

**MINE 427 Coal Preparation**  
**The Department of Mining Engineering**  
**Statler College of Engineering and Mineral and Energy Resources**  
**West Virginia University**

**Syllabus 2015**

<b>Course:</b>	MINE 427 Coal Preparation
<b>Semester:</b>	Spring Semester
<b>Course Format and Credit Hour:</b>	4 cr. hrs (Lecture 3 cr hr + Lab 1 cr hr)
<b>Prerequisites:</b>	CHEM 115, MATH 251 (grade C or better), MINE 261
<b>Instructor:</b>	Felicia Peng 401 Evansdale Drive, 359F Mineral Resources Bldg, the Department of Mining Engineering, CEMR, WVU 304-293-7680, <a href="mailto:ffpeng@mix.wvu.edu">ffpeng@mix.wvu.edu</a>
<b>Office Hours:</b>	Open door policy, or by Appointment
<b>Schedule:</b>	Monday 12:30 to 1:45 P.M. for Lecture; Wednesday 12:30-1:45 P.M. for lecture and/or 12:30 t-15:45 P.M. for experiment and/or computer lab. <b>Notes:</b> 1) Due to the limited lab space, human resources, instrument, and equipment, for better working efficiency, some of the groups might be scheduled in different date and time for experiment (lab), based on their course schedules. 2) Date and Time for Experiment or computer labs will be announced in class.
<b>Locations:</b>	Monday: MRB 109 for lecture. Wednesday: MRB 109 for lecture/Exp lecture. Experiment (lab) will be at MRB 157, 157B, 159, and 254. Computer lab will be at MRB 243.
<b>Objectives:</b>	This course provides the students the principles of coal characterization, size reduction, coal washability, classification, concentration, de-watering / filtartion, thickening. In addition, the knowledge of market specifications, environmental constrains, as well as the methods of coal preparation plant flowsheet design, and Material/water balances, tailings disposal will also be included.
<b>Expected learning Outcomes:</b>	Upon successful completion of this course, the students will 1. be able to apply the knowledge of mathematics, science, and engineering in Upon successful completion of this course, the students will understanding the principles of physical and surface property based separation methods for the mineral and ore concentration processing. 2. be able to recognize the need for, and an ability to engage in life-long learning. 3. have the ability to design and conduct experiments, as well as to analyze and interpret data through mineral processing and data analysis of data obtained. 4. acquire the knowledge of contemporary issues. 5. have the ability to use the techniques, skills, and modern engineering tools

	<p>necessary for engineering practice.</p> <ol style="list-style-type: none"> <li>6. have the understanding the professional and ethical responsibility.</li> <li>7. have the ability to function, and work as the team.</li> <li>8. have the ability to design a coal preparation system, and/or process to meet the desired needs.</li> </ol>
<b>Required Texts:</b>	Coal Preparation, F. F. Peng, (2014, 2015), DocuPrint, Morgantown, WV.
<b>References:</b>	<ul style="list-style-type: none"> <li>o Coal Preparation, 5th ed. (1991), ed. by J. W. Leonard, SME, Littleton, CO.</li> <li>o "Washability Data Analysis," in Coal Preparation, 4th ed. (1979) by J.W. Leonard, SME, Englewood, CO.</li> <li>o Annual Book of ASTM Standards, Vol. 05.05 Gaseous Fuels; Coal and Coke.</li> </ul>
<b>Topical Areas:</b>	<ul style="list-style-type: none"> <li>• Objectives of coal cleaning, market specifications, environmental constrains, modes of transportation</li> <li>• Coal classification by ranks, coal seams, coal analysis methods and characterization</li> <li>• Size distribution, washability data analysis and interpretations</li> <li>• Classification and concentration</li> <li>• Evaluation of separation performance for coal sizing and cleaning</li> <li>• Hydrophobicity and froth flotation of fine coal</li> <li>• Dewatering, filtration, flocculation and thickening; tailings disposal, water recirculation, storage and material handling facilities</li> <li>• Experiment test results and computer lab for data analysis will be provided to obtain the required data for coal preparation plant flowsheet design.</li> </ul>
<b>Experiments and Computer Labs:</b>	<p>Exp#1 Prepare representative coal samples, fuel analysis and characterization</p> <p>Exp#2 Sieving, size distribution and model</p> <p>Exp#3 Float-sink (washability) analysis</p> <p>Comp Lab#1 Washability data analysis</p> <p>Comp Lab#2 Evaluation of separation performance of a concentrator, yield and qualities</p> <p>(Note: For Comp Lab#1 and #2, some experiment data will be provided for the data analysis due to time constrains).</p> <p>Exp#4 Froth flotation of fine coal, and flotation rate model</p> <p>Exp#5 Flocculation, thickener design or filtration unit design.</p>
<b><i>“NO FOOD ARE ALLOWED IN ANY COMPUTER AND LABORATORY FACILITIES”</i></b>	
<p><b>Process Flowsheet Development, Mass Balances for Coal Preparation Plant Design Project:</b></p> <p>Using the data obtained from the experiments and provided data, the students will analyze the data for coal preparation plant flowsheet and surface facilities design. The plant will be designed based on the initial plant feed rate of 1800 tph. Each student will create and configure a coal preparation plant flowsheet using Auto CAD, word processing, spreadsheet for data analysis, Civil Suite (SurvCAD) and/or other computer software tools to create the plant flowsheet, perform material balance calculations, describe the mass and liquid flowing through the plant and surface facilities.</p> <p>Additionally, document and store the supporting calculation data, analyzed data, tables, and charts (graphs) for completion of coal plant design will be included in the write up of a coal preparation plant</p>	

<p>project report. All the efiles including coal preparation plant flowsheet with materials balances, should be stored in a CD, which should be attached to the hard copy of the plant design project report.</p>													
<b>Grading:</b>	<table border="1"> <tr> <td>Attendance, textbook, and plant field trip and report</td> <td>10%</td> </tr> <tr> <td>Home Works 15%</td> <td>15%</td> </tr> <tr> <td>Experiment Reports 15%</td> <td>15%</td> </tr> <tr> <td>Process Plant Design Project Report 15%</td> <td>15%</td> </tr> <tr> <td>Exam 1 (10%), Exam 2 (15%), Exam 3 (20%) and quizzes as needed</td> <td>45%</td> </tr> <tr> <td style="text-align: right;">Total</td> <td>100%</td> </tr> </table>	Attendance, textbook, and plant field trip and report	10%	Home Works 15%	15%	Experiment Reports 15%	15%	Process Plant Design Project Report 15%	15%	Exam 1 (10%), Exam 2 (15%), Exam 3 (20%) and quizzes as needed	45%	Total	100%
Attendance, textbook, and plant field trip and report	10%												
Home Works 15%	15%												
Experiment Reports 15%	15%												
Process Plant Design Project Report 15%	15%												
Exam 1 (10%), Exam 2 (15%), Exam 3 (20%) and quizzes as needed	45%												
Total	100%												
<b>Grade Assignment:</b>	<table border="1"> <tr> <td>90 to 100</td> <td>A</td> </tr> <tr> <td>80 to &lt; 90</td> <td>B</td> </tr> <tr> <td>70 to &lt; 80</td> <td>C</td> </tr> <tr> <td>60 to &lt; 70</td> <td>D</td> </tr> <tr> <td>&lt; 60</td> <td>F</td> </tr> </table>	90 to 100	A	80 to < 90	B	70 to < 80	C	60 to < 70	D	< 60	F		
90 to 100	A												
80 to < 90	B												
70 to < 80	C												
60 to < 70	D												
< 60	F												
<b>Grading Policy:</b>	<ul style="list-style-type: none"> <li>• The instructor reserves the right to adjust the grade distribution percentage, and decrease or increase the cut-off point between any two grades.</li> <li>• Late homework assignment and report will be accepted with a penalty of 20% per day. No homework, assignment and report handing in, no grade after one week of due date.</li> <li>• If you receive less than 40/100 in your 3rd exam, you will receive a D- or F, regardless of overall grades are higher than D-.</li> </ul>												
<b>Attendance and Exam Policy:</b>	<ul style="list-style-type: none"> <li>• Attendance is mandatory, and will be incorporated as a part of final grade.</li> <li>• No make-up exams. For excusable absence, the weight of missing exam will be added to that of next exam. WVU policy will be followed and will be at the discretion of the instructor.</li> <li>• For some reasons you must take the make-up Exam, the highest score for the make-up exam will be reduced to 70/100.</li> </ul>												
<b>Social Justice:</b>	<p>“The West Virginia University community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with the Office of Accessibility Services (293-6700). For more information on West Virginia University's Diversity Equity, and Inclusion initiatives, please see <a href="http://diversity.wvu.edu">http://diversity.wvu.edu</a>.</p>												
<b>Days of Special Concern:</b>	<p>Days of Special Concern are listed in the Schedule of Courses. They may choose to excuse absences resulting from these observances. Alternatively, they may choose to cover all reasons for student absences with a blanket absence policy. Students who will miss an examination or a field trip due to a Day of Special Concern absence should notify their instructors at the beginning of the term. Faculty are instructed to make reasonable accommodation for students who miss scheduled exams or field trips as a</p>												

	result of such observance.
<b>Ethic:</b>	<p>Integrity, trustworthiness and responsibility are central to the development of mature individuals. Students are expected to adhere to and practice the Code of Conduct of WVU, and maintain the highest standards of academic and professional integrity. Work that is not of the student's own creation will receive no credit. Student's ignorance is no legitimate defense for academic dishonesty. Academic dishonesty includes lying, cheating, stealing, and using unauthorized materials on any assignment, quiz or exam. Students shall refrain from using language or acting in a manner that is disrespectful/inappropriate towards other students and members of the WVU community. Sexual assault and harassment is inexcusable and shall result in disciplinary action in accordance with WVU policy. Students may not interrupt their classmates or professor, make fun of them, or disrupt the learning environment.</p> <p><b><u>Academic Honesty:</u></b>  Students are expected to conduct themselves in an ethical manner during this course. Cheating and Plagiarism will not be tolerated. Cheating in any way or form is unacceptable at WVU and may result in an F grade and disciplinary action, regardless of overall performance. See the Student Conduct Code at <a href="http://studentlife.wvu.edu/office_of_student_conduct/student_conduct_code/">http://studentlife.wvu.edu/office_of_student_conduct/student_conduct_code/</a></p>
<b>FE Examination and PE Registration:</b>	As part of the academic and professional development of young mining and Mineral Engineers, the Department of Mining Engineering encourages students to take the Fundamentals of Engineering (FE) exam and to then follow this by becoming registered as a Professional Engineer (PE).