sup>  Lab: <ul style="list-style-type: none"> <li>% moisture; prep for %om and texture</li> <li>Project topic &amp; refs due</li> </ul>	<b>Complete:</b> <ul style="list-style-type: none"> <li>Quiz 5</li> <li>Lab #9 (Due Nov 4<sup>th</sup> 11:59 pm)</li> </ul>
<b>Week 12:</b> Nov 5 <sup>th</sup> -11 <sup>th</sup>	6) Humans  Guest Lecture- NRCS (Wednesday)	Lab: Particle size distribution, pH, and BD	<b>Read 1:</b> Ch 15
<b>Week 13:</b> Nov 12 <sup>th</sup> -18 <sup>th</sup>	<b><u>Distribute Exam Nov. 12<sup>th</sup> (Mon)</u></b> <ul style="list-style-type: none"> <li>Mass Balance</li> </ul>	Library Rm.xxx- Final Project: Data Analysis	<b>Complete:</b> <b>Read</b> Chadwick 1990 <ul style="list-style-type: none"> <li>Assign 2: Mass Balance (Due Nov 18<sup>th</sup> 11:59 pm)</li> </ul> Final Project: Prelim abstract and data plots (Due Nov 18 <sup>th</sup> 11:59 pm)  <b><u>No Recitation</u></b>
<b>Week 14:</b> Nov 19 <sup>th</sup> -25 <sup>th</sup>	FALL BREAK 	FALL BREAK 	
<b>Week 15:</b> Nov 26 <sup>th</sup> – Dec 2 <sup>nd</sup>	Submit exams hard copy (Mon) <ul style="list-style-type: none"> <li>Land/soil judging</li> </ul>	Library Rm.xxx- Final Project: Presentation Preparation	<b>Complete:</b> <ul style="list-style-type: none"> <li>Submit completed fieldtrip project handbook (Due Nov 30<sup>th</sup> 11:59 pm)</li> </ul>
<b>Week 16:</b> Dec 3 <sup>rd</sup> -7 <sup>th</sup>	<ul style="list-style-type: none"> <li>Exit evaluation</li> <li>Final project presentations</li> </ul>	Final project presentations	<b>Complete:</b> <ul style="list-style-type: none"> <li>Final project presentations (Due Dec 7<sup>th</sup> 11:59 pm)</li> </ul>

\*\* Lab days will be held in PI Sci W001

## Grading and Exam Policy

Everyone will receive access to exams and Assignments on the same day. I encourage you to make your best effort to submit all assignments and exams on time, but I understand that sometimes circumstances arise that are beyond your control.

- **Late Submissions**
  - Plan ahead. This syllabus lists all of the course assessments.
  - 10% of the work is deducted per day it is late up to 4 days at which time it will receive a zero. Note that computer problems are not a valid excuse for late work
  - There will be no makeup assignments available for missed field labs
- **Make-up Exam Policy**
  - Make-up quizzes/exams will be permitted only under extenuating circumstances and only with prior notification and documentation (university excuse, original funeral notice, doctor note, etc.).
  - Students that miss an exam due to illness, family emergencies, or other University approved excuses will be able to make up exams by special arrangement
  - The instructor reserves the right to create alternate make-up exams for students who are not able to take the scheduled, on-campus exams.
  - Students who use alternative testing at RDS can contact me prior to the exam to make arrangements and sign applicable paperwork.
  - Please contact me ASAP if you miss an exam (preferably the day of the exam)
- **View your Grades**
  - Grades for assignments and quizzes will be posted within 2 weeks of CSU's working days of the closing date of the assignment.
  - Grades for exams will be posted on Canvas within 1 week of CSU's working days.

## Other Policies and Procedures

**Special Needs** - Students having special needs as defined by the Americans with Disabilities Act should:

- Notify the Office of Disability Services early in the term. It is the student's responsibility to contact the Disability Support Office to document disability prior to receiving services.
- Notify the instructor after you have contacted the Office of Disability Services to discuss what reasonable accommodations would be appropriate for your situation.

### Need Help? Rams Take Care of Rams

- Reach out and ask for help if you or someone you know is having a difficult time. Always feel free to come and talk to me; I will always make myself available to help connect you with any resources you need. CSU is a community that cares for you. If you are struggling with drugs or alcohol and/or experiencing depression, anxiety, overwhelming stress or thoughts of hurting yourself or others please know there is help available. Counseling Services has trained professionals who can help. Contact 970-491-6053 or go to <http://health.colostate.edu>. If you are concerned about a friend or peer, tell someone by calling 970-491-1350 (or visit <http://safety.colostate.edu/tell-someone.aspx>) to discuss your concerns with a professional who can discreetly connect the distressed individual with the proper resources. Rams take care of Rams.

### Academic Honesty:

**This course will adhere to the Academic Integrity Policy {Section 1.6} of the Colorado State University General Catalog, the Student Conduct Code, and University Principles of Community.**

- Student Conduct Code: <http://www.conflictresolution.colostate.edu/conduct-code.aspx#conduct>
- Colorado State University General Catalog: <http://www.catalog.colostate.edu/>
- Each student's work must be the result of his/her own thought, research, or self-expression.
- Cheating includes, but is not limited to: copying the work of another person (plagiarism) or permitting your work to be copied by another person, discussing test answers or questions with people who have not completed the test, possessing course materials that have not been formally

released to students in the course, and collaborating on the completion of assignments not specifically designated in the syllabus as being group projects".

- Cheating will be considered a breach of CSU's Code of Conduct Policy and may result in academic penalties (zero points on the assignment/test in question, a failing grade for the course), disciplinary action, and/or a referral to the Dean of Student Affairs. Examples 1) If it appears that two or more students have submitted the same material for any solo assignments, each student involved will receive zero points for that assignment. 2) If it appears that a student has copied published material (e.g. Internet sites), the student will receive zero points for that assignment.

### **Critical Event Procedure**

- In the event of a school closing due to weather or other major event that might impact class schedules, the instructor will post an announcement indicating what changes, if any, the event will have on the course schedule and due dates.

### **Copyright**

- **The materials used in this course may be protected by copyright and are only for the use of students enrolled in this course for the purposes associated with this course and may not be retained or further disseminated.**

### **Changes to the Syllabus**

- The instructor reserves the right to make changes to this syllabus. In the event that changes become necessary, students will be notified in class and through Canvas.

### **Student Success Tips**

In order to be successful in this course, you need to be organized and manage your time well so that you can complete all assessments on time. Make sure that you do not allow yourself to procrastinate, and that you communicate with the instructor or your classmates if you have any questions on any course materials or need assistance completing any assignments.

### **Principles of Community**

In this course we strive to follow and extend Colorado State's University's Principles of Community, and welcome spirited discussion, lively debate and pursuit of knowledge in a manner that respects each of us as individuals.

The Principles of Community support the Colorado State University mission and vision of access, research, teaching, service and engagement. A collaborative and vibrant community is a foundation for learning, critical inquiry, and discovery. Therefore, each member of the CSU community has a responsibility to uphold these principles when engaging with one another and acting on behalf of the University.

**Inclusion:** We create and nurture inclusive environments and welcome, value and affirm all members of our community, including their various identities, skills, ideas, talents and contributions.

**Integrity:** We are accountable for our actions and will act ethically and honestly in all our interactions.

**Respect:** We honor the inherent dignity of all people within an environment where we are committed to freedom of expression, critical discourse, and the advancement of knowledge.

**Service:** We are responsible, individually and collectively, to give of our time, talents, and resources to promote the well-being of each other and the development of our local, regional, and global communities.

Social Justice: We have the right to be treated and the responsibility to treat others with fairness and equity, the duty to challenge prejudice, and to uphold the laws, policies and procedures that promote justice in all respects.

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**Classroom Etiquette**

No animals are allowed in the classroom except those defined in the CSU policy regarding SERVICE animals (see pages \_\_\_\_\_ of this syllabus). No emotional support animals are allowed in class.

Please silence your phone and other electronic devices during class.

Please be quiet while in class. It can be difficult to hear in a large classroom and even quiet talking can be very disruptive to other students who are trying to listen.

Please do not read newspapers, text, play games, or listen to music during class. It may not impact your learning experience, but it is distracting to others in the room.

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